Resource Gap Analysis in Nepalese Budgetary System

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Abstract

Resource gap analysis in the Nepalese budget system has attempted to focus on both the situation at the current level and the estimated future value. Therefore, the study has applied both the OLS and ECM models, to look at the GNS and GCF relation to GNI. The result has been compared to the current situation and the target level of performance in the future. With the analysis of unexplained residual factors, RGA in budgetary operation has been examined between GNI as a resource and what rate of resource would be needed to satisfy future needs at the national level. However, these models gave the same conclusion that resource gaps have got irregular with the rate of 12 per cent speed of disequilibrium. With this performance of resource gap, the government agency and others rigorously understood the resource it currently has and the need for resources to meet the goal. The forecasting further would also provide valuable suggestions for expanding other areas of development by diverting their capacity to correct the resource gap in the budgetary system.

Keywords: national income, saving, capital formation, budget, deficit financing

Background

The government budget is a set out of a plan that forecasts revenues and expenditures within a year (Shah, 2019). The budget is the deciding policy of a government that governs through revenues and expenditures (Singh, 2014& Shah, 2019). A good national budget is visualized major macroeconomic indicators of an existing condition and indicates the priorities of economic areas through the inclusion of new development projects for economic and social development in a year. Further, a budget is an instrument used to guide the efficient allocation of resources through expenditure allocation on an annual basis (Musgrave & Musgrave, 1984). Further, the budget is the means of policy building and implementation through the planning decision. It acts as the supporting framework for the policy and law of the government (Bhandari, 2010).

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The budget is the financial administration of revenue and expenditure that play a vital role in the functioning of the federal state (Shah, 2016). All the economics, financials, and social functions are influenced and operated either in surplus or deficit financing. The form and size of the budget also provide ingredient features of the country's level of development in the global economy. Most of the evidence proves that a transparent and appropriate execution of a budget can successfully accelerate the country's development in a timely and systematic way.

The state can establish a relationship with the national and international levels for the budget operation and implantation. A policy assignment by the government and different institutions and the people's demands have been documented in the budget. In a federal system, the assignment of the centre can be implemented through the budget delegation to other tiers of the government level. Implementation of fiscal federalism is based on the measures of diversity, equivalent, centralized redistribution, location neutrality, centralized stabilization, correction of spillover, minimum provision of public service, and equalization of the fiscal position in the country is heavily relies on the budgetary operation. The proper decentralization of authority power to the vertical level of government can be minimized the resource gap situation in tiers of government. The proper implication of budget then also can be increased completion among the inter jurisdiction. Thus, the budget is a means that provides to implement new policies in a federal system (Rao & Sen, 1995; Oates,1999; Ranjitkar, 2014).

Despite proper implications of budgetary operation can link people's desires. The heavy burden of deficit financing from the pre-federalism in the country can evade the post-fiscal federalism macroeconomic indicators of Nepal (JBR, 2009). The country's size of gross domestic product (GDP) has existed with a sluggish growth rate. This has indicated a low level of per capita income resulting in a wide gap between gross domestic saving (GDS) and gross capital formation (GCF) in the past (MOF/GON, 2008/09). Thus, the study focused to analyze the actual situation of the resource gap that prevails in the Nepalese budgetary operation system and making decisions for correcting measures on resource gap.

This study signified that the task became difficult for understanding the issue that resources must be a value and scarce for sustainable development. To understand these

issues, the impact of her two macroeconomic variables such as GNS and GCF should be compared to draw the actual resource gap in GNI. This resource has a scarce value is to achieve the current need of people. However, it has been hindering development action at the current time need. Therefore, the analysis has heavily taken into account the measurement of the current resource gap in a moral sense that has value in the future.

Statement of the Problems

Resource gap analysis in the budgetary system of Nepal has endeavored to the GNS and GCF relation on GNI at the current state of the situation. This is an attempt to compare that result to the target level of performance in the future. In other words, RGA in budgetary operation has been decided to examine the actual gap between GNI as a resource and what level of resource would be needed to satisfy future needs at the national level.

Nepal has been facing a severe resource gap problem for decades. The difference between growing expenditure and revenue received basis was the cause of increasing public debt to meet the budget deficit over the years. The study further focuses on the low revenue received has prevailed due to ineffective tax policy on both direct and indirect tax bases. The lack of a country's effective fiscal policy is another root cause of the resource gap problem. The continuation of RG has hindered the economic development of the country. In this context, the differences between the macroeconomic indicators like GNS and GCF have been taken RGA to examine the current trend of GNI received. The hindrance of the development function has not happened at the recent time would have been measured for correcting in a plan. If priority has been taken into mind, it would decide to account for reducing the gap between GNS and GCF in the future time.

Objective

To analyze the resource gap trends and speed in the study period of Nepalese budgetary operation.

Literature Review

The theoretical concept of resource gap (RG) is also known as a fiscal deficit, occurring the difference between expenditure and revenue in raw data. The second type of RG is a budget deficit, stirred by the difference between expenditure and revenue plus foreign grants (JBR, 2009). The third type of RG is an overall deficit, happening when

the difference between expenditure and revenue plus foreign aid (grant or loan) plus internal borrowings. In Economic Survey Report (MOF/GON, 2017/18) resource gaps have been shown in the difference between Gross National Saving and Gross Capital Formation/ Investment made in different periods. Similar data have been drowning through the handbook report of Nepal Rastra Bank (2014).

In an assessment, Bandari (2010) examined the potential output and the output gap relation by adopting different methodologies. The assessment has based on the assumption of no inflationary pressure on the economy. The study has concluded that the output gap relied on a relatively narrow band from the used methodology of the observations. Finally, the study has shown that people's demand narrowed due to the regular decline in factors productivity hindered the sustainable development of the economy of Nepal (Bhandari, 2010).

Intentionally, an attempt has gone to the research gap has applied of aforementioned three macroeconomic variables in the budgetary process of Nepal.

Methodology

Methods of this RGA of government budgetary process applied descriptive techniques data carried through the government agencies from FY 1990 to FY 2018. The macroeconomic indices such as the gross national income (GNI), gross national saving (GNS), and gross capital formation (GCF) at the current price have been used to indicate the budgetary resource gap in Nepal. Findings of the study have been described in the table, graph, and OLS estimation by using advanced excel and Eviews modules for using the statistical tools follows-

Regression analysis

The regression analysis of dependent GNI at the current price on GNS and GCF has followed the estimating model.

GNI= F (GNS, GCF, dist) in time period

Or, $Y= C+ b_1 X_1 +b_2 X_2 + u$

Where, Y= Gross National Income (GNI), X_1 = Gross National Saving (GNS) and X_2 = Gross Capital formation or investment. In a simple word, it is the remaining GNS and GCF which affect GNI, and b_1 and b_2 represented the explanatory coefficient of GNS and GCF for estimating the average equation in the system of GNI_t

$$GNI_t = C + b_1 GNS_t + b_2 GCF_t + u_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad 1$$

Where, C, b_1, and b_2 are parameters: C the intercept, b_1, and b_2 are the slope of GNI concerning GNS and GCF, an u_t the unexplained residuals factor of GNI by explaining GNS and GCF.

Estimation equation 1 has transformed into logarithms form. So that, the new log transforms OLS being a long-run association.

$$\ln GNI_t = C + b_1 \ln GNS_t + b_2 \ln GCF_t + u_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad 2$$

An Augmented Dicky-Fuller (ADF) Test has been done for the testing unit root of variables. For this, the following three models should be checked one by one.

Model 1: Intercept only $dY_t = b_1 + zy_{t-1} + a_i + e_t$

Model 2: Trend and Intercept $dy_t = b_1 + b_2 y_t + zy_{t-1} + a_i + e_t$

Model 3: No Trend and no Intercept $dy_t = zy_{t-1} + a_i + e_t$

For the decision, all three models should be stationary.

The log transform model has become a long run time series at the first difference level after checking co-integration.

$$d\ln(GNI_t)) = C + b_1 d\ln(GNS_t)) + b_2 d\ln(GCF_t) + u_t \quad 3$$

When introducing residual in equation 3 we have an error correction equation as given below

$$d\ln(GNI)) = C + b_1 d\ln(GNS)) + b_2 d\ln(GCF) + b_3 u_{t-1} + z \quad .4$$

Where, b_3 is the coefficient of the residual term (t-1) and z is the new residual in the system

Result and Discussion

Based on the observed data from 1990 to 2018, GNI has been looking at the increasing trend. However, another GCF alone was changed negatively in 1999 and both were changed negatively in 2002, 2014, and 2016 with a higher negative change in 2014. The details of the variables attribute have been generalized in descriptive analysis, in which the mean value of GNI in millionth rupees has stood at Rs.529198.0, followed by GNS Rs. 166663.8, and GCF by Rs. 164315.2 during the 29 years as has shown more detail in Table 1.

Table 1

Descriptive Statistics of the GNI, GNS, and GCF at Current Price by their Percentage Changes and Change in Stock, Sample Period from FY 1990 to 2018

Rs. In Million

	CGI	CGNI	GNS	CGNS	GCF	STOCK	CSTOCK
Mean	529198.0	12.84385	166663.8	15.61314	164315.2	13.47233	2348.548
Median	352917.0	12.71786	111180.6	15.27049	93019.50	18.40670	-1020.000
Maximum	1705721.	24.22929	681706.0	68.02566	624645.0	58.33115	75979.00
Minimum	105350.0	3.523807	10249.00	-86.81983	19076.00	-87.05185	-29125.00
Std. Dev.	440025.5	4.558526	179844.7	24.76851	165072.4	24.43964	25505.39
Skewness	1.376351	0.396474	1.607469	-2.167580	1.611068	-2.232307	1.065165
Kurtosis	3.846213	3.312474	4.580489	11.70391	4.391429	11.21942	3.976664
Jarque-Bera	10.02124	0.877740	15.50748	114.2500	14.88453	105.7192	6.636387
Probability	0.006667	0.644765	0.000429	0.000000	0.000586	0.000000	0.036218
Observations	29	29	29	29	29	29	29

Note. CGNI= Percentage change in GNI, CGNS= percentage change in GNS, CGCF= Percentage change in GCF, and CSTOCK=change in stock/inventory or the difference between GNS and GCF.

Source: Hand Book of Government Statistics, 2018; Economic Survey of Nepal 2017/2018.

Table 1 shows that the GNI has been found to fluctuate with a range maximum of 1705721 to a minimum of 105350.0 million during the 29 years, followed by the GNS with a maximum of 681706.0 and a minimum of 10249.0, and the GCF with maximum 624645.0 to minimum 19076.00 million respectively. Data further have indicated a higher standard deviation of all three macroeconomic variables rather than the change in their respective percentages. Similarly, all three variables have positively skewed rather than their respective percentage changes. Likewise, the values of kurtosis are good in these three variables, indicating good symptoms of normality. While the value of Jarque-Bera has higher than 10 per cent in these variables. Finally, the probabilities of these three variables have well at a 5 per cent level of significance rather than their respective percentages.

Even though, the descriptive statistics of these three variables hold good for further analysis, the respective percentages of these variables are not good. The Jarque-Bera of CGNI is not satisfactory to the other two variables. Similarly, probably of CGNI

is not significant at the 5 per cent level. Thus, in sum, the selected data is not normally distributed along with the 29 years. The study suggested testing another attribute for concluding.

From the aforementioned data, regression equation 1 has given the following results-

GNI= 119223.2 + 1.77248 GNS + 0.692402 GCF
SE = (22358.70) (0.693235) (0.755273)
R^2 = 0.969716, DW= 0.127646

The regression equation of the observed data has indicated that with the positive intercept of 119223.2, per unit change if GNI has influenced by 1.77248-unit positive change in GNS, followed by 0.692-unit change GCF per year. However, the result of the equation has based on the following rule of thumb.

1. The R^2 = 0.969716, means the dispersion of GNI by the dispersion of GNS and GCF has jointly 96 per cent is good.

2. Standard error (SE) is always representing the margin or the error of estimate at a 5 per cent level of significance. The coefficient of variables must be twice the corresponding value of SE.

3. The t- statistics is the ratio of the absolute value of coefficient to the SE is always representing, indicating that the calculated value of t-statistics must be greater than 2.

$$t - stat = \frac{coef}{SE} > 2$$

Now using the rule of thumb-

i. At C, t- stat is greater than 2 is significance.

ii. At GNS, a t-stat greater than 2 is the significance

iii. At GCF, a t-stat is less than 2 is insignificance.

iv. The value of DW= 0.127646, and is not just near 2.66 and also R^2 > DW. The estimation has got spurious or nonsense at raw data. For a good estimation $R^{2,}$ < DW is non-spurious.

There have been mixed results when we interpret the result of the regression line. The model suggested that the correlation between GNI and GCF has weaker. The weakness of the interpretation has suggested further calculation of unit rout of each variable one by one as given below-

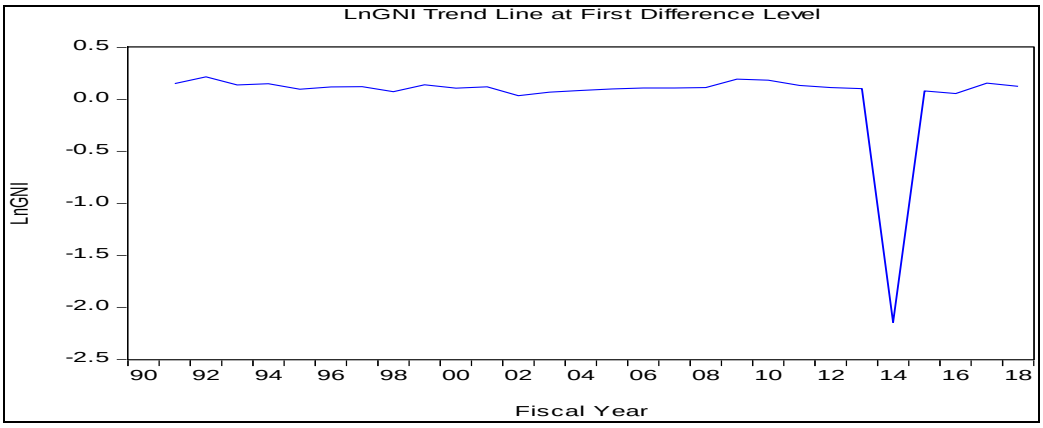
Analysis of GNI

The GNI figure at the current price is the money value of final goods and services that the produced in a year including net income from abroad. It is also known as factor income in net value. In other words, it is the sum of factors earned in the form of wages, rent, interest, and profit. In the budgetary process, government sources of revenue for maintaining expenditure in a different portfolio. Further, the disposable GNI is divided into consumption and saving/ investment as Disp GNI=C+S or I. Thus, consumption and saving are surely dependent upon National income.

In the budgetary system of Nepal, GNI was included as a factor of income during the period 1990 and then segregated into disposable income and factors earning till now. The economic importance of GNI during the 29 years has been non-stationary. The actual trend line of GNI has been de-trending in log GNI `at first difference level having non-stationary as in figure in figure 1.

Figure 1

GNI Trend Line by Log Transform at First Difference Level



Note. Ln= Natural logarithm

Figure 1 shows that LnGNI has almost got stationary at the first difference level. The graph itself detects the period 1991 to 2018, indicating the line is stationary from 1991 to 2013, became negative in 2014, and again stationary from 2015 to 2018. It was the abnormal situation in FY 2014 that was created by earth quack and blockade by India that affect macroeconomic indicators as reported mentioned by the economic survey (MOF/GON, 201718).

Now, the result of model 1 of the ADF unit root test at the first difference level, has been laid on

$d(LnGN_t)= 0.0339 – 1.01089\ LnGNI_{t-1} + a_i + e_t$, DW-stat=2.000327 and t_{cal}=-5.057> t_{crit}= -2.97 at 5 percent level of significance.

Similarly, all three models have got significance at the first difference level at 5 per cent level with calculated t-statistics is greater than tabulated value of t and D-W statistics around 2 has a satisfactory result for analyzing time series data in long run estimation.

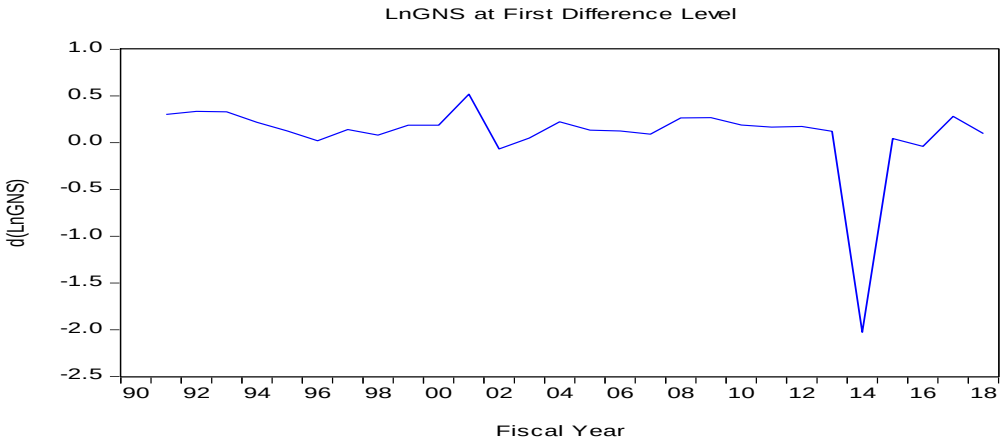
Analysis of GNS

Usually, GNS have derived by deducting final consumption expenditure (household and government) from gross national disposable income. It has consisted of personal savings plus business savings (including capital consumption allowance), retained business profit, plus government saving (excess of tax revenue over expenditure), but deducted foreign savings (import over export). Most of the figures are presented in percentage of GDP. A negative sign means dissaving or spending more income than produced, showing that drawing down gross national income and wealth (CIA Fact Book, 2018).

However, here we have analyzed the total figure of GNS with percentage change. The percentage change of GNS has 10.25 per cent in 2018, it was 32.26 per cent in 2017, but negative in 2002 (-6.26 per cent), 2014 (-86.82 per cent), and 2016 (-3.88 per cent). Thus, the figure has not stationary when the log is transformed at level, it has stationary when the log transforms at the first difference, as visualized in figure 2.

Figure 2

The Trend Line of GNS by log Transform at the First Difference Level



Note. Ln = Natural logarithm

Figure 2 shows that LnGNS at the first difference level automatically detects 1991 to 2018. The graph has stationary from 1991 to 2013, it was discontinuous in 2014, and have got stationary from 2015 to 2018.

However, the ADF- unit root of LnGNS indicated the following result.

Model 1: On the intercept form LnGNS has not stationary at level, but stationary at the first difference level and second difference level. For example, the model at the first difference level has given the result:

$d(lnGNS_t) = 0.789 - \quad 0.959 lnGNS_{t-1} + a_i + e_t,$

SE (0.087) (0.198)

Where, DW-stat = 2.012, and t_{cal}=-4.823> t_{crit}= -2.97 at 5 percent level of significance. Thus, LnGNS have no unit root at the first difference level.

Similarly, the other two models have no unit root at the first difference level.

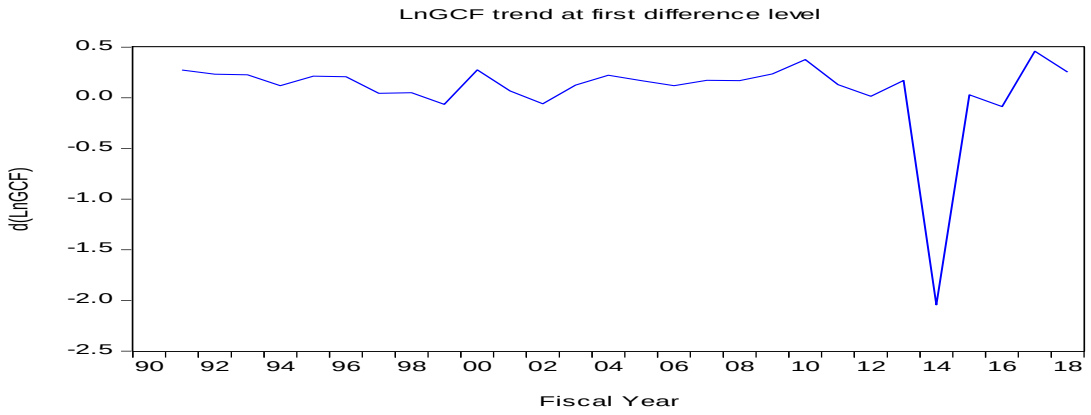
Analysis of GCF

The gross capital formation or gross domestic investment included total outlay made with fixed assets of the economy plus net changes in the level of inventories, a fixed asset with land improvement (fence, ditches, drain, etc), plant, machinery and equipment, and equipment purchase and construction of roads, railways, schools, colleges, and commercial and industrial building.

The study considered gross figures with percentage changes from FY 1990 to 2018. The percentage change in GCF has 28.77 percent in 2018; it was 58.33 percent in 2017, but it was negative in 1999 (-6.25%), 2002 (-5.71%), 2014 (-87.05%) and 2016 (-8.38%) respectively. The GCF has not stationary at the level and LnGCF have been tested for further analysis as shown in graph 3.

Figure 3

Trend Line of GCF by Log Transform at First Difference Level



Note. Ln= Natural logarithm

Graph 3 shows that GCF is automatically detected from FY 1991 to 2018 at the first difference level. The graph has got almost stationary from FY 1999 to 2013 and 2015 to 2018, but it has got negative in 1999, 2002, 2014, and 2016 respectively.

Further, the ADF unit root test of GCF has indicated the following results

Model 1: On the intercept form LnGCF has not stationary at level, but stationary at the first difference level and second difference level as the result is given below-

$D(LnGCF) = 0.667 \quad -0.986LnGCF_{t-1} + a_i + e_t$

SE (0.078) (0.199),

Where, DW-stat=2.004, and t_{cal}=-4.93> t_{crit}= -2.97 at 5 percent level of significance. Thus LnGNS have not got unit root at first difference level or stationary.

Similarly, the other two models have not got unit root at the first difference level.

Integrated Model for GNI

After analysis of GNI, GNS and GCF it has been decided that these variables have got spurious at the raw level then the study has prescribed to transform in log form. The separated unit root at the different levels of each variable suggested only one equation that is appropriate for future prediction in the long-run model.

Now, running data according to model 3 that predetermined decision has provided result as in below-

$dln(GNI)) = -0.04486 + \quad 0.534dLn(GNS)) + \quad 0.452dLn(GCF))+u_t$

SE (0.016291) (0.120340) (0.119985)

R^2=0.96 <DW-stat=2.203077

Looking at the equation, the coefficients of LnGNS and LnGCF have positively related to the GNI. The dependence on LnGNI at the first difference level to those independent variables has an economically viable relationship, indicating that as GNS and GCF increased the volume GNI increased in the same direction. In other words, per unit change in GNI has positively been influenced by GNS and GCF by 0.534 % and by 0.52 % jointly. The model has a long-run association due to the following rules of thumb-

1. The probability (P-value) of each variable and joint probability (F- statistics) are less than 5 per cent means the model has significance.
2. The R^2 value (0.96) has less than Durbin-Watson statistics (2.203), a variable that has stationary
3. The Breusch- Godfrey serial correlation LM test of observed R^2= 5.364 with a corresponding P-value is 6 per cent indicating that residuals have a serial correlation.
4. The Heteroskedasticity test on Brusch-Pagan-Godfrey, obs. R^2= 2.223 corresponding P-value 33 per cent proved residuals have homoskedasticity.
5. In The histogram normality test of series residuals the value of Jarco-Bera (JB) =37 per cent and P-value=83 per cent indicating residuals are normally distributed, some problem is the JB test. It has symptoms of irregularity in residuals means the resource gap must have suffered the problems of disequilibrium.

ECM Model

The result of the ECM equation 4 has been given in the following form

$$dln(GNI_t)) = -0.0141 + 0.526\ dln(GNS)) + 0.463\ dln(GCF) - 0.1268\ u_{t-1} + z$$

SE (0.016671) (0.123087) (0.122634) (0.204504)

Where, R^2 =0.96<DW-stat=2.116

The ECM equation said that the coefficient of GNS and GCF are positive means there is a positive relationship between independent and dependent (GNI) variables, but there is a negative relation between GNI and unexplained residual factor. The coefficient of the residual sign has negative means the speed rate of disequilibrium leads GNI negatively influenced by residual at short run by 12 per cent. The residual has no unit root at the level means stationary for future prediction. Finally, the study surely identified that economic development remained inadequate and that the government was ignorant about relevant policy variables. This has been a severe limitation of the

government budgetary system in past. In the context of new fiscal federalism, the unexplained residual should be disaggregated into recognizable elements by developing new projects with advanced technology at the policy level and organizational knowledge. However, the gap is difficult to specify exactly how much yield in GNI, but the budget should be operating effectively for the well-being of people in a new context of the political and socio-economic environment.

The model has satisfied the resource gap analysis on the following rules

1. High R^2 value at 5 per cent significant level has satisfied,
2. No serial correlation in residuals has satisfied
3. No heteroscedasticity in residual has been satisfied, and
4. Residual should be normally distributed has satisfied

Conclusion

The resource gap in the Nepalese budgetary system is derived based on the regression model of dependent GNI concerning GNS and GCF. The first difference level is only on log transformation best fitted than other techniques. The model has been applied best after testing the unit root of each variable and the de-trend line of each response variable. Every three variables have no unit root at the first difference level, resulting in the best prediction of the study objectives. The estimated regression output of variables indicates both the GNS and GCF apply to the resource gap in the Nepalese budgetary system. The almost estimated de-trend line from the first difference level on given observations indicates that the resource gap in the Nepalese budgetary system has irregular means fluctuated in abnormal conditions and other political changes.

However it has got unpredictable at the data level, the derivation suggested, that it should be stationary at the current when government expands new development projects to meet the people's needs in the future. The study further opens the door to generalising the gap between potential GNI and actual GNI at the current time. Any freelance researcher and policy level can take lesions for analyzing resource gap on the immediate objective to meet the future need by reforming policy at present by improving the technique of planning to raise income bearing forces to constitute the resource gap. The study further, does not oppose other income depressing forces such as the growing

population, the transitional context of the socio-economic and political environment, and other existing administrative chaos in the country.

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