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TIME SERIES ANALYSIS OF FISCAL PARAMETERS: A STUDY OF UTTARAKHAND STATE

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Abstract

Fiscal assessment after an interval gives the real picture and scenario of the economic performance. A wide range of economic activities affects the economic variables as a large scale which direct affect the fiscal health of an economy, considerably global economic pattern create the landscape for small level economies. The impacts of global economic activities also pump-up theeconomic boost as well as economic slowdown. In the case of Indian State 'Uttarakhand' very less attention given to carry out the fiscal stimulus in the State. However, the Revenue Deficit of the State is below critical situation and effective revenue deficit is also in superior state, the major troubles are in two key indicators also such as debt stance and primary deficit in the state. This paper will analysis the time series trend analysis of these pointer frameworks and will give appropriate suggestions to way forward in the pioneer fiscal soundness.

Keywords: Fiscal Deficit, Debt Sustainability, GSDP Growth Rate, Primary Deficit, Revenue Deficit, Debt to GSDP Ratio

Introduction

Stability in fiscal viability and fiscal consolidation determine the inner strength of economic independency, multi economic factors create a wide range of space and scope for economic righteousness. Some of the economic indicators drive the economy in falsehood an hallucination state, such variables represent significant progress and leap forward in economic development. These volatile factors create paradox and trade-off in the economy, the real outcome of the economy can be identifying with simultaneous economic agents and variables. Gross Domestic Product (GDP) used as a universal parameter to determine the economic development.

It is generalised if GDP of the economy shows the positive rays, there will be high employment, low poverty, low fiscal deficit, low revenue deficit, minimum primary deficit, low debt to GDP ratio etc. it is often quoted as trade-off among these variables. But, in actual economic world there may be paradox among these variables, in the case of our research area, it was identified that even higher GSDP does not strike on these supplementary economic indicators.

Review of Literature

Marcelo Piancastelli (1985) this paper discussed the detail update of the measurement of the tax effort made by governments in developed economies and less developed economies. And to measure the fiscal health various indicators has been used like, per capita income, trade to GDP, tax to GDP ratio moreover tax effort index has been used by the author to indicate the fiscal performance of the countries.

Atul Sharma (2002) this paper assessed the fiscal reforms initiated in the 90s by the governmentof India to improve the financial health of the Centre and the States. Only after 1991 governmentstarts thinking about to reduce the fiscal and primary deficit in the country's economy, which result the expenditure of the Central Government also came down.

Objectives of the Study

- To examine the revenue and expenditure of the Uttarakhand State government.
- To examine the tax to GDP ratio performance of Uttarakhand State.
- To examine the fiscal performance of Uttarakhand State.

Research Methodology

The present study is based on secondary data, and the research is qualitative and descriptive in nature. Coefficient of correlation is used to know the relationship between two variables, though coefficient assumes that there is linear relationship between the two variables either positive or negative. But the degree of correlation can be computed how, the two variables are related to one-another.

Methodology of VAR

In forecasting two or more time series, we have gone beyond the ARIMA and ARMA model andused Vector Autoregressive Models (VARs) for this purpose. Here in VAR, we have oneequation for each variable and each equation have only the lagged values of that variable and the lagged values of all other variables in the system. For the case of univariate time series, in VAR we need the time series to be stationary. When each variable in the VAR is stationary then each equation can be estimated by using ordinary least square method OLS. In the studies of macroeconomic problem, it is more common issue, where we have models in which some variables are not only exogenous variables for a given dependent variable; but also explained by the variables that they are used to determine. Therefore, in such cases we have simultaneous equation models, where it is necessary to identify the endogenous and exogenous variables of the system.

Model Used

There has been six various economic model used to analysis the fiscal indicators and their performance. For instance, in equation one fiscal deficit depends upon six variables and two lags of each variable. Similarly, six equations are constructed and each equation has six variables and one intercept and each variable has two lags.

Equation - 1:

$$\begin{aligned} \boldsymbol{FDEF} = {} & \boldsymbol{C_1 FDEF(-1) + C_2 FDEF(-2) + C_3}\left(\frac{\boldsymbol{Rev.Exp.}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-1) + C_4}\left(\frac{\boldsymbol{Rev.Exp.}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-2) + C_5}\left(\frac{\boldsymbol{Debt}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-1)} \\ & \boldsymbol{+ C_6}\left(\frac{\boldsymbol{Debt}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-2) + C_7}\left(\frac{\boldsymbol{Tax\ Rev}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-1) + C_8}\left(\frac{\boldsymbol{Tax\ Rev}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-2) + C_9 GSDP\ Growth(-1)} \\ & \boldsymbol{+ C_{10} GSDP\ Growth(-2) + C_{11} Tax\ Buo\ UTK(-1) + C_{12} Tax\ Buo\ UTK(-2) + C_{13}} \end{aligned}$$

Equation-2:

$$\begin{aligned} \left(\frac{\boldsymbol{Rev.Exp.}}{\boldsymbol{GSDP}}\right) = {} & \boldsymbol{C_{14} FDEF(-1) + C_{15} FDEF(-2) + C_{16}}\left(\frac{\boldsymbol{Rev.Exp.}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-1) + C_{17}}\left(\frac{\boldsymbol{Rev.Exp.}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-2) + C_{18}}\left(\frac{\boldsymbol{Debt}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-1)} \\ & \boldsymbol{+ C_{19}}\left(\frac{\boldsymbol{Debt}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-2) + C_{20}}\left(\frac{\boldsymbol{Tax\ Rev}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-1) + C_{21}}\left(\frac{\boldsymbol{Tax\ Rev}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-2) + C_{22} GSDP\ Growth(-1)} \\ & \boldsymbol{+ C_{23} GSDP\ Growth(-2) + C_{24} Tax\ Buo\ UTK(-1) + C_{25} Tax\ Buo\ UTK(-2) + C_{26}} \end{aligned}$$

Equation-3:

$$\begin{aligned} \left(\frac{\boldsymbol{Debt}}{\boldsymbol{GSDP}}\right) = {} & \boldsymbol{C_{27} FDEF(-1) + C_{28} FDEF(-2) + C_{29}}\left(\frac{\boldsymbol{Rev.Exp.}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-1) + C_{30}}\left(\frac{\boldsymbol{Rev.Exp.}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-2) + C_{31}}\left(\frac{\boldsymbol{Debt}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-1)} \\ & \boldsymbol{+ C_{32}}\left(\frac{\boldsymbol{Debt}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-2) + C_{33}}\left(\frac{\boldsymbol{Tax\ Rev}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-1) + C_{34}}\left(\frac{\boldsymbol{Tax\ Rev}}{\boldsymbol{GSDP}}\right)\boldsymbol{(-2) + C_{35} GSDP\ Growth(-1)} \\ & \boldsymbol{+ C_{36} GSDP\ Growth(-2) + C_{37} Tax\ Buo\ UTK(-1) + C_{38} Tax\ Buo\ UTK(-2) + C_{39}} \end{aligned}$$

Equation-4:

$$\left(\frac{Tax\ Rev}{GSDP}\right) = C_{40}FDEF(-1) + C_{41}FDEF(-2) + C_{42}\left(\frac{Rev.Exp.}{GSDP}\right)(-1) + C_{43}\left(\frac{Rev.Exp.}{GSDP}\right)(-2) + C_{44}\left(\frac{Debt}{GSDP}\right)(-1) + C_{45}\left(\frac{Debt}{GSDP}\right)(-2) + C_{46}\left(\frac{Tax\ Rev}{GSDP}\right)(-1) + C_{47}\left(\frac{Tax\ Rev}{GSDP}\right)(-2) + C_{48}GSDP\ Growth(-1) + C_{49}GSDP\ Growth(-2) + C_{50}Tax\ Buo\ UTK(-1) + C_{51}Tax\ Buo\ UTK(-2) + C_{52}$$

Equation - 5:

$$GSDP\ Growth = C_{53}FDEF(-1) + C_{54}FDEF(-2) + C_{55}\left(\frac{Rev.Exp.}{GSDP}\right)(-1) + C_{56}\left(\frac{Rev.Exp.}{GSDP}\right)(-2) + C_{57}\left(\frac{Debt}{GSDP}\right)(-1) + C_{58}\left(\frac{Debt}{GSDP}\right)(-2) + C_{59}\left(\frac{Tax\ Rev}{GSDP}\right)(-1) + C_{60}\left(\frac{Tax\ Rev}{GSDP}\right)(-2) + C_{61}GSDP\ Growth(-1) + C_{62}GSDP\ Growth(-2) + C_{63}Tax\ Buo\ UTK(-1) + C_{64}Tax\ Buo\ UTK(-2) + C_{65}$$

Equation-6:

$$Tax\ Buo\ UTK = C_{66}FDEF(-1) + C_{67}FDEF(-2) + C_{68}\left(\frac{Rev.Exp.}{GSDP}\right)(-1) + C_{69}\left(\frac{Rev.Exp.}{GSDP}\right)(-2) + C_{70}\left(\frac{Debt}{GSDP}\right)(-1) + C_{71}\left(\frac{Debt}{GSDP}\right)(-2) + C_{72}\left(\frac{Tax\ Rev}{GSDP}\right)(-1) + C_{73}\left(\frac{Tax\ Rev}{GSDP}\right)(-2) + C_{74}GSDP\ Growth(-1) + C_{75}GSDP\ Growth(-2) + C_{76}Tax\ Buyo\ UTK(-1) + C_{77}Tax\ Buo\ UTK(-2) + C_{78}$$

Where,

$\boldsymbol{FDEF}$ **– Fiscal Deficit.**

$\left(\frac{Rev.Exp.}{GSDP}\right)$ **– Revenue Expenditure to GSDP ratio.**

$\left(\frac{Debt}{GSDP}\right)$ **- Debt to GSDP ratio.**

$\left(\frac{Tax\ Rev}{GSDP}\right)$ **- Tax Revenue to GSDP ratio.**

$\boldsymbol{GSDP\ Growth}$ **- GSDP growth rate of Uttarakhand.**

$\boldsymbol{Tax\ Buyo\ UTK}$ **– Tax buoyancy of Uttarakhand.**

Vector Auto Regressive (VAR) Model and Result interpretation

For the analysis purpose we first tested for stationarity test and then gone for co-integration test. After that, we use vector autoregressive model for estimation, as it has merits over single equation model like autoregressive distributed lag model (ARDL)**.** At first level, we tested the stationarity test, because a forecasting and reliability of the result depends on the nature and pattern of the data. It means, if we have data series, which do not havemean, variance, and

covariance constant over time then reliability of the result and forecasting based on that, would be in question. Therefore, the statistical properties must be unchanged with time.

(i) Constant Mean: E (y_t) = E (y_{t-k}) = □

(ii) Constant variance: E[y_t - □]^2=E [y_{t-k} -□]^2 = ε_0 = □^{2}>0

(iii) Constant covariance: E(Y_t -□) (Y_{t-k} - □)= ε_j.

Stationarity Result:-1 (DEBT _TO_GSDP_RATIO)

Null Hypothesis: D(DEBT_TO_GSDP_RATIO_IN_TH) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on AIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.652960	0.0595
Test critical values:	1% level	-4.728363	
	5% level	-3.759743	
	10% level	-3.324976	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations

and may not be accurate for a sample size of 15

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(DEBT_TO_GSDP_RATIO_IN_TH,2)

Method: Least Squares

Date: 10/18/20 Time: 00:48

Sample (adjusted): 3 17

Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (DEBT_TO_GSDP_RATIO_IN_TH(-1))	-1.069910	0.292889	-3.652960	0.0033
C	1.135319	3.429498	0.331045	0.7463
@TREND("1")	-0.189146	0.349737	-0.540826	0.5985

R-squared	0.533939	Mean dependent var	-0.164000
Adjusted R-squared	0.456262	S.D. dependent var	7.537105
S.E. of regression	5.557755	Akaike info criterion	6.445122
Sum squared resid	370.6637	Schwarz criterion	6.586732
Log likelihood	-45.33842	Hannan-Quinn criter.	6.443614
F-statistic	6.873847	Durbin-Watson stat	1.909711
Prob(F-statistic)	0.010248		

In the process of determinants investigation, first we run the stationarity test and found that the variable debt to GSDP ratio is stationary at first. As in stationarity result – 1 the probability value is equal to 0.05, which reflect that the null hypothesis of having unit root is rejected at 5% level of significance. However, it was not stationary at level so we have taken first difference and after that it is found stationary. Considering the data generating process, we can observe that the variable debt to GSDP ratio is stationary at first difference with trend and intercept.

Stationarity Result:-2 (FISCAL_DEFICIT)

Similarly, the variable fiscal deficit also found non-stationary at level, but taking first difference it is found stationary. Its probability value at first difference is equal to 0.05. Which reflects that the null hypothesis of non-stationarity is not accepted and the variable fiscal deficit in Crore is stationary. The data generating process shows that the series is stationary with intercept.

Stationarity Result:-3 (GDP_GROWTH)

The stationarity test for GDP growth data series also depicts that the series is stationary at first difference. The probability value is equal to 0.05 at first difference means the data series do not have unit root or stationary at first difference.

Stationarity Result:-4 (REVENUE EXPENDITURE _GSDP Ratio)

The above table representing the stationarity test for the variable revenue expenditure to GSDP ratio. The data series is stationary with trend and intercept after taking first difference. This infers that the mean, variance, and co-variance is constant over time after taking first difference. The probability value of this test is 0.0409 which is less than 0.05 means the series do not have unit root and stationary in nature.

Stationarity Result:-5 (TAX_BUOYANCY IN THE STATE)

Similarly to the above given explanation, the data series related to tax buoyancy is stationary at first difference with intercept not with trend, as reflected by data generating process. Here null hypothesis of unit root is rejected and alternative hypothesis for stationarity of series accepted.

Stationarity Result:-6 (TAX_TO_GSDP RATIO IN UTTARAKHAND)

The variable tax to GDP ratio of Uttarakhand series is not stationary at level. Therefore, we have gone at first level and found the stationary data series at first difference. At first difference, the probability value is 0.0304, which is less than 0.05. The data generating process reflecting that after first difference the series stationary with intercept.

As the whole data series is stationary at first difference, we have tested for co-integration test which is found no co-integration. Therefore, we have gone for vector auto-regressive model (VAR model of estimation). The model used, has its own merits over single equation ARDL model. As it reduces the problem in single equation model and also captures the problem of simultaneity. By using this model, we shall be able to run regression and can investigate about the determinants and strength of a particular variable.

Result and Discussion: Determinants of Fiscal Performance

For the purpose of the determinants of fiscal performance, measurement of the relative strength of a particular variable and investigate the impact of past values of a variables on the present and future values of associated variables, present researcher used VAR model. The detailed methodology is mentioned in methodology.

Here we have estimated six models, because we have six variables (including all endogenous andexogenous variables). We have first tested the stationarity test of the data and found that the series are stationary at first difference (mentioned above in stationarity test result). After that we have gone for co-integration test and found no co-integration (variables are not co-integrated). Therefore, we used unrestricted VAR for our estimation the result is mentioned below.

VAR Result

Vector Autoregression Estimates
Sample (adjusted): 3 17
Included observations: 15 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	FISCAL_DEFICIT__	EXP_TO_GSDP_RATIO	DEBT_TO_GSDP_RATIO_IN_TH	TAX_REVENUE_TO_GDP	GDP_GROWTH	TAX_BUOYANCY_IN_THE_STAT
FISCAL_DEFICIT__(-1)	-1.055887	-0.003050	7.916097	-0.040217	1.821646	-0.422253
	(0.75843)	(2.78368)	(4.52065)	(0.98468)	(1.31888)	(0.61706)
	[-1.39221]	[-0.00110]	[1.75110]	[-0.04084]	[1.38121]	[-0.68430]
FISCAL_DEFICIT__(-2)	0.001543	1.382949	-0.020167	0.538358	1.988957	-0.076265
	(0.18433)	(0.67654)	(1.09869)	(0.23932)	(0.32054)	(0.14997)
	[0.00837]	[2.04414]	[-0.01836]	[2.24957]	[6.20506]	[-0.50854]
EXP_TO_GSDP_RATIO(-1)	0.342365	1.030938	0.568384	0.016144	0.301856	-0.015923
	(0.06411)	(0.23532)	(0.38215)	(0.08324)	(0.11149)	(0.05216)
	[5.33999]	[4.38105]	[1.48733]	[0.19395]	[2.70745]	[-0.30526]
EXP_TO_GSDP_RATIO(-2)	0.418579	-0.497537	-2.951640	-0.046799	-1.146729	0.188856
	(0.28868)	(1.05954)	(1.72067)	(0.37479)	(0.50200)	(0.23487)
	[1.44999]	[-0.46958]	[-1.71540]	[-0.12487]	[-2.28433]	[0.80410]
DEBT_TO_GSDP_RATIO_IN_TH(-1)	-0.091906	-0.124871	0.684379	-0.117699	-0.017543	-0.017836
	(0.10034)	(0.36828)	(0.59809)	(0.13027)	(0.17449)	(0.08164)
	[-0.91594]	[-0.33906]	[1.14428]	[-0.90347]	[-0.10054]	[-0.21848]
DEBT_TO_GSDP_RATIO_IN_TH(-2)	0.021025	-0.215680	-0.784664	-0.039012	-0.108221	0.049875
	(0.07088)	(0.26014)	(0.42246)	(0.09202)	(0.12325)	(0.05766)
	[0.29664]	[-0.82909]	[-1.85736]	[-0.42395]	[-0.87805]	[0.86492]
TAX_REVENUE_TO_GDP(-1)	0.576319	-1.489433	-9.113411	0.195741	-1.066308	0.217897
	(0.50431)	(1.85098)	(3.00595)	(0.65475)	(0.87697)	(0.41030)
	[1.14279]	[-0.80467]	[-3.03179]	[0.29895]	[-1.21590]	[0.53106]
TAX_REVENUE_TO_GDP(-2)	-0.622320	-0.341213	2.193463	-0.150591	0.559656	0.058733
	(0.45446)	(1.66803)	(2.70884)	(0.59004)	(0.79029)	(0.36975)
	[-1.36935]	[-0.20456]	[0.80974]	[-0.25522]	[0.70816]	[0.15885]
GDP_GROWTH(-1)	-0.595071	0.166848	2.576910	0.129753	-0.062597	-0.065071
	(0.16931)	(0.62142)	(1.00918)	(0.21982)	(0.29442)	(0.13775)
	[-3.51470]	[0.26849]	[2.55348]	[0.59027]	[-0.21261]	[-0.47239]
GDP_GROWTH(-2)	-0.504772	0.301914	5.329110	-0.093734	1.835682	-0.422996
	(0.37218)	(1.36603)	(2.21840)	(0.48321)	(0.64721)	(0.30281)
	[-1.35626]	[0.22102]	[2.40223]	[-0.19398]	[2.83631]	[-1.39692]
TAX_BUOYANCY_IN_THE_STAT(-1)	-4.170773	-4.232466	17.86943	-1.626094	-2.769967	0.049853
	(1.12643)	(4.13438)	(6.71415)	(1.46247)	(1.95882)	(0.91646)
	[-3.70264]	[-1.02372]	[2.66146]	[-1.11188]	[-1.41410]	[0.05440]

TAX_BUOYANCY_IN_THE_STAT(-2)	-0.385936	3.480569	14.26649	0.501677	7.754211	-1.968756
	(1.21299)	(4.45207)	(7.23007)	(1.57484)	(2.10934)	(0.98689)
	[-0.31817]	[0.78179]	[1.97322]	[0.31856]	[3.67614]	[-1.99492]
C	11.74358	30.42683	-7.549470	14.75991	-2.090957	4.001381
	(6.87682)	(25.2402)	(40.9896)	(8.92831)	(11.9585)	(5.59497)
	[1.70770]	[1.20549]	[-0.18418]	[1.65316]	[-0.17485]	[0.71517]
R-squared	0.988864	0.979827	0.955261	0.949521	0.988223	0.892471
Adj. R-squared	0.922046	0.858786	0.686826	0.646646	0.917563	0.247295
Sum sq. resids	0.828104	11.15570	29.42105	1.395880	2.504177	0.548158
S.E. equation	0.643469	2.361747	3.835430	0.835428	1.118968	0.523526
F-statistic	14.79942	8.095043	3.558631	3.135028	13.98561	1.383299
Log likelihood	0.440920	-19.06333	-26.33653	-3.475141	-7.858402	3.535231
Akaike AIC	1.674544	4.275110	5.244871	2.196685	2.781120	1.261969
Schwarz SC	2.288188	4.888754	5.858514	2.810329	3.394764	1.875613
Mean dependent	4.335732	24.45747	33.44733	9.813588	10.88400	1.616000
S.D. dependent	2.304668	6.284850	6.853639	1.405414	3.897240	0.603428
Determinant resid covariance (dof adj.)		0.000000				
Determinant resid covariance		0.000000				

In the above result the first, second and third row shows the coefficients, standard error and t- statistics respectively. The R- square for the each model is high. However, the adjusted R-square for is also high except the last model related to tax buoyancy in the state. For the significanceand probability value (p-value) we have estimated each equations separately and the result is mentioned below.

Result of Estimation

System: UNTITLED
Estimation Method: Least Squares
Sample: 3 17
Included observations: 15
Total system (balanced) observations 90

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-1.055887	0.758427	-1.392207	0.1891
C(2)	0.001543	0.184327	0.008371	0.9935
C(3)	0.342365	0.064113	5.339995	0.0002
C(4)	0.418579	0.288676	1.449994	0.1727
C(5)	-0.091906	0.100341	-0.915940	0.3777
C(6)	0.021025	0.070876	0.296639	0.7718
C(7)	0.576319	0.504307	1.142793	0.2754
C(8)	-0.622320	0.454462	-1.369355	0.1960
C(9)	-0.595071	0.169309	-3.514698	0.0043
C(10)	-0.504772	0.372180	-1.356257	0.2000
C(11)	-4.170773	1.126431	-3.702644	0.0030
C(12)	-0.385935	1.212987	-0.318170	0.7558
C(13)	11.74357	6.876819	1.707705	0.1134
C(14)	-0.003050	2.783683	-0.001096	0.9991
C(15)	1.382949	0.676543	2.044142	0.0635
C(16)	1.030938	0.235318	4.381047	0.0009

C(17)	-0.497537	1.059539	-0.469578	0.6471
C(18)	-0.124871	0.368285	-0.339061	0.7404
C(19)	-0.215680	0.260140	-0.829091	0.4232
C(20)	-1.489433	1.850977	-0.804674	0.4367
C(21)	-0.341213	1.668028	-0.204561	0.8413
C(22)	0.166848	0.621422	0.268494	0.7929
C(23)	0.301914	1.366027	0.221016	0.8288
C(24)	-4.232466	4.134381	-1.023724	0.3262
C(25)	3.480569	4.452069	0.781787	0.4495
C(26)	30.42683	25.24024	1.205489	0.2512
C(27)	7.916050	4.520467	1.751157	0.1054
C(28)	-0.020324	1.098702	-0.018498	0.9855
C(29)	0.568357	0.382158	1.487227	0.1628
C(30)	-2.951558	1.720595	-1.715429	0.1119
C(31)	0.684373	0.598118	1.144209	0.2748
C(32)	-0.784648	0.422463	-1.857319	0.0880
C(33)	-9.113336	3.005966	-3.031749	0.0104
C(34)	2.193339	2.708916	0.809674	0.4339
C(35)	2.576940	1.009182	2.553494	0.0253
C(36)	5.329098	2.218359	2.402270	0.0334
C(37)	17.86931	6.713924	2.661531	0.0207
C(38)	14.26651	7.229878	1.973271	0.0719
C(39)	-7.549994	40.99004	-0.184191	0.8569
C(40)	-0.040217	0.984681	-0.040843	0.9681
C(41)	0.538358	0.239316	2.249572	0.0440
C(42)	0.016144	0.083240	0.193950	0.8495
C(43)	-0.046799	0.374794	-0.124866	0.9027
C(44)	-0.117699	0.130275	-0.903467	0.3841
C(45)	-0.039012	0.092020	-0.423951	0.6791
C(46)	0.195741	0.654752	0.298954	0.7701
C(47)	-0.150591	0.590037	-0.255223	0.8029
C(48)	0.129753	0.219818	0.590274	0.5660
C(49)	-0.093734	0.483209	-0.193981	0.8494
C(50)	-1.626094	1.462468	-1.111883	0.2880
C(51)	0.501677	1.574844	0.318556	0.7555
C(52)	14.75991	8.928308	1.653158	0.1242
C(53)	1.821646	1.318876	1.381211	0.1924
C(54)	1.988957	0.320538	6.205059	0.0000
C(55)	0.301856	0.111491	2.707454	0.0190
C(56)	-1.146729	0.501997	-2.284334	0.0414
C(57)	-0.017543	0.174489	-0.100539	0.9216
C(58)	-0.108221	0.123251	-0.878049	0.3972
C(59)	-1.066308	0.876971	-1.215899	0.2474
C(60)	0.559656	0.790292	0.708164	0.4924
C(61)	-0.062597	0.294422	-0.212609	0.8352
C(62)	1.835682	0.647208	2.836311	0.0150
C(63)	-2.769967	1.958821	-1.414100	0.1827
C(64)	7.754211	2.109337	3.676136	0.0032
C(65)	-2.090957	11.95852	-0.174851	0.8641
C(66)	-0.422253	0.617056	-0.684303	0.5068
C(67)	-0.076265	0.149968	-0.508539	0.6203
C(68)	-0.015923	0.052163	-0.305261	0.7654
C(69)	0.188856	0.234867	0.804096	0.4370
C(70)	-0.017836	0.081637	-0.218478	0.8307
C(71)	0.049875	0.057665	0.864919	0.4040
C(72)	0.217897	0.410304	0.531062	0.6051
C(73)	0.058733	0.369750	0.158846	0.8764
C(74)	-0.065071	0.137750	-0.472387	0.6451
C(75)	-0.422996	0.302806	-1.396923	0.1877
C(76)	0.049853	0.916464	0.054397	0.9575
C(77)	-1.968756	0.986885	-1.994919	0.0693

C(78)	4.001381	5.594975	0.715174	0.4882
Determinant residual covariance		0.000000		

Equation – 1 :

$$FDEF = C_1 FDEF(-1) + C_2 FDEF(-2) + C_3 \left(\frac{Rev.Exp.}{GSDP}\right)(-1) + C_4 \left(\frac{Rev.Exp.}{GSDP}\right)(-2) + C_5 \left(\frac{Debt}{GSDP}\right)(-1) + C_6 \left(\frac{Debt}{GSDP}\right)(-2) + C_7 \left(\frac{Tax\ Rev}{GSDP}\right)(-1) + C_8 \left(\frac{Tax\ Rev}{GSDP}\right)(-2) + C_9 GSDP\ Growth(-1) + C_{10} GSDP\ Growth(-2) + C_{11} Tax\ Buo\ UTK(-1) + C_{12} Tax\ Buo\ UTK(-2) + C_{13}$$

Observations: 15

R-squared	0.988864	Mean dependent var	4.335732
Adjusted R-squared	0.922046	S.D. dependent var	2.304667
S.E. of regression	0.643469	Sum squared resid	0.828104
Durbin-Watson stat	2.944415		

The estimated result of equation – 1 reflects that the R square and adjusted R-Square both are high. Here three variables (first lag of expenditure to GSDP ratio, GSDP growth, and tax buoyancy) are found significant at 5% level of significant. This shows that the past value of one lag of these variables greatly determines the fiscal deficit of the Uttarakhand. The result finds its correlation with theoretical grounds and shows that if expenditure to GSDP ratio will increase, the fiscal deficit will also increase. Means it has negative impact on fiscal performance of the state. However, the one lag value of GSDP growth and tax buoyancy has positive impact on the fiscal performance of state, as it is negatively associated with tax buoyancy and GSDP growth. **Equation 2:**

$$\left(\frac{Rev.Exp.}{GSDP}\right) = C_{14} FDEF(-1) + C_{15} FDEF(-2) + C_{16} \left(\frac{Rev.Exp.}{GSDP}\right)(-1) + C_{17} \left(\frac{Rev.Exp.}{GSDP}\right)(-2) + C_{18} \left(\frac{Debt}{GSDP}\right)(-1) + C_{19} \left(\frac{Debt}{GSDP}\right)(-2) + C_{20} \left(\frac{Tax\ Rev}{GSDP}\right)(-1) + C_{21} \left(\frac{Tax\ Rev}{GSDP}\right)(-2) + C_{22} GSDP\ Growth(-1) + C_{23} GSDP\ Growth(-2) + C_{24} Tax\ Buo\ UTK(-1) + C_{25} Tax\ Buo\ UTK(-2) + C_{26}$$

Observations: 15

R-squared	0.979827	Mean dependent var	24.45747
Adjusted R-squared	0.858786	S.D. dependent var	6.284850
S.E. of regression	2.361747	Sum squared resid	11.15570
Durbin-Watson stat	2.795683		

In the second equation the R-square and Adjusted R-square both are high reflecting the good explanatory power of the model. However, in this model most of the coefficients are found insignificant. Only two variables fiscal deficit with lag two and one lag of expenditure to GSDP ratio found significant. Here fiscal deficit in the lag one period do not have impact on expenditure to GSDP ratio but the two period lag of fiscal deficit has great impact on the expenditure to GSDP ratio. On the other hand, it is seen that the expenditure to GSDP ratio is also greatly determined by its own one lagged value.

Equation 3:

$$\left(\frac{\boldsymbol{Debt}}{\boldsymbol{GSDP}}\right) = \boldsymbol{C_{27}FDEF(-1) + C_{28}FDEF(-2) + C_{29}\left(\frac{Rev.Exp.}{GSDP}\right)(-1) + C_{30}\left(\frac{Rev.Exp.}{GSDP}\right)(-2)} + \boldsymbol{C_{31}\left(\frac{Debt}{GSDP}\right)(-1) + C_{32}\left(\frac{Debt}{GSDP}\right)(-2) + C_{33}\left(\frac{Tax\ Rev}{GSDP}\right)(-1)} + \boldsymbol{C_{34}\left(\frac{Tax\ Rev}{GSDP}\right)(-2) + C_{35}GSDP\ Growth(-1) + C_{36}GSDP\ Growth(-2)} + \boldsymbol{C_{37}Tax\ Buo\ UTK(-1) + C_{38}Tax\ Buo\ UTK(-2) + C_{39}}$$

Observations: 15

R-squared	0.955261	Mean dependent var	33.44733
Adjusted R-squared	0.686826	S.D. dependent var	6.853639
S.E. of regression	3.835430	Sum squared resid	29.42105
Durbin-Watson stat	3.243332		

The Equation-3 gives some important result, as the R^2 and adj-R^2 both are good and six variables are found significant at 5% level of significant. The Debt to GSDP ratio is greatly determined by these variables having different relative strengths. The variables debt to GSDP ratio with two lag, tax revenue to GSDP ratio with a lag, GSDP growth with both lags and tax buoyancy with both the lags are significant.

Equation 4:

$$\left(\frac{\boldsymbol{Tax\ Rev}}{\boldsymbol{GSDP}}\right) = \boldsymbol{C_{40}FDEF(-1) + C_{41}FDEF(-2) + C_{42}\left(\frac{Rev.Exp.}{GSDP}\right)(-1) + C_{43}\left(\frac{Rev.Exp.}{GSDP}\right)(-2)} + \boldsymbol{C_{44}\left(\frac{Debt}{GSDP}\right)(-1) + C_{45}\left(\frac{Debt}{GSDP}\right)(-2) + C_{46}\left(\frac{Tax\ Rev}{GSDP}\right)(-1)} + \boldsymbol{C_{47}\left(\frac{Tax\ Rev}{GSDP}\right)(-2) + C_{48}GSDP\ Growth(-1) + C_{49}GSDP\ Growth(-2)} + \boldsymbol{C_{50}Tax\ Buo\ UTK(-1) + C_{51}Tax\ Buo\ UTK(-2) + C_{52}}$$

Observations: 15

R-squared	0.949521	Mean dependent var	9.813588
Adjusted R-squared	0.646646	S.D. dependent var	1.405414
S.E. of regression	0.835428	Sum squared resid	1.395880
Durbin-Watson stat	2.856152		

Here the above equation takes Tax to GSDP ratio as dependent variable and other six variables as independent equation. The regression result found only one variable as significant and reflecting no serious implications. Therefore, we move forward to equation 5.

Equation 5:

$$\boldsymbol{GSDP\ Growth} = \boldsymbol{C_{53}FDEF(-1) + C_{54}FDEF(-2) + C_{55}\left(\frac{Rev.Exp.}{GSDP}\right)(-1) + C_{56}\left(\frac{Rev.Exp.}{GSDP}\right)(-2)} + \boldsymbol{C_{57}\left(\frac{Debt}{GSDP}\right)(-1) + C_{58}\left(\frac{Debt}{GSDP}\right)(-2) + C_{59}\left(\frac{Tax\ Rev}{GSDP}\right)(-1)} + \boldsymbol{C_{60}\left(\frac{Tax\ Rev}{GSDP}\right)(-2) + C_{61}GSDP\ Growth(-1) + C_{62}GSDP\ Growth(-2)} + \boldsymbol{C_{63}Tax\ Buo\ UTK(-1) + C_{64}Tax\ Buo\ UTK(-2) + C_{65}}$$

Observations: 15

R-squared	0.988223	Mean dependent var	10.88400
Adjusted R-squared	0.917563	S.D. dependent var	3.897240
S.E. of regression	1.118968	Sum squared resid	2.504177
Durbin-Watson stat	3.256460		

The 5th Equation of the VAR result reflects the determinants of GSDP growth and found five variables as significant. These variables greatly determines the GSDP growth in Uttarakhand state. The variables fiscal deficit with lag two, expenditure to GSDP ratio with one and two lag, GSDP with one lag and two period lag of tax buoyancy greatly determines the GSDP in the state. The R-square and adj-R square both are high reflecting the model is appropriate for investigation.

Equation 6:

$$\boldsymbol{Tax\ Buo\ UTK = C_{66}FDEF(-1) + C_{67}FDEF(-2) + C_{68}\left(\frac{Rev.Exp.}{GSDP}\right)(-1) + C_{69}\left(\frac{Rev.Exp.}{GSDP}\right)(-2)}$$
$$\boldsymbol{+ C_{70}\left(\frac{Debt}{GSDP}\right)(-1) + C_{71}\left(\frac{Debt}{GSDP}\right)(-2) + C_{72}\left(\frac{Tax\ Rev}{GSDP}\right)(-1)}$$
$$\boldsymbol{+ C_{73}\left(\frac{Tax\ Rev}{GSDP}\right)(-2) + C_{74}GSDP\ Growth(-1) + C_{75}GSDP\ Growth(-2)}$$
$$\boldsymbol{+ C_{76}Tax\ Buyo\ UTK(-1) + C_{77}Tax\ Buo\ UTK(-2) + C_{78}}$$

Observations: 15

R-squared	0.892471	Mean dependent var	1.616000
Adjusted R-squared	0.247295	S.D. dependent var	0.603428
S.E. of regression	0.523526	Sum squared resid	0.548158
Durbin-Watson stat	2.748697		

The equation - 6 takes tax buoyancy of Uttarakhand as dependent variable and other six indicators as independent. The R-square and adj. R-square both are highly low and the all the indicators except tax buoyancy with two lag found insignificant.

Conclusion and Suggestions

Prosperity lead the foundation of financial righteousness and financial righteousness break the vicious cycle of economic backwardness.Every economy suffers the darkest era to stand alone for economic stability. There has been tremendous growth in all spheres of economic development and fiscal discipline in the state but still there are some shortcomings in fiscal consolidation and fiscal discipline in thestate and these are.

- The revenue expenditure of the state is very high then the capital expenditure.
- Non-plan expenditure still having larger part in the total expenditure.
- Tax to GSDP ratio is lower in the state.
- Own tax to GSDP ratio also below the 10 per cent.
- Debt to GSDP ratio is very high in the state.
- Fiscal deficit is not controllable.
- Primary deficit widening the gap of deficit.
- Interest payment is very high in the state.

These major shortcomings affecting the state financial position and fiscal health; therefore, state government needs to take corrective measures to overcome from these challenges.

1. The high revenue expenditure of the government worsens the fiscal deficit, as it has negative impact on fiscal performance of the state.
2. As the GSDP growth increases, it brings the better fiscal performance of the state. Therefore, the state must take measures to boost its GSDP growth via strengthening tourism (as the state has more potential in it), manufacturing, agro-processing and herbal and medicine industry.
3. The increase in the tax buoyancy, the government must find sources to boost its revenue and invest it to attract private investment.

Suggestions

The overall economic performance of Uttarakhand is appreciable and a matter of pride, the balanced economic development has taken place in the state, which is leading its economic development into the next level. There are large possibility of economic development and fiscal discipline in the state and this is possible if the state government initiates some corrective measures and these suggestions are.

- Increase the capital expenditure on various sectors such as Primary sector and tertiary sector also.
- Minimise the revenue expenditure as much as possible.
- Increase the tax to GSDP ratio in the state.
- Tax base need to be revised for better tax collection.
- Tax administration should work efficiently.
- A strong law should be enforced for tax evasion.
- Increase its fiscal capacity.
- Government should follow the path of fiscal consolidation.
- Government should fix some range of fiscal deficit, revenue deficit and primary deficit just likeinflation range in the country.
- Unnecessary government expenditure should minimise.

- Capital expenditure and receipts should also increase.

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