Determinants of Public Expenditure in Southern States of India: Panel Data Analysis

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ABSTRACT

The success of public expenditure depends on the government's efforts to ensure the effectiveness of the public expenditure with appropriate composition, but the major states in India failed to pay adequate attention. The objectives are the growth and trend of public expenditure in Southern States and to study the determinants of the growth of Public expenditure from 1990- 91 to 2013- 2014. In order to test trends in the revenue expenditure the tools namely panel testing have been applied for estimating the responsiveness of government expenditure to State Gross State Domestic Product (GSDP). The paper is divided into six sections. The first section is introductory in nature and the second discusses the various theoretical developments of public expenditure. Third section deals with objectives of the paper, fourth section deals with methodology. The fifth one provides the results and discussion, especially illustration of public expenditure, growth and composition public expenditure of southern states and lastly conclusions.

Keywords: Public expenditure; State finance; Economic growth; State gross state domestic product.

1.0 Introduction

Public expenditure is one of the most effective measures whereby different economic and social objectives of the country. The objectives mainly consists of the acceleration of the rate of economic growth, equitable distribution of income, improving the living standards, stabilization of economic activity, balanced regional development in addition to the orthodox classical objectives of defence, maintenance of law and order.

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It deals with empirical verification of various hypotheses and development models relating to public expenditure. For example , Wagner's 'Law of increasing State activities', Peacock and Wisemans hypothesis of the 'Displacement effect', Colin Clark's critical limit hypothesis, Baumol's 'Productivity-Lag hypothesis', Rostow's and Musgrave's development model and several empirical studies that were undertaken by various Economists to test the aforesaid hypotheses fall within the ambit of this aspect (Basu, 1995). Adolph Wagner, the famous German political Economist hypothesized a functional relationship between the growth of an economy and the relative growth of its public sector activity. Wagner referred to this as the "law of increasing extension of State activity".

2.0 Theoretical Perspective of Public Expenditure

The classical economist advocated laissez faire policy in the economic life of the people. The government restricted spending to a relatively small range of activities such as maintenance of law and order. Besides, they advocated balanced budget which lost its importance after the Great depression of 1930's.

The government in developing economy are resorting to stimulate growth process by enhancing public expenditure. Besides, public expenditure has an active role in reducing regional disparities, developing social overheads, creation of infrastructure for economic growth in the form of transport and communication facilities, education and training, growth of capital goods industries, basic and key industries, research and development and so on.

The pioneering study of Fabricant (1952) is worth mentioning. He argued that the 'Triko' variables such as per capita income, degree of urbanization and density of population explain 72 percentage of variation in expenditure differences among states. Besides, Tussing and Henning (1974) examined the determinants of public expenditure. However, these studies have not considered the influence of political factors on public expenditure.

Rao (1981) exposed the ideological leanings of the parties in power which do not effect significantly the level of expenditure in the state but intend to create imaginary output differentiation. On the stability consideration less stable government intend to increase public expenditure particularly on social and economic services to maximize their vote bank. Bhat and Patnaik (1991) examined the socio-economic and political factors influencing public expenditure of Indian states. They found that the recent drive for literacy rate and uplifting the scheduled caste and scheduled tribe population increased the burden of the state exchequer. These drives have taken place on vote

maximizing rationality in a particular political state and such a drive will continue for the other states for the same reasons. Hence, the variable determining the state expenditure would be the same irrespective of the political party in power. However, the degree of the impact will vary from one political state to another which has vote maximizing rationality by adopting particular levels of determinants of state expenditures.

Bhat and Patnaik (1991), considered dummy variable as a proxy for political variable in examining the impact of political factors on public expenditure. The quantification of political factors is questionable on the ground that it is not an appropriate measure. Further, it leads to the problem of errors in measurement. In this context, it is better to quantify the political factors as percentage of elected representatives of one party to the total elected representatives in a year. This is justified on the following grounds. The state government and Central government allocate certain amount for each constituency through elected representatives. Elected representatives will normally spend the same on the constituency with the rationality of vote maximizing principle. In this direction, no study exists in identifying the socio-economic and political determinants of public expenditure in a regional economy like Southern states of India. On the background, the paper attempts to investigate the impact of socio-economic and political factors influencing different components of state expenditure of Southern states for the period from 1991-92 to 2013-14.

2.1 Research problem

The role of the state has been widening and depending as a result maximizing welfare and developmental expenditure along with increasing population. State finance occupies a predominant role in economic and social developments of the people as states are nearer to the people than the centre. Though, Public expenditure is a means to achieve social well-being of the people and also promote Agriculture, Industry, Transport, Health and Development sectors intended to the welfare of the society. In the Indian federal setup, the centre and state government decide the composition of Public expenditure in India. The success of Public expenditure depends on the government's efforts to ensure the effectiveness of the Public expenditure with appropriate composition, but the major states in India failed to pay adequate attention to Public expenditure composition and its effectiveness. It is emerged from available literature most of the study in Public expenditure of state governments either concentrated on an expenditure item of the state governments or expenditure items in individual states. More importantly no specific work has been done for the southern states. Hence, the present study analyze the growth, trend and compositions of Public expenditure of southern states namely Andhra Pradesh, Karnataka, Kerala and Tamil Nadu which fall under the

category of major Indian states. Particularly, in the respect of the growth and composition of revenue expenditure of southern states from 1990- 1991 to 2013- 2014.

3.0 Objectives of the Paper

The objectives are to review the growth and trend of public expenditure in Southern States and to study the determinants of the growth of Public expenditure. The paper is divided into six sections. The first section is introductory in nature and the second discusses the various theoretical developments of public expenditure. Third section deals with objectives of the paper, fourth section deals with methodology. The fifth one provides the results and discussion, especially illustration of public expenditure, growth and composition public expenditure of southern states and lastly conclusions.

4.0 Research Methodology and Data Sources

The present study depends on secondary data from different published Government Reports like Economic Survey published by the Planning Department, Government of India for various years. Reviews on State Finances, published by the Reserve Bank of India, for various years. Five Year Plans, published by Planning Commission, Government of India. In addition to the above sources, many Studies, Reports, Status papers, working papers prepared by different Government Departments and Non-Governmental Organizations have also been consulted.

4.1 Statistical tools

In order to test trends in the revenue expenditure the tools namely panel testing have been applied for estimating the responsiveness of government expenditure to State Gross State Domestic Product (GSDP). Panel data regression model is also applied to test the state effect and time effect.

The study has covered all the aspects of Public expenditure. The study discussed progress of Public expenditure at various phases and sectoral compositions. Though the study covered all the aspects but there are certain areas not covered. The study covers only twenty four year of period from 1990-91 to 2013-2014.

The study has even though considered both development and non-developmental expenditure does not include capital expenditure of southern states. This study is purely based on the secondary data available in the report published by the state finances of RBI for four southern states. Further, the variables used in this study

highlight the composition of Public expenditure in general and this study puts more emphasis on revenue expenditure of southern states in particular.

5.0 Results and Discussion

5.1 Determinants of public expenditure in southern states

Classification of public expenditure refers to the systematic arrangement of different categories of government expenditure like Revenue and Capital Expenditure. *Revenue expenditure* relates to the normal running of government departments and various services, interest charges on debt incurred by the government and all transfers including grants given to the state government. *Capital Expenditure* is those expenditures of the Government which lead to the creation of physical or financial assets or reduction in recurring financial liabilities.

Developmental and Non Developmental Expenditure: Revenue and Capital Expenditure may be further divided or categorized into developmental and non-developmental expenditure. Generally, expenditures on Social and Economic Services are considered as developmental expenditure and expenditures on General Services are considered as a non-developmental expenditure.

Social services refer to education, sports, art and culture, medical and public health, family welfare, water supply and sanitation, housing, urban development etc. Economic services refer to agricultural and allied services, energy, industry, transport and communications. General Economic services like Secretariat (Economic Services), tourism, civil supplies and organs of state, fiscal services like collection of taxes and duties, interest payments and servicing of debt, and administrative services.

Plan and Non-Plan Expenditure (both revenue and capital) on the Plan schemes which are active in the current Five-Year Plan is termed plan expenditure and the rest of the expenditures, including that on the Plan schemes which were initiated in previous financial years but not included in the current Plan is referred to as non-plan expenditure. Plan revenue expenditure incurred on roads and bridges.

5.2 Per capita tax revenue

The size of tax revenue has considerable significance in influencing the growth of public expenditure as it represents the financial status of the state. Further, it influences the pattern and composition of production by the allocation of resources among different sectors.

5.3 Per capita income at current prices

It is associated with an increase in demand for social and economic services that result in the growth of public expenditure.

5.4 Per capita grants-in-aid

Grants-in-aid which constitute the revenue receipts of the state has a positive influence on public expenditure. Grants are given to cover the gap between revenue and expenditure needs of the states. Hence, an increase in grants is always followed by an increase in the outlay of the state government, thereby influencing the state government budgets. In addition, when the resources available with the state government increase, the budgetary income effect is created. Therefore, the grants-in-aid influence the public expenditure, positively.

Table 1 shows the determinant of public expenditure for Andre Pradesh during 1990-91 to 2013-14. Total public expenditure has been considered as the dependent variable, while it is explanatory variable in second stage analysis. It is noted that out of 16 variables, 7 variables show significant impact on the dependent variable. Further, one percent increase in gross domestic product lead to 79 percent increase in public expenditure. It is true as the growing income of the economy will eventually invite expenditure. The growing population will naturally incur more expenditure; one percent increase in population size will bring 35.4 percent increase in total expenditure in the next 10 years; one percent increase in economic service lead to 13.4 percent increase in Total Expenditure in the next 10 years; one percent increase in capital expenditure lead to 55 percent increase in total expenditure.

The total revenue receipts shows significant impact on total expenditure as revenue receipts increased by one percent, the total expenditure will increase 32.7 percent in the next 10 years. The coefficients for state tax, state capita tax, net tax and grants shows a significant impacts on the total expenditure but the relationship is negative. As it implies that those factors increase by one percent the total expenditure will get down.

In the second equation, GSDP has been taken as dependent variable and rest of 16 variables are explanatory variables. Out of 16 variables, 10 variables shows significant impact on dependent variable. The computed 'F' value is significant at 5 percent level shows the model is fit. It is clear if total expenditure increase by one percent the GSDP of Andhra Pradesh will boost up to 61.8 percent. It implies that increasing total public expenditure will bring growth in Gross State Domestic Product. There is positive relationship existing between total public expenditure and GSDP vice versa.

Table 1: Determinants of Public Expenditure in Andhra Pradesh: 1990-91 to 2013-14

Variables	Equation1	Equation 2
Log value of Total Expenditure	-	0.618** (2.59)
Log value of Gross State Domestic Product	0.790** (2.59)	-
Log value of Population	3.544 (0.70)	6.740 (1.73)
Log value of Economic Services	1.340 (0.96)	1.103 (0.89)
Log value of Social Services	1.649 (0.80)	1.462 (0.81)
Log value of Administrative Services	0.683 (0.27)	0.158 (0.74)
Log value of Revenue Expenditure	5.344 (1.09)	2.123 (0.46)
Log value of Capital Expenditure	0.555*** (24.90)	0.348** (2.63)
Log value of Development Expenditure	-3.726 (-0.71)	-0.764 (-0.16)
Log value of Non-developmental Expenditure	-.930 (-0.54)	0.565 (0.37)
Log value of Plan Expenditure	-.896 (-1.87)	1.022** (2.93)
Log value of Non-plan Expenditure	-1.433 (-0.80)	-2.529 (-1.86)
Log value of Transport Expenditure	3.271** (2.70)	2.707** (2.37)
Log value of State Tax Revenue	-1.609** (-2.81)	-1.357** (-2.55)
Log value of Share in Capital Tax (SCT)	-0.919*** (-3.23)	-0.754** (-2.73)
Log value States own Non-Tax (SNT)	-0.616** (-2.98)	-0.506** (-2.73)
Log value of Grants	-0.595** (-3.06)	-0.495** (-2.67)
Intercept	-64.78	-116.741
Observations	24	24
R^2	0.99	0.99
F	2448.5 (0.000)	1432.66 (0.000)

Source: RBI A Study on State Finance Various Years Mumbai.

Table 2: Determinants of Public Expenditure in Karnataka: 1990-91 to 2013-14

Variables	Equation1	Equation 2
Log value of Total Expenditure	-	0.350 (1.82)
Log value of Gross State Domestic Product	0.916 (1.82)	-
Log value of Population	0.554 (0.10)	4.148 (1.38)
Log value of Economic Services	-16.842** (-2.19)	5.828 (1.01)
Log value of Social Services	-21.4389** (-2.13)	7.452 (1.00)
Log value of Administrative Services	-0.712 (-0.93)	0.767 (1.88)
Log value of Revenue Expenditure	-0.920 (-0.17)	-0.660 (-0.20)
Log value of Capital Expenditure	0.425*** (5.93)	-0.178 (-2.08)
Log value of Development Expenditure	39.199** (2.45)	-13.052 (-1.04)
Log value of Non-developmental Expenditure	0.259 (0.18)	-0.148 (-0.17)
Log value of Plan Expenditure	0.059 (0.06)	0.034 (0.05)
Log value of Non-plan Expenditure	0.431 (0.12)	-0.072 (-0.03)
Log value of Transport Expenditure	5.323 (1.29)	4.930** (2.30)
Log value of State Tax Revenue	-4.004 (-1.63)	3.510 (2.95)
Log value of Share in Capital Tax (SCT)	-0.807 (-1.04)	0.715 (1.64)
Log value States own Non-Tax (SNT)	-0.574 (-1.15)	0.664** (2.95)
Log value of Grants	-0.409 (-1.12)	0.406** (2.14)
Intercept	-42.690 (-0.46)	-52.623 (-0.96)
Observations	24	24
R^2	0.99	0.99
F	1439.09	1448.31

Source: RBI A Study on State Finance Various Years Mumbai.

One percent increase in capital expenditure will bring 34.8 percent increase in GSDP. One percent increase in Plan expenditure will boost up GSDP of Andhra Pradesh about 10.2 percent in the next 10 years. In the case of grants, one percent increase in grant will make decline of GSDP of about 49.5 percent.

Table 2 express the determinants of public expenditure for Karnataka during 1990-91 to 2013-14. It is noted that out of 16 variables, 4 variables show significant impact on the dependent variable. Further, one percent increase in gross domestic product lead to 91 percent increase in Public Expenditure, but the coefficient is not significant. The growing population will eventually bring more expenditure, one percent increase in population size will bring 55.4 percent increase in total expenditure; one percent increase in social service expenditure lead to 21.4 percent increase in Total Expenditure in the next 10 years; one percent increase in capital expenditure lead to 42.5 percent increase in total expenditure.

In the second equation, GSDP has been taken as dependent variable and rest of 16 variables are explanatory variables. Out of 16 variables, 3 variables shows significant impact on dependent variable. The computed 'F' value is significant at 5 percent level shows the model is fit. If total expenditure increase by one percent the GSDP of Karnataka will boost up to 35 percent. It implies that increasing total public expenditure will bring growth in Gross State Domestic Product. There is positive relationship existing between total public expenditure and GSDP vice versa. One percent increase in revenue receipts will bring 49 percent increase in GSDP in the next 10 years. One percent increase in state net tax will boost up GSDP of Karnataka about 66.4 percent. In the case of grants, one percent increase in grant will increase GSDP of about 40.6 percent.

Table 3 shows the determinants of public expenditure for Kerala during 1990-91 to 2013-14. Out of 16 variables, 2 variables show significant impact on the dependent variable. One percent increase in gross domestic product lead to 32 percent increase in Public Expenditure, but the coefficient is not significant. The growing population will eventually bring more expenditure, one percent increase in population size will bring 21.8 percent increase in total expenditure; one percent increase in capital expenditure lead to 37.1 percent increase in Total Expenditure; one percent increase in non-plan expenditure lead to 57.8 percent increase in total expenditure in the next 10 years.

In the second equation, GSDP has been taken as dependent variable and rest of 16 variables are explanatory variables. Out of 16 variables, only two variables show significant impact on dependent variable. The computed 'F' value is significant at 5 percent level shows the model is fit. It is clear if total expenditure increase by one percent the GSDP of Kerala will boost up to 42 percent.

Table 3: Determinants of Public Expenditure in Kerala: 1990-91 to 2013-14

Variables	Equation1	Equation 2
Log value of Total Expenditure	-	0.418 (1.05)
Log value of Gross State Domestic Product	0.325 (1.05)	-
Log value of Population	2.181 (0.63)	-2.562 (-0.66)
Log value of Economic Services	-1.990 (-1.68)	-0.976 (-0.63)
Log value of Social Services	-3.966 (-1.71)	-1.589 (-0.52)
Log value of Administrative Services	0.118 (0.52)	-0.097 (-0.37)
Log value of Revenue Expenditure	-5.604 (-1.85)	-3.901 (-1.00)
Log value of Capital Expenditure	0.371*** (32.88)	-0.155 (-1.05)
Log value of Development Expenditure	5.774 (1.74)	2.090 (0.47)
Log value of Non-developmental Expenditure	-0.509 (-1.74)	0.633** (2.00)
Log value of Plan Expenditure	1.054 (1.71)	0.876 (1.15)
Log value of Non-plan Expenditure	5.784** (2.03)	2.942 (0.75)
Log value of Transport Expenditure	1.032 (0.35)	-3.817 (-1.25)
Log value of State Tax Revenue	-0.894 (-0.48)	2.723 (1.45)
Log value of Share in Capital Tax (SCT)	-0.136 (-0.23)	1.151** (2.21)
Log value States own Non-Tax (SNT)	-0.205 (-0.83)	0.360 (1.38)
Log value of Grants	-0.194 (-0.65)	0.510 (1.75)
Intercept	-39.762 (-0.69)	50.018 (0.78)
Observations	24	24
R^2	0.99	0.99
F	4846.95	1686.86

Source: RBI A Study on State Finance Various Years Mumbai.

Table 4: Determinants of Public Expenditure in Tamil Nadu: 1990-91 to 2013-14

Variables	Equation1	Equation 2
Log value of Total Expenditure	-	0.159 (1.35)
Log value of Gross State Domestic Product	1.292 (1.35)	-
Log value of Population	12.775 (-1.66)	3.046 (1.02)
Log value of Economic Services	1.510 (0.76)	-0.499 (-0.71)
Log value of Social Services	3.255 (0.92)	-1.300 (-1.07)
Log value of Administrative Services	-1.558 (-1.16)	0.997** (2.80)
Log value of Revenue Expenditure	16.368 (1.46)	-7.356** (-2.07)
Log value of Capital Expenditure	0.505 (6.97)	-0.047 (-0.68)
Log value of Development Expenditure	-5.585 (-0.83)	3.428 (1.63)
Log value of Non-developmental Expenditure	-0.594 (-0.42)	0.943** (2.68)
Log value of Plan Expenditure	-2.041 (-1.42)	0.536 (1.00)
Log value of Non-plan Expenditure	-10.4-2 (-1.31)	3.479 (1.23)
Log value of Transport Expenditure	3.019 (1.15)	-1.089 (-1.18)
Log value of State Tax Revenue	-2.415 (-1.37)	0.993 (1.69)
Log value of Share in Capital Tax (SCT)	-0.776 (-1.11)	0.421 (1.97)
Log value States own Non-Tax (SNT)	-0.153 (-1.60)	0.060 (1.88)
Log value of Grants	-0.532 (-1.22)	0.232 (1.61)
Intercept	207.479 (1.60)	-45.682 (-0.91)
Observations	24	24
R^2	0.99	0.99
F	550.96	1716.42

Source: RBI A Study on State Finance Various Years Mumbai.

It implies that increasing total public expenditure will bring growth in Gross State Domestic Product. There is positive relationship existing between total public expenditure and GSDP vice versa. One percent increase in non-development expenditure will bring 63 percent increase in GSDP. One percent increase in state capita tax will boost up GSDP of Kerala about 11.5 percent in the next 10 years. In the case of grants, one percent increase in grant will increase GSDP of about 51 percent but the coefficient is not significant at 5 percent level.

Table 4 shows the determinants of public expenditure for Tamil Nadu during 1990-91 to 2013-14. It is noted that one percent increase in gross domestic product lead to 12.92 percent increase in public expenditure in next 10 years. The growing population will naturally incur more expenditure, one percent increase in population size will bring 127 percent increase in total expenditure; one percent increase in economic service lead to 151 percent increase in Total Expenditure; one percent increase in capital expenditure lead to 50.5 percent increase in total expenditure.

In the second equation, GSDP has been taken as dependent variable and rest of 16 variables are explanatory variables. Out of 16 variables, only three variables show significant impact on dependent variable. The computed 'F' value is significant at 5 percent level shows the model is fit. If total expenditure increase by one percent the GSDP of Tamil Nadu will boost up to 15 percent. It implies that increasing total public expenditure will bring growth in Gross State Domestic Product. There is positive relationship existing between total public expenditure and GSDP vice versa. One percent increase in non-development expenditure will bring 94.3 percent increase in GSDP. One percent increase in state capita tax will boost up GSDP of Tamil Nadu about 42 percent. In the case of grants, one percent increase in grant will increase GSDP of about 23 percent, but the coefficient is not significant at 5 percent level.

5.5 Panel data estimation

Consider having data on n units-individuals, firms, countries, or whatever-over T periods. The data might be income and other characteristics of n persons surveyed each of T years, the output and costs of n firms collected over T months, or the health and behavioural characteristics of n patients collected over T years. In panel datasets, we write xit for the value of x for unit i at time t. The xt commands assume that such data sets are stored as a sequence of observations on (i; t; x). By pooling cross-sectional and time series datasets, the combined datasets called Pooled data, gives more source of variation which allows for more efficient estimation of the parameters. Further, individual heterogeneity also can be controlled under panel data settings. Panel method is better able to identify and estimate effects that are simply not detectable in pure cross-

sections or pure time series data. There are two popular methods of used in panel data analysis: Fixed Effect and Random Effects.

The regression equation under panel data setting is:

$$y_{it} = \alpha + X'_{it}\beta + u_{it} \qquad \text{.........(1)}$$

Where i denotes cross-sections and t denotes time periods with i=1, 2, …….., N, and t=1,2,….,T. α is a scalar, β is K x 1 and X_{it} is the ith observation on K explanatory variables. The observations are usually stacked with i being th slower index. Under the equation, the disturbance term take the form

$$u_{it} = \mu_i + v_{it} \qquad \text{.........(2)}$$

Where the $\mu_i's$ are cross-section specific components and v_{it} are remainder effects.

Fixed Effects: If the $\mu_i's$ are thought of as fixed parameters to be estimated, then the equation (1) becomes

$$y_{it} = \alpha + X'_{it}\beta + \sum_{i=1}^{N}\mu_i D_i + v_{it} \qquad \text{.........(3)}$$

Where Di is a dummy variable for the ith household. The vit are the usual classical IID random variable with zero mean and variance σ^2_v.then, the equation (3) is BLUE, but there are two problem arises: One is to loss of degrees of freedom and another one is problem of Multicollinearity.

Random Effects: The twin problems of fixed effect model can be avoided if the $\mu_i's$ can be assumed Random. In this case the $\mu_i \sim \text{IID}(0,\sigma^2_\mu)$, $v_{it} \sim \text{IID}(0,\sigma^2_v)$ and they $\mu_i's$ are independent of $v_{it}'s$. In addition, the Xit's are independent of $\mu_i's$ and$v_{it}'s$ for all i and t. The random effect model is appropriate specification if we are drawing N individuals randomly from a large population. This specification implies a homoscedastic variance vary (unit) $= \sigma^2_\mu+\sigma^2_v$for all i and t, and an equi-correlated block-diagonal covariance matrix which exhibits serial correlation over time only between the disturbances of the same individual. In fact,

Cov(uit, ujs)   = $\sigma^2_\mu+\sigma^2_v$ for   i=j,   t=s
         = σ^2_μ for   i=j, $t \neq s$

And zero otherwise.

Hausman Test: A critical assumption for the linear regression model $y = X\beta + u$ is that the set of repressors X are uncorrelated with the error term u. Otherwise, there is a simultaneous bias and OLS is inconsistent. Hausman (1978) proposed a general specification test for H_0: E (u|X) = 0 versus H_1: E (u|X) $\neq$ 0. Two estimators are needed to implement the test.

Table 5: Baseline Findings and Panel Data Analysis for Total Expenditure

Variables	Coefficients
Gross State Domestic Product	0.245* (1.62)
Revenue Expenditure	-2.161** (-2.03)
Capital Expenditure	0.441*** (31.38)
Developmental Expenditure	0.046 (0.03)
Non-Developmental Expenditure	-0.259 (-1.53)
Plan Expenditure	0.452** (2.20)
Non-Plan Expenditure	2.609** (2.95)
Social Service Expenditure	0.166 (0.23)
Economic Services	0.058 (0.12)
TRR	-0.215 (-0.95)
State Tax Revenue	0.099 (0.97)
State Non-Tax Revenue	-0.027 (-1.13)
State Capita Tax	-0.109 (-1.11)
Grants	-0.040 (-0.86)
Administrative Services	-0.277** (-2.51)
Constant	0.419 (0.42)
R squared	0.99
F test	37046.16

Source: RBI A Study on State Finance Various Years Mumbai.

Notes: Author's own compilation. All variables are converted into natural logarithm. T statistics are reported in parenthesis. (*), (**) and (***) denote the 1 percent, 5 percent and 10 percent levels of significance respectively.

The first estimator must be a consistent and efficient estimator of β under H0 which becomes inconsistent under H1. Let us denote the efficient estimator under H0 by $\hat{\beta}$. The second estimator, denoted by $\hat{\beta}_1$, must be consistent for β under both H0 and H1, but inefficient under H0. Hausman test is based on the difference between these two estimators $\hat{q} = \hat{\beta}1 - \hat{\beta}0$. The Hausman test becomes

$$m = \hat{q}[var(\hat{q})]^{-1}\hat{q}$$

Which is asymptotically distributed under H0 as χ_k^2 where k is the dimension of β.

The value of Hausman test is 10.86 and the p value is 0.7627 which is higher than 0.05 supporting the acceptance of null hypothesis i.e., the difference in coefficients not systematic. The result of Hausman specification test reveals the suitability of Random Effects model for this data.

Table 5 shows the baseline findings and panel data analysis for total expenditure. It finds that increase in GSDP positively influences Total Expenditure. The empirical result shows that negative relationship between revenue expenditure and total expenditure. Since government expenditure on revenue activities are long term in nature, therefore no revenue expenditure will occur at time interval. There is positive effect of capital expenditure on total expenditure. As capital expenditure increases by a percent, the total expenditure will increase by 44 percent. More importantly, we find positive and significant relation between Plan and Non-plan Expenditure with respect to total expenditure. There is positive trend but insignificant relationship between social service expenditure and total expenditure, the same is also applicable to economic service expenditure. However, our empirical analysis shows negative and insignificant relation between States own Non-Tax (SNT), Grants, Administrative Service Expenses (AS), Share in Capital Tax (SCT) and total Expenditure.

6.0 Conclusions

In order to test trends in the revenue expenditure the tools namely panel testing have been applied for estimating the responsiveness of government expenditure to State Gross State Domestic Product (GSDP). Panel data regression model is also applied to test the state effect and time effect.

For Andre Pradesh, the total revenue receipts shows significant impact on total expenditure as revenue receipts increased by one percent, the total expenditure will increase 32.7 percent in the next 10 years. The coefficients for state tax, state capita tax, net tax and grants shows a significant impacts on the total expenditure but the relationship is negative. If total expenditure increases by one percent the GSDP of

Andhra Pradesh GSDP will boost up to 61.8 percent. There is positive relationship existing between total public expenditure and GSDP vice versa. One percent increase in capital expenditure will bring 34.8 percent increase in GSDP. One percent increase in Plan expenditure will boost up GSDP of Andhra Pradesh about 10.2 percent in the next 10 years. In the case of grants, one percent increase in grant will make decline of GSDP of about 49.5 percent.

For Karnataka state, one percent increase in gross domestic product lead to 91 percent increase in public expenditure, but the coefficient is not significant. One percent increase in social service expenditure lead to 21.4 percent increase in Total Expenditure in the next 10 years; one percent increase in capital expenditure lead to 42.5 percent increase in total expenditure. If total expenditure increase by one percent the GSDP of Karnataka will boost up to 35 percent. There is positive relationship existing between total public expenditure and GSDP vice versa. One percent increase in revenue receipts will bring 49 percent increase in GSDP in the next 10 years. One percent increase in state net tax will boost up GSDP of Karnataka about 66.4 percent. In the case of grants, one percent increase in grant will increase GSDP of about 40.6 percent.

For the state of Kerala, one percent increase in gross domestic product lead to 32 percent increase in public expenditure, but the coefficient is not significant. One percent increase in capital expenditure lead to 37.1 percent increase in Total Expenditure; one percent increase in non-plan expenditure lead to 57.8 percent increase in total expenditure in the next 10 years. If total expenditure increase by one percent the GSDP of Kerala will boost up to 42 percent. There is positive relationship existing between total public expenditure and GSDP vice versa. One percent increase in state capita tax will boost up GSDP of Kerala about 11.5 percent in the next 10 years. In the case of grants, one percent increase in grant will increase GSDP of about 51 percent but the coefficient is not significant at 5 percent level.

For the state of Tamil Nadu, it is noted that one percent increase in gross domestic product lead to 12.92 percent increase in public expenditure in next 10 years. One percent increase in economic service lead to 151 percent increase in Total Expenditure; one percent increase in capital expenditure lead to 50.5 percent increase in total expenditure. If total expenditure increase by one percent the GSDP of Tamil Nadu will boost up to 15 percent. There is positive relationship existing between total public expenditure and GSDP vice versa. One percent increase in non-development expenditure will bring 94.3 percent increase in GSDP. One percent increase in state capita tax will boost up GSDP of Tamil Nadu about 42 percent. In the case of grants, one percent increase in grant will increase GSDP of about 23 percent, but the coefficient is not significant at 5 percent level.

There is positive effect of capital expenditure on total expenditure. As capital expenditure increases by a percent, the total expenditure will increase by 44 percent. More importantly, we find positive and significant relation between Plan and Non-plan Expenditure with respect to total expenditure. There is positive trend but insignificant relationship between social service expenditure and total expenditure, the same is also applicable to economic service expenditure. However, our empirical analysis shows negative and insignificant relation between States own Non-Tax (SNT), Grants, Administrative Service Expenses (AS), Share in Capital Tax (SCT) and total Expenditure.

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