Government expenditure and Economic Growth in the State of Jammu and Kashmir: A Unit Root and Co-integration Approach with Error Correction Model

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Abstract

Over last three decades, the state of Jammu and Kashmir has witnessed an enormous increase of government expenditure both in its absolute and relative sense. Surprisingly, the increased level of public expenditure did not get translated in to a greater level of infrastructural development and improvement in living standards of the people. In order to study the dynamics of the causal relationship between the public expenditure and economic growth in Jammu and Kashmir states, this study tries to apply Unit root test and Johansen Co-integration Test followed by Error correction Mechanism on the time series data to estimate the short-run and long-run relationships between government expenditure and economic growth.

The results show the non-existence of a causal relationship between aggregate government expenditure and economic growth. Further, the aggregate government expenditure and its main components have very week adjustment tendency towards long run equilibrium in economic growth. Expenditure on social, economic and general services has positive and significant impact on economic growth. Furthermore expenditure on education, health, industry and mining has significant and positive impact on economic growth while as expenditure on agriculture and allied sectors and expenditure on administrative services were found negative impact on economic growth.

Key words

Government expenditure, components, Economic growth, Error Correction Model, Co-integration , **JEl Classification: H11, H30, H50, C22, C32**

1. Introduction

In recent years the government expenditure has increased in all the states of the Indian federation in both relative and absolute terms. This particular observation provides a strong base for any systematic attempt to study the intricacies of government expenditure growth, for the growth of governmental activities lies in the heart of continued controversy over the increasing importance of the public expenditures in the process of economic development. This particular proposition tries to negate a situation in an underdeveloped state like Jammu and Kashmir, where the rate of growth of government expenditures surpasses the growth of State Domestic Product.

In a socialistic welfare characterized state, a significant share of domestic resources is directly controlled by the government where it tries to shape the policy measures for private economic agents and civil society by not only controlling the size of government expenditure but also by dictating terms and conditions for its efficient utilization. Therefore, in the quest for economic and social progress, the use of government expenditure must give emphasis to efficiency and equity so as to attain the end objective of a sustainable economic growth. Such participation of the government not only raises the quality and sustainability of development programs but also helps to insert a greater degree of purchasing power by way of a greater impetus to the expanded economic activities.

As a result, the question of economic growth remains as an obvious outcome of the government economic policies of expenditure on social, economic and general services which comprises the aggregate government outlays to the various sectors. In the above context, if, the rate of economic growth will be taken to be positively associated with the size of government investment that the government undertakes from time to time, the relevant question that arises; to what extent, government economic policies of its public expenditure affect the scale of economic growth?

Further, in the economy of Jammu and Kashmir, where government sector is highly influenced due to affirmed objectives of the state so as to attain a desirable rate of economic growth, there will be continuously complicated choices in selecting an suitable composition of government expenditure and in choosing among alternatives government programs that are projected to accomplish social goals. In the state where social goals change continually, selection of suitable composition of government expenditure remains vague and as a result the achievement of new goals pushes the government expenditure growth to incredible heights. In recent times, much of the theoretical as well as applied work has been concentrated on finding out the factors accounted for the major variations in the share of public expenditure in the aggregate national / state income and to identify and specify the nature of relationship between the structure of public expenditure and the level of economic development. In working out the developmental plan which implicitly takes into account the public expenditure ratio, a major question that always arises is: what is the ultimate effect of public expenditure growth on the economic development and whether the question of economic development is the sole factor that pushes the growth of public expenditure to a higher plateau? No doubt, the fiscal philosophy of the government to execute a certain level of public expenditure depends on the societal needs, which are the culmination of societal values judgments. What we intend to hammer at is the fact that public expenditure policies do not emerge in a vacuum, but by and large, are mainly influenced by the socio-economic environment that exist in the state.

So, the extents to which these socio- economic factors have been responsible for determining the absolute level of government expenditure in the state remain an open question. Therefore by taking into account these socio- economic dimensions, a systematic analysis of public expenditure and its effect on economic development may be illuminating for ascertaining the extent to which the rate of economic development explains the rate of growth of government

expenditure and to examine the inherent nexus between them. We believe that a causal-effect analysis would enable us not only in understanding the intricacies of public expenditure growth but also to have a better understanding of the mechanism of changes that take place in the quantum of public expenditure in response to a change in social value judgment and its inherent effects on the level of economic development in the state.

A fundamental question is whether or government expenditure increases the long run steady state growth rate of the economy or not. The universal view is that public spending, notably on physical infrastructure or human capital, can be growth oriented although the financing of such expenditures can be growth retarding due to disincentive effects associated with taxation. There has been increased argument among development economists as to the relationship between public expenditure and economic growth, Jerono, (2009). Government spending activity may directly or indirectly increase total output of economy through its interface with the private sector. Lin (1994) pubic goods, public infrastructure, social services and targeted intervention (subsidies) are significant provisions in which government can increase growth in economy. Barro (1990), expenditure on infrastructure and productive activities contribute positively to growth. Folster and Henrekson (1999) argue that there is negative relationship, whereas Agell *et al* (1999) respond that it is not significant. The actual relationship between public expenditure and economic growth is not well understood and there require more empirical research (Grier and Tullock, 1989).

However our primary aim is to examine the casual nexus between public expenditure and economic growth in order to understand the productivity of government expenditure in the state of Jammu and Kashmir. Our main focus in this paper is to analyze how far the government expenditure and its different components are prominent to encourage the growth of economy in the state over the years and how far the current allocation pattern is growth oriented in line with future economic growth. As we know from earlier discussion of growth and pattern of government expenditure that there is huge increase of government expenditure over the years. But despite the ever increasing rate of government expenditure in recent times in Jammu and Kashmir, there has not been a proportionate growth in the economy. It appears that either these funds are not released or they are released to finance an inappropriate expenditure item or maybe the funds are mismanaged or not fully utilized.

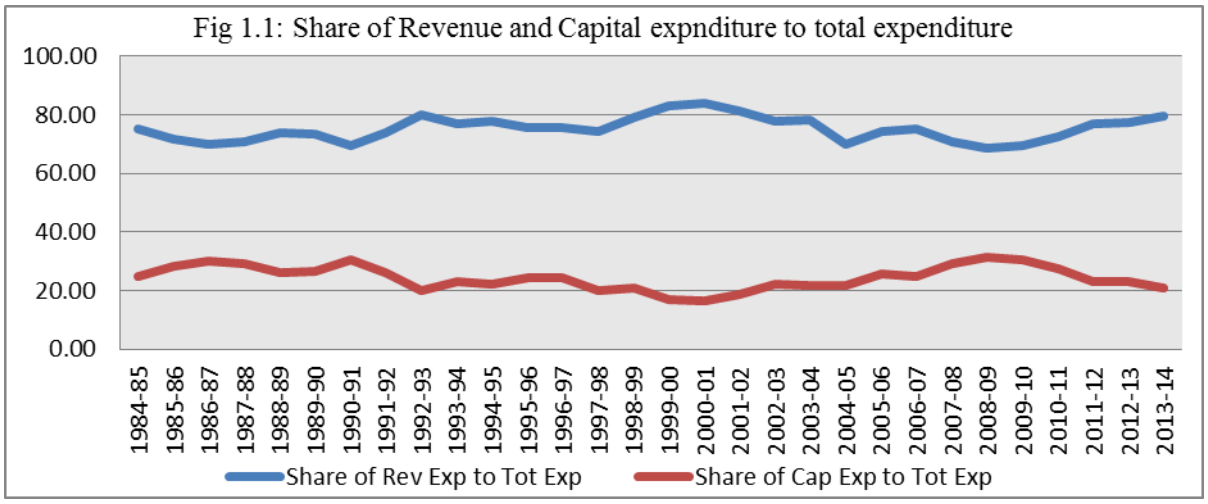
Therefore the relationship between government expenditure and economic growth become obvious research question to analyze and is the relation between government expenditures and economic growth robust over time or not. The understanding of relationship between government expenditure and economic growth in the state of Jammu and Kashmir will improve the understanding of structural and long term public finance issues, whether the size of government expenditure shrinks or expends the economy of state. Second, an enhanced understanding of the dynamic relation between government expenditure and economic growth will help in comprehension of policy-relevant issues over a short-to medium term horizon. Disposing of a reliable measure of the structural relation between the non-cyclical components of government expenditure and potential output is key to obtain a standard to assess the attitude of expenditure policy and then of overall fiscal policy. Analyzing the relationship will ensure that whether expenditure policy of the state has translated its public expenditure into a higher growth trajectory of the state or not. If, the state has failed in this direction, then, what measures need to be taken to make it productive and growth oriented.

2. Background of the study

The exponential growth of government expenditure in the state of Jammu and Kashmir without a matching growth of its own tax revenue and income has brought about an explosive growth of government expenditure in the state. A closer analysis of Jammu and Kashmir fiscal scenario

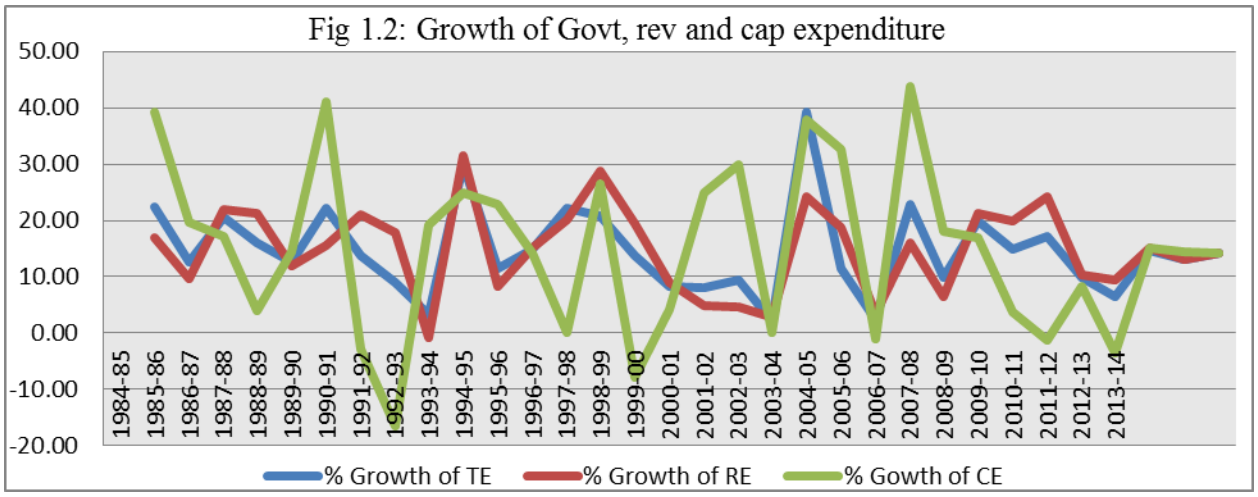
shows a rising trends of government expenditure on the service sector followed by the primary and manufacturing sectors. The sluggish growth of manufacturing sector over the years has resulted not only in a limited economic activity and thereby limiting the economic base of taxation but also has brought about its accompanying problems of poverty and its immediate transformation in to apparent social tension and unrests. It is noteworthy that the state economy has undergone a severe upswing and downswing both in its economic, social and cultural front from time to time and as a result, public expenditure pattern has shown an erratic trend in recent times. Public expenditure in the state has increased tremendously during late 90's to cover the rising administrative cost, law and order, salaries for government employees, pension, debt repayment etc. As a result, all these expenditure noted above have squeezed the expenditure on social and economic services like education, health care, tourism, industries, transport, infrastructure like roads, railways, communication etc.

In the light of the above discussion, it can be inferred that the state has failed miserably in transforming its public expenditure growth into an economic growth oriented economy. Over the last thirty years the government expenditure of the state has increased with an average annual growth rate of 15.6 percent while as the Net State Domestic Product (NSDP) has increased with average annual growth rate of 13.1 percent. This is indicative of the possible leakages in the income- expenditure flow in the state, which we believe is mainly responsible for this poor state of affairs. The growth of government and its components can be seen in the figure 1.1 and 1.2 below.



Sources: Calculated by author

The figure predicts the wide spreading gap between the two major components of government expenditure over the years, which lead the nature of economic growth. The figure shows that since the 90's the gap between revenue and capital expenditure has increased widely and is constantly increasing in current time period. It might be due to the tremendous increase of unproductive spending of the state. The higher percentage of government spending, over last two and half decades, is for non-productive programs, like administrative services, security, law and order, pension, salary bills etc., which hardly promote growth in NSDP, while as spending on economic and social services is considerably very less and reducing, it results heavy growth of revenue expenditure and less of capital expenditure. This entire imbalance of growth in revenue and capital expenditure is also due to the social and economic constraints in the state which create hindrance in allocating funds for economic and social purposes. The state is continually affected by violence and unrest, which make the government spending unproductive and inconsistent to promote economic growth



Sources: Calculated by Author

The public expenditure of the state has increased 239 percent "between 1984-85 to 1993-94" with an average annual growth rate of 15 percent while as revenue expenditure and capital expenditure increased 247 and 246 percent with average annual growth rate of 10 and 14 percent respectively during same period. The NSDP of the state during this period has increased 214 percent respectively with average annual growth rate of 10 percent during same period. Similarly between 1993-94 and 2003-04 the total public expenditure of the state has increased 266 percent with average annual growth rate of 13 percent and revenue expenditure and capital expenditure increased 272 and 169 percent respectively with average annual growth rate of 12 and 9 percent respectively during same period. During 1993-94 to 2003-04, the NSDP has increased 235 percent with average annual growth rate of 9 percent. Further during last ten years from 2003-04 to 2013-14 the total expenditure of the state has increased 306 percent and revenue expenditure has increased 311 percent with average annual growth rate of 15 and 13 percent respectively. Similarly the capital expenditure has got highest share during this period. The capital expenditure has increased 456 percent during with average annual growth rate of 16 percent. With growth in capital expenditure the NSDP of the has increased 273 percent over same period with average annual growth rate of 12 percent, which no doubt, show a positive and encouraging trend in the economic activities and public finance of the state.

The allocation pattern of government expenditure which can directly and indirectly support economic growth has also undergone a vast change over the years. It can be seen that the developmental expenditure of the state during 1984-85 to 1993-94 was growing with average annual growth rate of 10 percent while as non-developmental expenditure was growing at 13.8 percent annually during the same period. Between 1993-94 and 2003-04 the developmental expenditure was growing at 10.4 percent while as non-developmental expenditure was growing at 16.3 percent annually during the same period. It is only from last ten years from 2003-04 to 2013-14 that the developmental expenditure has increased with an average annual growth rate of 13.9 percent and non-developmental expenditure has shown decreasing trend growing at 13 percent annually during the same period. Similarly the social, economic and general expenditure of the state has shown an unexpected and fluctuating trend. The social expenditure of the state between 1984-85 and 1993-94 has increased 293 percent with average annual growth rate of 13 percent but between 1993-94 and 2003-04 the social services expenditure has increased 169 percent with average annual growth rate of 9 percent which clearly shows a large decline in social services expenditure during this period. During last ten years from 2003-04 to 2013-14 the social services expenditure has increased 297 percent with average annual growth rate of 13.3 percent respectively during same period which shows an upward trend in expenditure in social services like health care, sanitation, electricity, roads, transport etc. on other hand the

economic expenditure of the state over the years shows upward trend but with low rate of growth. During 1984-85 to 1993-94 the Economic expenditure has increased 155 percent with average annual growth rate of 8 percent respectively during same period. Further during 1993-94 to 2003-04 the economic expenditure has increased 227 percent with an average annual growth rate of 11 percent while as during last ten years from 2003-04 to 2013-14 the expenditure on economic services has increased 340 percent with average annual growth rate of 14.4 percent which mean that state has adopted the policy of self-sufficiency and self-dependence by increasing its expenditure on services like industries, hydro plants, animal husbandry, handicraft etc., where it can generate income. But apart from expenditure social and economic services the expenditure on general services have always remained ahead due to different economic, political and social constraints inside the state, the general expenditure between 1984-85 and 1993-94 has increased 318 percent with average annual growth rate of 13.8 percent. During 1933-94 to 2003-04 the general expenditure has marked highest status and its share in total expenditure was highest during this period. The general expenditure during the period has increased 430 percent with an average annual growth rate of 16 percent which is highest than social and economic expenditure during the same period. Moreover from last ten years during 2003-04 to 2013-14 the expenditure on general services has increased only 285 percent with average annual growth rate of 13 percent which is less than last decade which might be due to policy diversion and focus on social and economic expenditure.

Thus, it is evident from the foregoing analysis that the public expenditure in the state exhibits not only a wide fluctuation in its trend between revenue expenditure and capital expenditure but also has given rise to a widening gap between developmental and non-developmental expenditure. Further, it is evident that the government over the years has failed to maintain a consistency in balancing its expenditure pattern between expenditure on social, economic and general services.

In the light of the above discussion, it becomes pertinent to have a closer look into the intrinsic relationship between the growth of public expenditure vis-a-vis the growth of State Domestic Product to ascertain the extent to which the exponential growth of public expenditure has contributed the growth of State Income over the years. Keeping consistency with our argument, the paper seeks to explore the following objectives. (I) to analyze the linkage between government expenditure and economic growth (II) to identify the various components of public expenditure that have a strong capacity to stimulate economic growth in the state III) to examine and to identify the extent to which the short run instability in expenditure can be adjusted in long run.

The paper is divided into III sections. Section-I deals with a brief description of growth of Government expenditure in the state. Sections II spells out estimation procedure where a detail explanation is provided regarding econometric models and variables used. Section III reports the result and discussion of the models used.

3. Sources of Data

The study is primarily based on secondary data. The study has been carried out for a period of thirty years from 1984-85 to 2013-14. This is a period in which the state economy has passed through both upswing and down swing in its economy due to a variety of factors including economic, social and cultural, that have reinforced a relatively a static growth rate . Further entire period has witnessed a drastic political instability and social unrest leading to a wide change in expenditure and economic policies in the state. During this period the public expenditure has increased tremendously but the growth of state income has not come up with same pace which has resulted in a wide gap in the growth of public expenditure and the resultant economic growth in the state.

The main sources of data are the annual state finance reports by RBI, annual state budget reports of Jammu and Kashmir, Handbook of Economy of Jammu and Kashmir, Economic Surveys of Jammu and Kashmir over the period of time. We have also collected data from the directorate of Economics and Statistics Jammu and Kashmir and Handbook of Indian Economy by RBI regarding the Economy of Jammu and Kashmir.

4. Methods and Variables

Our primary aim is to establishing dynamic properties of the relationship between government expenditures and Economic growth in the state of Jammu and Kashmir over the period 1984-2013. In particular, we are concerned in the following questions. Are government expenditures and potential output linked by a stable long-run relationship? Is the long-term elasticity between government expenditure and potential economic growth greater than one, as predicted by the Keynesian law? No doubt, a clear cut answer to the questions raised above requires the establishment of an intricate relationship between a set of growth related variables with that of various components of public expenditure. The literature suggest that many researchers have indicated economic growth with GDP, Per capita income, social welfare, standard of living etc., Jerono (2009), Olabisi (2012), Patricia (2013), Nworji et al. (2012), Vuale and Suruga (2005). Therefore, we thought it imperative to take Net State Domestic Product at current prices (NSDP) as a proxy variable for economic growth. The relationship between government expenditure and economic growth (hereafter NSDP) has not only been explained with total expenditure of the state but also with different subcategories as different studies of Hansson and Henrekson (1994), Knellar *et al*, (1998), Nurudeen and Usman (2010) suggest. Further, all these studies suggest that other components of government expenditure like education, health, revenue, capital, organs of state administration services also have an impact on GDP.

In the line of the studies carried out by Ashauer (1989), Maingi (2010), Kar and Taban (2003) Yilgör (2012), we thought it logical to take into consideration the following explanatory variables to analyze the relationship between government expenditure and economic growth are, total government expenditure, revenue expenditure, capital expenditure, developmental expenditure, non-developmental expenditure, expenditure on social services, expenditure on general services, expenditure on general services, education, health agriculture, industry and mining, administrative services and interest payments and servicing of debt, The variables used to explain their impact on NSDP of the state are very important in terms the fiscal system of the state. The revenue expenditure has remained high in the share of total government expenditure while as capital expenditure has lagged behind. The developmental expenditure has not shown steady growth in line with non-developmental growth. The expenditure on social, economic and general services has fluctuated considerable and further expenditure on other activities of the state has increased over the years but with wide ups and downs. Thus does the changing trend of these variables have produce any impact on growth of NSDP over the years will be an important question to answer? Thus the variables used in this paper are denoted by:

$Govtexp_t$ =Total government expenditure

$Revexp_t$ = Revenue Expenditure

$Capexp_t$ = Capital Expenditure

$Devexp_t$ = Developmental expenditure

$Nondevexp_t$ = non-developmental expenditure

$Sosexp_t$ = expenditure on social services

$Ecoexp_t$= expenditure on economic services

$Genexp_t$ = expenditure on general services

Eduexp$_t$ = expenditure on education and allied activities

Healthexp$_t$ = expenditure on health and allied services

Adminexp$_t$ = expenditure on administrative services

Interestpayexp$_t$ = expenditure on interest payments and servicing at debt

The study uses time series data, collected from RBI and other state government authorities. The data has been converted into natural log equations for time series so as to ascertain the elasticity from the coefficients, Gujarati (2008). The Error Correction model has been used to identify the long-term as well as short-term relationship between NSDP and different components of government expenditure. In order to perform regression approach on time series data there are lot of issues which need to address before perform the regression and overcome the issue of spurious regression that characterized in earlier studies due to the neglect of the time series properties, Ram (1987). We follow three standard step approach consisting of (i) analyzing the stationarity of the time series data (ii) in case the variables are not stationary, checking whether they are characterized by a co-integration relationship, Wahab (2004), Chang (2002), Akitoby et al. (2004). (iii) in Case co-integration holds, estimating error correction mechanism (ECM) has been used, which permits to analyze the long-run relationship between the variables jointly with the short-term adjustment towards the long-run equilibrium, Maku (2009), Abu and Abdullahi (2010), Rehman et al., (2010), if co-integration does not exists only short-term coefficients will be analyzed by VAR model. In this paper we have used Vector Auto regression model (VAR) and Vector Error Correction model (VECM) Abdullah (2000), Simiyu (2015) to analyze the relationship between Government expenditure and NSDP as per the nature of the data predicted.

5. Estimation Procedure

5.1 Stationary Test/Unit Root Test

The time series stationarity is a statistical characteristic of a series like its mean and variance (Gujarati &Porter 2008). So if in a series, both mean and variance are constant over time then the series has no unit root or is stationary otherwise if not constant over time than the series has unit root or is non-stationary and thus we need to change the series in to respective differences. Thus at first, we examine the stationarity properties of the time series using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test. The purpose of Augmenting Dickey-Fuller (ADF) and Phillips-Perron (PP) tests regression is to get *white noise* errors. A series y_t (government expenditure and its different components) are said to be integrated of order d denoted by y_t~I(d) if it becomes stationary after differencing d times and thus y_t contains d unit roots. A series which is I(0) is said to be stationary. To test formally for the presence of a unit root for each variable of government expenditure and NSDP in the model, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests of the type given by regression (1) and (2) were conducted. The ADF test is conducted using the regression of the form:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum_{j=1}^{p} \gamma_j \Delta y_{t-j} + \varepsilon_t \qquad (1)$$

Where, Δ is the first-difference operator, y_t is the respective variable of expenditure over time, *p* is lag, α_0 is constant, α_1 *and* γ_j are parameters and ε_t denotes stochastic error term.

If α_1 = 0, then the series is said to have a unit root and is non-stationary. Hence, if the hypothesis, α_1 =0, is not accepted according to equation it can be concluded that the time series does not have a unit root and is integrated of order I(0), or in other words it has stationarity properties.

Similarly the Phillips-Perron (PP) test is estimated by following equation:

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 (t - T/2) + \mu_t \qquad (2)$$

Where $\alpha_0, \alpha_1, \alpha_2$ are the expected least-squares regression coefficients. The hypotheses of stationarity to be tested are H_0: α_0 = 1 and H_0: α_1 = 1, $H0: \alpha_2$= 0.

To level series and allow an explanation of regression coefficients in terms of elasticities, all the regression analysis has been done on the natural logarithms of government expenditure and its components and NSDP series. With trending variables, the testing equation has intercepts when variables are expressed in first differences and Akaike's Information Criterion (AIC) has been used to determine the lag order of each variable under study.

5.2 Co-integration Test

After the stationary test we perform Co-integration test to identify the stable relationship between non- stationary series within a stationary model, Adam (1998). It is important to carry co-integration test to avoid spurious and inconsistent regression problem. Co-integration method made it feasible to identify the information of non-stationary series without losing the statistical strength of the estimated equation (Stock and Watson, 1988). The test is conducted to know the number of co integrated vectors/equations between the variables and examine is there long run association between the variables or not. Johansen and Juselius Co integration Test (1990) has been to carry out with following equation:

$$y_t = \alpha_t + \theta_{it} x_{it} \dots\dots\dots\dots\dots \theta_{nt} x_{nt} + \mu_t \qquad (3)$$

Where y_t *and* x_{it} are, respectively, the log of prime cyclically adjusted NSDP and of government expenditure and its respective components variable i in year *t*, $\mu_t$is a stochastic residual and α_t is specific intercept. The elasticity of NSDP θ_{it} is allowed to vary across individual variables over time. Co-integration occurs when the linear combination of I(1) variables is stationary, implying that deviations of one variable from the path prescribed by the co-integrating relationship are temporary. In such a case, there is a long-run relationship between the variables and temporary deviations can be modeled with an error correction mechanism (ECM).The test is analyzed on certain hypotheses which are tested on trace statistics and Max-Egan value statistics. Trace statistics tests the null hypothesis of none or 1, 2, 3……..n co integrated vectors or alternative hypothesis of no co integrated vectors. Similarly Max-Egan statistic tests the hypothesis of none or 1, 2, 3……..n co integrated vectors. If we do not found any co-integration equation among the variables fitted in ECM equation the method to obtain Error correction term will change accordingly either to VAR or VECM model. If in some cases Trace and Max-Eigen statistics may yield different results then the results of trace test should be preferred. The test is performed on natural log of level data and the following equation has been used to identify co-integration between the variables:

5.3 Error Correction Models (ECM)

After all above analysis we reach to the final analysis to examine the long run as well as short run relationship between NSDP and different government expenditure categories. After co-integration analysis we find that some variables are having long run association ship with NSDP (i.e. having co-integration) while as some variables are not having long run association with NSDP (not having co-integration). Thus we have used both VAR and VECM model to predict relationship between the variables mentioned. VAR model is used for those equations where we found no co-integrated equation (i.e. no long run association) in order to identify short run relationship between those variables and VECM model used for those equations where we found more than one co-integration equations (having long run association) in order to get both long run and short run coefficients of relationship.

A vector error correction model (VECM) is a modeling technique which adds error correction features to a multi-factor model to understand the long run as well as short run relationship among the variables after knowing that the variables are co integrated, Jerono (2009); Chipaumire et.al (2014) and Ayo et.al (2011) while as VAR model is an autoregressive model in which all variables were accepted as endogenous without distribution and get short-term association between dependent and independent variables in absence of long run association, Terzi and Kurt, (2007); Bozkurt, (2007). The study follows the approach of Simiyu (2015), Arpaia (2008) and Loizides and Vamivoukes (2005). We have divided the explanatory variables into five equations where three of them have been analyzed through VAR model due to their nature of relationship and two of them have been analyzed under VECM model. The equations have been arranged in such an order to avoid the problem of multi-collinearity (Karagoz 2012). The five ECM equations used in this paper to analyze the long as well as short run relationship between aggregate government expenditure and its different categories with NSDP by keeping in mind the multi-collinearity factor and in order to get Error correction term VAR and VECM will be used on the bases of co-integration test of these equations.

$$DNSDP_t = \alpha_1 + \sum_{i=0}^{n} \beta_1 DNSDP_{t-i} + \sum_{i=0}^{n} \beta_2 DGovtexp_{t-i} + \prod ECT_{t-1} + \epsilon_{1t} \quad (1)$$

$$DNSDP_t = \alpha_2 + \sum_{i=0}^{n} \gamma_1 DNSDP_{t-i} + \sum_{i=0}^{n} \gamma_2 Drevexp_{t-i} + \sum_{i=0}^{n} \gamma_3 Dcapexp_{t-i} + \prod ECT_{t-1} + \epsilon_{1t} \quad (2)$$

$$DNSDP_t = \alpha_3 + \sum_{i=0}^{n} \gamma_4 DNSDP_{t-i} + \sum_{i=0}^{n} \gamma_5 Ddevexp_{t-i} + \sum_{i=0}^{n} \gamma_6 Dnondevexp_{t-i} + \prod ECT_{t-1} + \epsilon_{2t} \quad (3)$$

$$DNSDP_t = \alpha_4 + \sum_{i=0}^{n} \beta_3 DNSDP_{t-i} + \sum_{i=0}^{n} \beta_4 Deduexp_{t-i} + \sum_{i=0}^{n} \beta_5 Dhealthexp_{t-i} + \sum_{i=0}^{n} \beta_6 Dagriexp_{t-i} + \sum_{i=0}^{n} \beta_7 Dindiming_{t-i} \sum_{i=0}^{n} \beta_8 Dadminexp_{t-i} + \sum_{i=0}^{n} \beta_9 Dinterestpayexp_{t-i} + \prod ECT_{t-1} + \epsilon_{1t} \quad (4)$$

Where D is the difference level of the variable $\alpha_1, \alpha_2, \alpha_3, \alpha_4 \; and \; \alpha_5$ are the long run coefficients of the equations. However, if the series are not co-integrated there will be no long run cofficent. ECT is the Error coefficient term of the long term relationship of the variables and $\prod t$ are the Error coefficients term of the equations which capture the adjustment of independent variables in the long run towards dependent variable. Also $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}, \beta_{12} \; and \; \beta_{13}$ are the coefficients of the respective variables of ECM equation 1, 4 and 5 and $\gamma_1, \gamma_2, \gamma_3, \gamma_4, \gamma_5 \; and \; \gamma_6$ are the coefficients of the respective variables in ECM Equation 2 and 3. The hypothesis of both the equations is tested on probability value of t-statistics at 5% and 10 % level of significance.

However, if the series are not co-integrated, ECM test is carried out without the error correction terms.

5.4 Diagnostic Tests

In order to check the strength of our models estimated, different diagnostic tests have been carried out. The diagnostic tests applied in the restricted equations of the government expenditure and NSDP are: the Breusch-Godfrey Serial Correlation or LM Test done for serial correlation of the model, ARCH Test (autoregressive conditional heteroskedasticity) has been carried for Heteroskedasticity. Similarly, the test for parameter stability of the model has been performed by the CUSUM statistics and the Normality test has been done through Jarque-Bera test. All the diagnostic tests are estimated through null hypothesis which are tested through the test statistic value of each test at the probability value at 5% level of significance.

6. Result and Discussion

6.1. Unit Root Test

The empirical analysis begins with the lag creation. Akaike's Information Criterion (AIC) has been used to find out the lag order of each variable under study. The Augmented Dickey-Fuller (ADF) test and Pearson Philips (PP) test was conducted to pretest the variables for unit roots to verify that the variables are not integrated of an order higher than one. Table 1.1provide the cumulative distribution of ADF and PP test based on Mackinnon (1991).

Table 1.1: Estimated Results of Augmented Dickey-Fuller Test and Phillips-Perron Test for Unit Root

Variables	Definition of variables	At level				1st difference Stationary order I(1)			
		t-stat	1%	5%	Prob*	t-stat	1%	5%	Prob*
GOVTEXP	Total Government Expenditure	-1.078	-3.679	-2.968	0.711	-4.682	-4.324	-3.581	0.0044
REVEXP	Revenue Expenditure	-0.801	-3.679	-2.968	0.804	-5.47	-4.324	-3.581	0.0007
CAPEXP	Capital Expenditure	-1.029	-3.679	-2.968	0.729	-4.316	-4.324	-3.581	0.0102
DEVEXP	Developmental Expenditure	-0.777	-3.679	-2.968	0.811	-4.512	-4.324	-3.581	0.0065
NONDEVEXP	Non Developmental Expenditure	-1.242	-3.679	-2.968	0.642	-3.577**	-4.324	-3.581	0.0503
SOSEXP	Social Expenditure	-1.622	-3.700	-2.976	0.458	-5.786	-4.339	-3.581	0.0003
ECOEXP	Economic Expenditure	-0.016	-3.700	-2.976	0.949	-3.061**	-3.689	-2.972	0.0413
GENEXP	General expenditure	-1.508	-3.689	-2.972	0.515	-4.858	-4.324	-3.581	0.0029

Variables	Definition of variables	At level				1st difference Stationary order I(1)			
		t-stat	1%	5%	Prob*	t-stat	1%	5%	Prob*
NSDP	Net State Domestic Product	-0.219	-3.724	-2.986	0.924	-6.413	-4.334	-3.581	0.0001
EDUEXP	Education Expenditure	-1.190	-3.679	-2.968	0.665	-3.961**	-4.324	-3.581	0.0224
HEALTHEXP	Health Expenditure	-0.367	-3.689	-2.972	0.902	-7.671	-4.324	-3.581	0.0000
AGRIALLIEDEXP	Expenditure on Agriculture and allied sectors	-0.585	-3.689	-2.972	0.987	-4.649	-4.441	-3.633	0.0065
INDMINGEXP	Expenditure of industry and mining	-0.972	-3.679	-2.968	0.750	-4.384	-4.324	-3.581	0.0087
ADMINSEXP	Expenditure on administrative services	-0.986	-3.679	-2.968	0.745	-4.367	-4.324	-3.581	0.0091
INTERESTPAY	Expenditure on interest payments and servicing at debt	-2.038	-3.679	-2.968	0.270	-10.311	-4.324	-3.581	0.0000

*M Mackinnon (1991) * 1% level of significance ** 5% level of significance*

The results suggest that the null hypothesis is accepted for level data of the variables which shows that all the variables are non-stationary at level for. Controlling the variables at differenced data the computed ADF and PP test shows that the null hypothesis is not accepted for all the variables at first order of difference at 1% and 5% level of significance and the variables $Govtexp_t$, $Revexp_t$,$Capexp_t$, $Devexp_t$, $Nondevexp_t$, $Sosexp_t$, $Ecoexp_t$, $Genexp_t$, $Eduexp_t$, $Healthexp_t$, $Adminexp_t$ and $Interestpayexp_t$ are integrated of order one i.e. I(1). Thus all the variables are stationary at 1st difference level according to ADF test and PP test and are of same integrated order I(1).

6.2 Co- Integration Test

Determining that the variables are stationary at integral order of I(1) i.e. first difference we perform the Johansen co-integration test (1991) for all the variables put under different model equation to examine whether there are more than a single co-integration relationship between economic growth (NSDP) and the government expenditure variables and to know whether the variables in each model have long run association ship or not. The co-integration test for each model is shown in tables 1.2, 1.3, 1.4, 1.5 and 1.6 respectively. The null hypothesis tested for each co-integration test is there is r number of co–integration vectors among each variable in the model.

Table 1.2: Result of Johansen Co-integration Test

Model 1: Series: NSDP GOVTEXP TAXREV				
Unrestricted Co-integration Rank Test				
Hypothesized		**Trace**	**5 Percent**	**1 Percent**
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Critical Value**
None	0.32849	17.75385	29.68	35.65
At most 1	0.210039	6.603502	15.41	20.04
At most 2	6.77E-05	0.001894	3.76	6.65
Hypothesized		**Max-Eigen**	**5 Percent**	**1 Percent**
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Critical Value**
None	0.32849	11.15035	20.97	25.52
At most 1	0.210039	6.601608	14.07	18.63
At most 2	6.77E-05	0.001894	3.76	6.65
**(**) denotes rejection of the hypothesis at the 5%(1%) level. Max-eigenvalue test indicates no co-integration at both 5% and 1% levels. Trace test indicates no co-integration*				

Table 1.3: Result of Johansen Co-integration Test

Model 2: Series: NSDP REVEXP CAPEXP				
Unrestricted Co-integration Rank Test				
Hypothesized		**Trace**	**5 Percent**	**1 Percent**
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Critical Value**
None	0.397365	22.37888	29.68	35.65
At most 1	0.253635	8.198473	15.41	20.04
At most 2	0.000263	0.007357	3.76	6.65
Hypothesized		**Max-Eigen**	**5 Percent**	**1 Percent**
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Critical Value**
None	0.397365	14.18041	20.97	25.52
At most 1	0.253635	8.191116	14.07	18.63
At most 2	0.000263	0.007357	3.76	6.65
**(**) denotes rejection of the hypothesis at the 5%(1%) level, Trace test indicates no co-integration at both 5% and 1% levels, Max-eigenvalue test indicates no co-integration at both 5% and 1% levels*				

Table 1.4: Result of Johansen Co-integration Test

Model 3: Series: NSDP DEVEXP NONDEVEXP				
Unrestricted Co-integration Rank Test				
Hypothesized		**Trace**	**5 Percent**	**1 Percent**
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Critical Value**
None	0.373248	21.69486	29.68	35.65
At most 1	0.256632	8.613122	15.41	20.04
At most 2	0.010987	0.309331	3.76	6.65
Hypothesized		**Max-Eigen**	**5 Percent**	**1 Percent**
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Critical Value**
None	0.373248	13.08174	20.97	25.52
At most 1	0.256632	8.303791	14.07	18.63
At most 2	0.010987	0.309331	3.76	6.65
**(**) denotes rejection of the hypothesis at the 5%(1%) level, Trace test indicates no co-integration at both 5% and 1% levels, Max-eigenvalue test indicates no co-integration at both 5% and 1% levels*				

Table 1.5: Result of Johansen Co-integration Test

Model 4: Series: NSDP SOSEXP ECOEXP GENEXP				
Unrestricted Co-integration Rank Test				
Hypothesized		**Trace**	**5 Percent**	**1 Percent**
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Critical Value**
None *	0.641103	53.91247	47.21	54.46
At most 1	0.426757	25.22028	29.68	35.65
At most 2	0.278674	9.639794	15.41	20.04
At most 3	0.01746	0.493191	3.76	6.65
Hypothesized		**Max-Eigen**	**5 Percent**	**1 Percent**
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Critical Value**
None *	0.641103	28.69219	27.07	32.24
At most 1	0.426757	15.58049	20.97	25.52
At most 2	0.278674	9.146603	14.07	18.63
At most 3	0.01746	0.493191	3.76	6.65
**(**) denotes rejection of the hypothesis at the 5%(1%) level, Trace test indicates 1 co-integrating equation(s) at the 5% level, Trace test indicates no co-integration at the 1% level, Max-eigenvalue test indicates 1 co-integrating equation(s) at the 5% level, Max-eigenvalue test indicates no co-integration at the 1% level*				

Table 1.6: Result of Johansen Co-integration Test

Model 5: Series: NSDP EDUEXP HELATHEXP AGRIALLIED INDMING ADMINS INTERESTPAY				
Unrestricted Co-integration Rank Test				
Hypothesized		**Trace**	**5 Percent**	**1 Percent**
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Critical Value**
None **	0.857045	168.2056	124.24	133.57
At most 1 **	0.777939	113.7392	94.15	103.18
At most 2 *	0.709339	71.60478	68.52	76.07
At most 3	0.468703	37.00806	47.21	54.46
At most 4	0.367329	19.29991	29.68	35.65
At most 5	0.18401	6.481367	15.41	20.04
At most 6	0.027732	0.787465	3.76	6.65
Hypothesized		**Max-Eigen**	**5 Percent**	**1 Percent**
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Critical Value**
None **	0.857045	54.46632	45.28	51.57
At most 1 *	0.777939	42.13447	39.37	45.1
At most 2 *	0.709339	34.59672	33.46	38.77
At most 3	0.468703	17.70815	27.07	32.24
At most 4	0.367329	12.81855	20.97	25.52
At most 5	0.18401	5.693902	14.07	18.63
At most 6	0.027732	0.787465	3.76	6.65
**(**) denotes rejection of the hypothesis at the 5%(1%) level, Trace test indicates 3 co-integrating equation(s) at the 5% level, Trace test indicates 2 co-integrating equation(s) at the 1% level, Max-eigenvalue test indicates 3 co-integrating equation(s) at the 5% level, Max-eigenvalue test indicates 1 co-integrating equation(s) at the 1% level*				

The co-integration test of each model indicates that in model 1, 2 and 3 there is no co-integration vectors equation among them which means that there is no long run relationship among these variables. The null hypothesis of all these models is not accepted as the trace static indicates that each group of variables in each model is not co-integrated as the Trace statistic as well as Max-Eigen statistic is not significant at 1% and 5% level of significance. Thus it proves that variables like NSDP, Govtexp in model 1, NSDP, Revexp, Capexp in model 2 and NSDP, devexp and nondevexp in model 3 does not have long run association between the respective variables thus has no co-integrated equation in these variables thus for these model we can use VAR model to generate short run relationship and error term. On other hand the Trace static and Max-Eigen statistic shows that model 4 and 5 has one and more than one co-integrated vectors. The table 1.5 and 1.6 shows that there is long run association between NSDP, Sosexp, ecoexp and genexp as the trace statistic and Max-Eigen statistic is rejecting null hypothesis of no co-integration at 5% level of significance. Thus table 1.5 shows there is at least one co-integrated

equation among variables. Similarly table 6.6 also shows long run association ship between the variables like NSDP, eduexp, healthexp, agrialliedexp, indiminingexp, adminexp, and interestpay. The Trace statistic and Max-Eigen statistic indicates that there are 3 co-integrated equations at 5% level of significance and 2 co-integrated equation at 1% level of significance. Thus it accepts the null hypothesis of r number of co-integrating equations. Thus for model 4 and 5 we can use VECM model to generate short run as well as long run estimates as the variables have co-integration and we can examine Error correction term for short run adjustment of the variables.

6.3 Result of Models

Having verified that from the above five model, used to identify the relationship between government expenditure and economic growth (NSDP) there some variables which are not having any co-integration with NSDP, thus for short run estimates VAR model will be used for model 1, 2 and 3 to generate Error term. Therefore the model 1, 2 and 3 will be modified as below:

$$DNSDP_t = \sum_{i=0}^{n}\beta_1 DNSDP_{t-i} + \sum_{i=0}^{n}\beta_2 DGovtexp_{t-i} + \sum_{i=0}^{n}\beta_3 Dtaxrev_{t-i} + \epsilon_{1t} \quad (1)$$

$$DNSDP_t = \sum_{i=0}^{n}\gamma_1 DNSDP_{t-i} + \sum_{i=0}^{n}\gamma_2 Drevexp_{t-i} + \sum_{i=0}^{n}\gamma_3 Dcapexp_{t-i} + \epsilon_{2t} \quad (2)$$

$$DNSDP_t = \sum_{i=0}^{n}\gamma_4 DNSDP_{t-i} + \sum_{i=0}^{n}\gamma_5 Ddevexp_{t-i} + \sum_{i=0}^{n}\gamma_6 Dnondevexp_{t-i} + \epsilon_{3t} \quad (3)$$

Where, n is lag length; ε is random error term whose average is zero, covariance with its own lag values is zero, and variances are constant and which has normal distribution. D is the level of difference and β_1, β_2, β_3 and $\gamma_1, \gamma_2, \gamma_3, \gamma_4, \gamma_5$ and γ_6 are the short run coefficients of the respective variables.

Further from the co-integration analysis we found that the group series of model 4 and 5 are having more than 0ne co-integrated equations thus for these models ECT can be analyzed through VECM model. The error correction terms *Et*-1 and *Ct*-1 serve as measures of disequilibrium, representing stochastic shocks in the dependent variables in each model (NSDP) respectively. They symbolize the proportion by which the long-run disequilibrium in the dependent variables is corrected in each short-term period. The coefficients on *Et*-1 and *Ct*-1 are expected to be negative and statistically significant.

6.4 Vector Auto Regression Model

The VAR model has been used to identify the short run coefficients of the variables in those group series which does not have co-integration. There are three techniques for using the VAR model in structural analysis i) Short-term estimation and ii) impulse-response analysis. In this paper we have used these methods to identify the mutual relationships and interaction between variables through short-term estimates and symmetrical relationships to determine dynamic relationships between the examined variables by impulse-response analysis, Cansu (2006). The results of VAR model for equation 1, 2 and 3 are shows in table 1.7 below.

Table 1.7: Vector Auto Regression (VAR) Estimates (Short run estimates) Standard errors in ( ) & t-statistics in [ ]			
Variables	**ECM Model 1** **DNSDP**	**ECM Model 2** **DNSDP**	**ECM model 3** **DNSDP**
DNSDP(-1)	0.544219 (-0.20563) [2.64662]**	-0.333868 (-0.20082) [-1.66255]	-0.240962 (-0.21772) [-1.10677]**
DNSDP(-2)	0.136987 (-0.21792) [0.62863]	-0.00274 (-0.17674) [-0.01551]	0.108319 (-0.2273) [0.47655]
DGOVTEXP(-1)	0.009295 -0.26531 [0.03504]		
DGOVTEXP(-2)	0.20678 (-0.23336) [0.88608]		
DTAXREV(-1)	0.168806 (-0.12684) [1.33087]		
DTAXREV(-2)	-0.056211 (-0.12169) [-0.46191]		
DREVEXP(-1)		0.109767 (-0.18846) [0.58244]	
DREVEXP(-2)		-0.248055 (-0.2055) [-1.21005]	
DCAPEXP(-1)		0.358963 (-0.10708) [3.35224]*	
DCAPEXP(-2)		0.197161 (-0.10814) [1.82325]***	
DDEVEXP(-1)			0.109116 0.18214

Table 1.7: Vector Auto Regression (VAR) Estimates (Short run estimates)

Standard errors in ( ) & t-statistics in [ ]

Variables	**ECM Model 1**	**ECM Model 2**	**ECM model 3**
	DNSDP	**DNSDP**	**DNSDP**
			[0.59908]
DDEVEXP(-2)			0.039721
			0.17542
			[0.22644]
DNONDEVEXP(-1)			-0.01558
			-0.16908
			[0.09214]
DNONDEVEXP(-2)			-0.080086
			-0.16563
			[0.48353]
C	0.444156	0.265477	0.174527
	(-0.19071)	(-0.06234)	(-0.07364)
	[2.32892]**	[4.25853]*	[2.37006]**
R-squared	0.643599	0.467965	0.472413
F-statistic	978.1496	2.93192	0.575558
Log likelihood	36.84787	38.9871	32.61827
Akaike AIC	-2.131991	-2.369415	-1.897649
Schwarz SC	-1.79894	-2.033457	-1.561692

*Note: * significant at 1% level of significance, ** significant at 5% level of significance,*

**** significant at 10% level of significance*

The results of VAR model suggests that the variables have short run relationship at the set of two period lag which were optimal lags according to the value of the Akaike Information Criteria (AIC). The results of VAR estimation for all these models are surprising. The results show that government expenditure and tax revenue has positive but insignificant relationship with NSDP that means government expenditure and tax revenue are not efficient to produce change in NSDP of the state, Yilgör (2012); Gacener (2005) while as NSDP of previous year has significant impact on change in NSDP of current year (model 1). The t statistics of both the variables are not significant at 5% level of significance. The reason might be that most of the government expenditure over the years was defective and has been allocated to unproductive services like administrative services, organs of the state, security, law and order, repayment of loans, interest payments and many services which does not have direct linkage with growth like revenue expenditure on education, health, agriculture and allied activities, industry and mining etc., which only produce dead lock in economy as there was no efficient change in these sectors which could not produce any asset to produce any change in NSDP of the state. However from model 2 we find that revenue expenditure has positive but insignificant impact on economic growth of the state Agell *et al* (1999). Which suggest that revenue expenditure is inefficient to promote economic growth as at both the lags revenue expenditure coefficient is insignificant at

1% and 5% level of significance. While as capital expenditure has positive and significant impact on growth of NSDP of the state at both time lags, Yilmaz and Kaya (2005) Altay and Altin (2008).

The results show that 1 percent increase in capital expenditure of previous year will produce 0.3% change in NSDP. Also 1 percent change in capital expenditure of previous of previous year produce 0.19 percent change in NSDP. Both the coefficients are significant at 1% and 10% percent level of significance at both the time lags. This reason might be due to that factor that capital expenditure is incurred for generating the capital assets and the return of those assets is not soon it take more than 2-3 years to return. The increase of expenditure in economic services like health, water and power, industry and mining, tourism, transport and communication have increase capital expenditure and thus help to promote change in NSDP of the state after a long time thus produce change in NSDP. From the model 3 we also get surprising results which shows that developmental expenditure does not have significant impact on NSDP of the state. The results show that developmental expenditure has positive impact but is insignificant variable to produce change in NSDP. However on other hand non developmental expenditure shows negative and insignificant variable to promote change in NSDP as it was expected. Both the variables are insignificant at 1% and 5% level of significance at both time lags.

The reason might be that the developmental expenditure is mostly allocated to the project which does not have long run duration. Also the vast mismanagement and improper allocation of funds for developmental purpose have also made developmental expenditure unproductive thus could not promote economic growth in the state. Thus the VAR estimation of model 1, 2 and 3 shows that the variables like government expenditure, tax revenue, revenue expenditure, developmental expenditure have positive but insignificant short run association with NSDP which indicates that these variables are inefficient to promote any change in economic growth of the state. On other hand capital expenditure has negative but significant impact on economic growth of the state. Also non developmental expenditure has negative and insignificant impact on economic growth. Thus over all the VAR estimation shows that most of government expenditure and its main components are inefficient to produce economic growth. The R-square of model 1 indicate that 64 percent variation in NSDP is explained by the respective variables in the model while rest is due to other factors similarly model 2 and 3 shows that 46 percent and 47 percent variation in NSDP is explained by the respective variables in the model which is quite less than normal level. Thus it suggests that there are some other important factors which have significant impact on economic growth over long and short period of time.

In order to find out the reliability of the model and how fit and adequate is our data, certain tests were applied. The results of those test show that all the equation of NSDP are significant and robust. Table 1.8 shows the result of different diagnostic test. Breusch-Godfrey Serial Correlation LM test was used to analyze the serial correlation in the model. The hypothesis tested was that the model has no serial correlation. The results of the test accept the null hypothesis as the observed R^2 and its respected P value is greater than 5% level of significance. So there is no problem of serial correlation in the model, auto regressive conditional heterokedasticity test (ARCH Test) is used to asses that the significance of the model. The results show that as the respective P value of the observed R^2 is greater than 5% level of significance, so there is no Auto regression in the model which was our null hypothesis and our model is significant. Normality test was carried out to know whether the date was under the normal distribution or not. Jarque-Bera test shows that the residuals of the model are normally distributed as the respected p value of Jarque-Bera test is more than 5% level of significance. So we accept our null hypothesis that the residuals are normally distributed. The CUSET (coefficient Specification Test) statistics for model1, 2, 3 is in figure 1.3, 1.4, and 1.5

respectively, which reveal no serious omission of variables, indicating the correct specification of the entire model.

Table 1.8: Diagnostic Test of the Models

Model 1			
Breusch-Godfrey Serial Correlation LM Test			
F-statistic	2.252325	Prob*	0.129957
Obs*R-squared	4.945381	Prob*	0.084358
ARCH Test:			
F-statistic	0.316803	Prob*	0.578548
Obs*R-squared	0.337866	Prob*	0.561064
	Normality test		
Jarque-Bera statistic	5.473618	Prob*	0.2421
Model 2			
Breusch-Godfrey Serial Correlation LM Test			
F-statistic	1.076975	Prob*	0.361586
Obs*R-squared	2.885619	Prob*	0.236263
ARCH Test			
F-statistic	0.150005	Prob*	0.701944
Obs*R-squared	0.161496	Prob*	0.687783
Normality test			
Jarque-Bera statistic	0.752	Prob*	0.686602
Model 3			
Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.161442	Prob*	0.852135
Obs*R-squared	0.47579	Prob*	0.788285
ARCH Test:			
F-statistic	0.238638	Prob*	0.629625
Obs*R-squared	0.25598	Prob*	0.612896
Normality test			
Jarque-Bera statistic	3.2003	Prob*	0.1439

Figure 1.3: The CUSET (coefficient Specification Test)

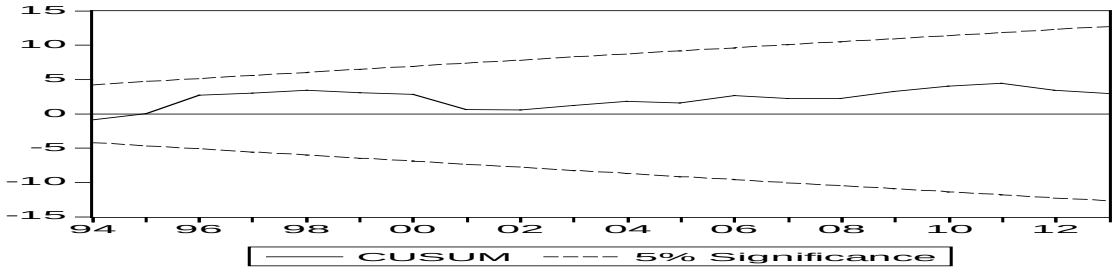


Figure 1.4: The CUSET (coefficient Specification Test)

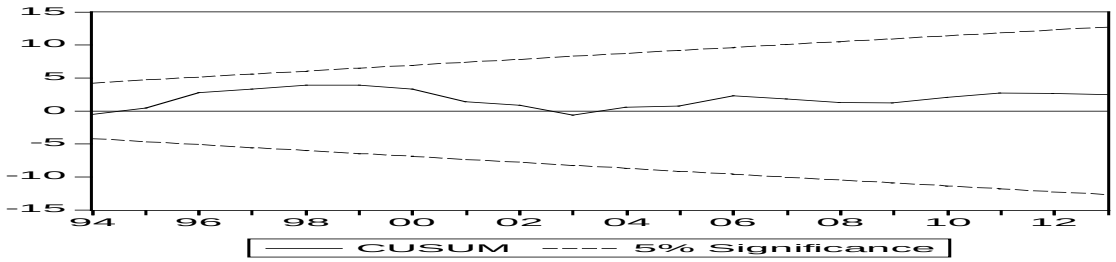
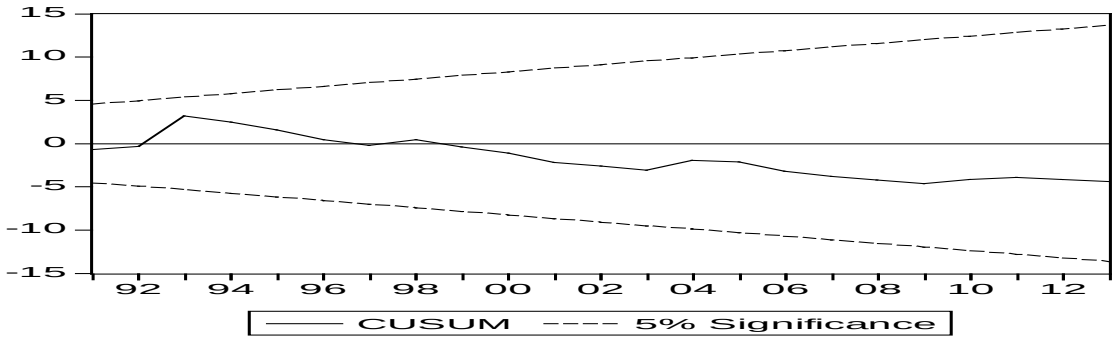


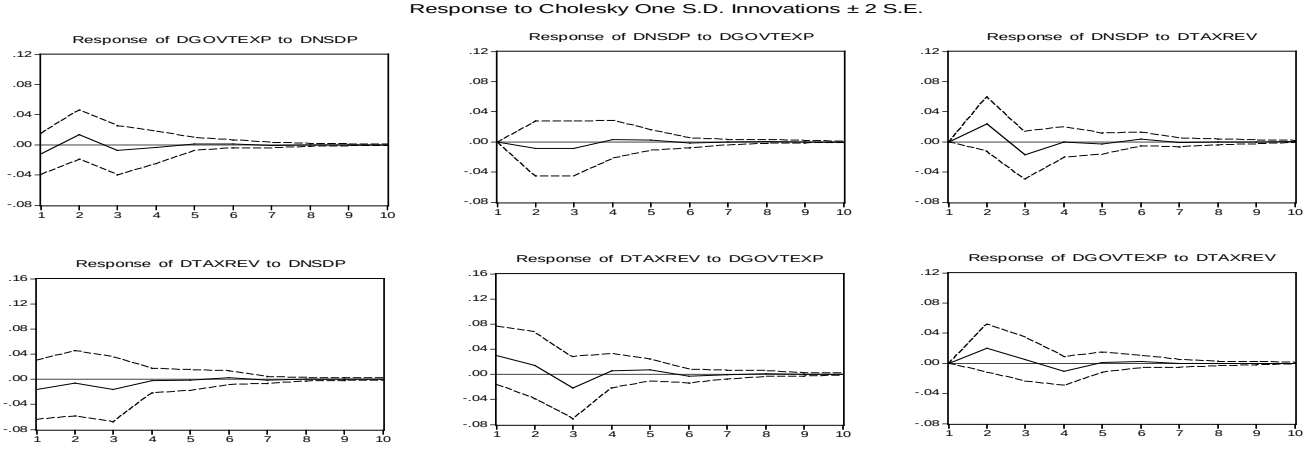
Figure 1.5: The CUSET (coefficient Specification Test)



6.5. Impulse response function

An impulse response refers to the response of any dynamic system in response to some external change. The results of Impulse-response function for VAR model 1, 2 and 3 are shown in Figure 1.6, 1.7 and 1.8 respectively.

Figure 1.6: Impulse-response Function of NSDP, Govtexp and Taxrev



The Figure 1.6 shows the response of Dgovtexp to DNSDP and DNSDP to Dgovtexp. It can be seen that one unit shock occurs in DGOVTEXP variable, the response of DNSDP variable is to increase until 2nd period and remain positive until 3rd period. After 3rd period it decreases and after the 4th period it remains positive up to 10th period. While as when one unit shock occur in DNSDP variable the increase occurs in DGOVTEXP variable until after 3rd period in response which remain positive after 4th period.

The chart also shows response of DNSDP to DTAXREV and DTAXREV to DNASP, it can be seen that one unit shock occurs in DNSP variable is to increase DTAXREV until 2nd period. After second it decrease, and shows negative growth. After 3rd its start rising but remain negative and after 4th period it remain positive until 10th period. The effect of DTAXREV on DNSDP is like that one unit shock occurs in DTAXREV increase DNSDP until 2nd period. After that decrease until 3rd period and after 3rd start increasing until 4th period and after 4th it remain positive until 10th period.

Also the figure shows response of DTAXREV to DGOVTEXP and DGOVTEXP to DTAXREV. It shows that one unit shock occur occurs in DTAXREV decrease DGOVTEXP until 3rd period. After 3rd period it will increase but remain negative and after 4th period remain positive and stable until 1oth period. While as the response of DGOVTEXP to DTAXREV shows that one unit shock occurs in DGOVTEXP increase DTAXREV until 2nd period. After it will decrease until 3rd period and goes negative, after 4th period it increases and remains positive.

Figure 1.7: Impulse-response Function of NSDP, REVEXP and CAPEXP

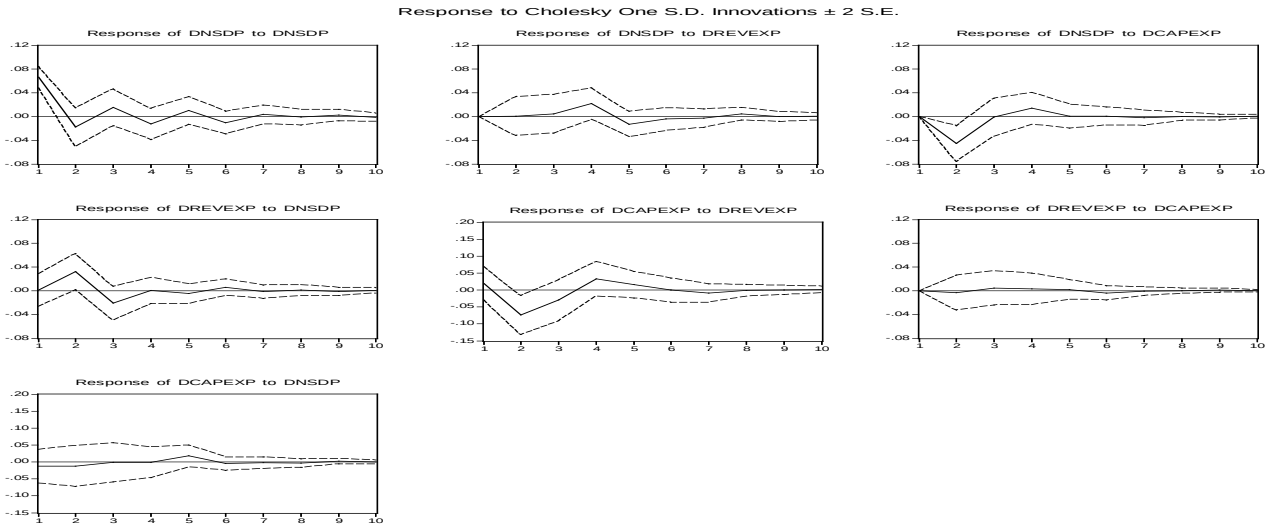


Figure 1.7 shows the response of DNSDP to DREVEXP, it can be seen that one unit shock in DNSDP, the response of DREVEXP is to increase after 3rd period, after 4th period it decrease and goes negative until 5th period. After 5th it increased but remains negative until 7th period. After 7th period it remains positive until 10th period. Chart also shows the response of DREVEXP to DNSDP, it shows that one unit shock in DREVEXP, the response of DNSDP is to increase until 2nd period, after decrease until 3rd period. After 3rd period it increase but remain negative until 4th period, after 4th period it remain positive.

Further the figure shows the response of DCAPEXP to DREVEXP, it shows that one unit shock in DCAPEXP, the response of DREVEXP is to decrease until 2nd period, after it will increase until 3rd period but remain negative, after 4th period it will increase and remain positive until 6th

period but from 5th period it decrease but remain positive until 10th period. The response of DRECEXP to DCAPEXP shows that one unit shock in DREVEXP, the response of DCAPEXP remains same until 10th period which means it does not affect.

Figure 1.7 also shows the response of DCAPEXP to DNSDP, it can be seen from the chart below that one unit shock in DCAPEXP, the response of DNSDP is to increase until 3rd period and after remain positive 4th period, after 4th increase until 5th period, after remain positive until 10th period.

Figure 1.8: Impulse-response function of NSDP, DEVEXP and NONDEVEXP

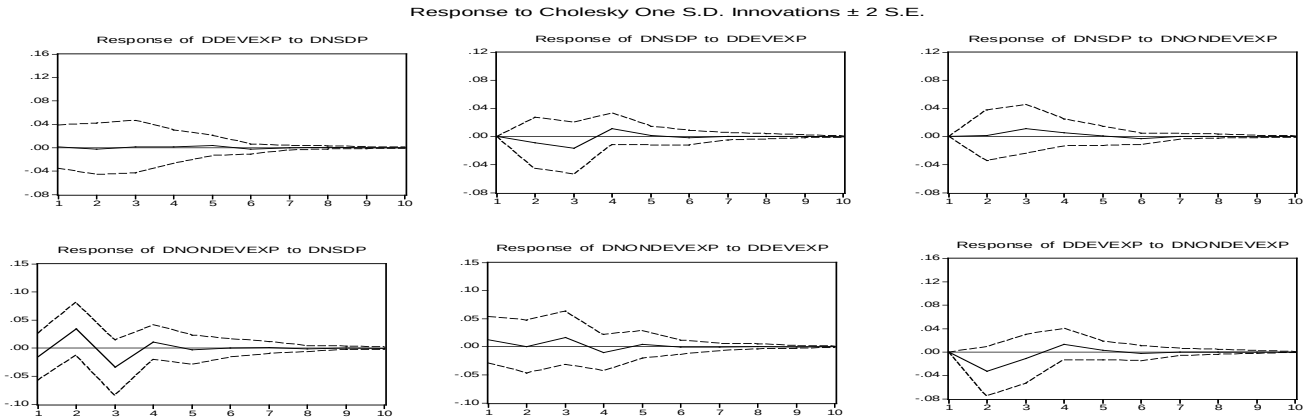


Figure 1.8 shows the response of DDEVEXP to DNSDP, it shows that one unit shock in DDEVEXP, the response of DNSDP is to remain positive in same position as it was before until 10th period. While as the response of DNSDP to DDEVEXP shows that one unit shock in DNSDP, the response of DDEVEXP is to decrease until 3rd period, after 3rd period increase but remain negative until 4th period. After 4th period increases until 5th period, after 5th decrease but remains positive until 6th period and after that remains positive until 10th period.

The chart also shows response of DNSDP to DNONDEVEXP, it shows that one unit shock in DNSDP, the response of DNONDEVEXP is to remain positive until 2nd period, after 2nd it increases until 3rd period. After 3rd it decreases but remains positive until 10th period. While as the response of DNONDEVEXP to DNSDP shows that one unit shock in DNONDEVEXP, the response to DNSDP is to increase until 2nd period, after decrease until 3rd period. After 4th period it increases and remains positive until 10th period.

Thus the impulse response in general shows that there is a wide range of period in expenditure variables to stable any disequilibrium in state income. It shows that any disequilibrium in NSDP can be stabilizing in short run but the stability period is longer.

6.6. Long Run and Short Run Estimates (VECM)

After verifying that the there are some series groups which are having long run co-integration with NSDP we can examine the casual relationship between different components of expenditure and economic growth (NSDP) by ECM models. The Vector error Correction model is used to identify the long run as well as short run relationship between the variables. The importance of analyzing VECM is we can understand the long run adjustment with short run stability through the Error Correction term. The error correction terms, $\prod ECT_{t-1}$ and ϵ_t serve as measures of disequilibrium, representing stochastic shocks in the dependent variables, *NSDP*

respectively in our different model 4 and 5. In the model 4 and 5 they will represent the proportion by which the long-run disequilibrium in the dependent variables is corrected in each short-term period. The coefficients on $\prod ECT_{t-1}$ and ϵ_t in these models are expected to be negative and statistically significant. The coefficients on the lagged values of Dsosexp, Decoexp, Dgenexp, Deduexp, Dhelath, Dagriexp, Dindiming, Dadminexp and Dinterespay are short-run parameters measuring the immediate impact of independent variables on NSDP. The result of long run as well as short run estimates of model 4 and 5 is shown in table 1.9 and 1.10 with some diagnostic tests as well to find out the strength, reliability and efficiency of our models and data.

Table 1.9: Long and Short Run Estimates of ECM Model 4

Long run and short run estimates of EMC Model 4				
Long run estimates				
	Coefficient	standard error	T-statistic	Prob
NSDP(1)	1			
SOSEXP(1)	2.100854	-0.98516	[2.13250]	0.0512***
ECOEXP(1)	1.076562	-0.48266	[2.23049]	0.0257**
GENEXP(1)	-0.129818	-0.53184	[-1.24409]	0.0158**
C	-0.819362			
Short run estimates				
	Coefficient	Standard error	T-statistic	Prob
D(NSDP(-1))	-0.328885	-0.18849	-1.74484	0.0991***
D(NSDP(-2))	-0.052876	-0.19522	[-0.27086]	0.7898
D(SOSEXP(-1))	-0.07859	-0.17432	[-0.45084]	0.6578
D(SOSEXP(-2))	0.240254	-0.18534	[1.29630]	0.2122
D(ECOEXP(-1))	0.339345	-0.18513	[1.83303]	0.0844***
D(ECOEXP(-2))	-0.14083	-0.15438	[-0.91223]	0.3744
D(GENEXP(-1))	-0.079602	-0.13241	[- 0.60119]	0.5556
D(GENEXP(-2))	-0.042637	-0.12663	[-0.33671]	0.7405
ECT	-0.186296	-0.07017	[-2.65488]	0.0167**
C	0.113061	-0.07612	[1.48537]	0.1558
R-squared	0.514836	Sum sq. resids	0.080283	
F-statistic	2.00441	S.E. equation	0.068721	
Akaike AIC	-2.239414	Log likelihood	40.23209	

Long run and short run estimates of EMC Model 4			
Diagnostic Tests			
Breusch-Godfrey Serial Correlation LM Test			
F-statistic	1.841082	Prob*	0.192744
Obs*R-squared	5.321568	Prob*	0.069893
ARCH Test:			
F-statistic	0.212215	Prob*	0.578548
Obs*R-squared	0.227885	Prob*	0.633096
	Normality test		
Jarque-Bera statistic	3.185473	Prob*	0.42102
*** Significant at 5% level of Significance, *** Significant at 10% level of significance*			

Sources: Calculated by Author

The observed result of model 4, where we regress, different categories of expenditure, like expenditure on social, economic and general services with NSDP to examine their impact on economic growth, Josaphat *et al.* (2000). The results indicate long run relationship of these variables. Table shows that expenditure on social and economic services are significant and positive relationship with NSDP, Deverajan *et al.* (1993) while as expenditure on general services has negative relation but is insignificant to produce any change in NSDP. It suggests that over long run 1 percent increase in expenditure on social services led 2.1 percent change in NSDP which means more elastic over long run. Similarly 1 percent increase in expenditure on economic services led to 1.07 percent change in NSDP. This might be due to the direct impact of expenditure incurred on services like education, health, water and sanitation, transport and communication and some of the economic activities like horticulture, handicraft, handloom, cement industry, mining etc., which increase the production of goods and services through expenditure on these services and thus directly results growth in economy.

The t-statistic of both these variables over long run is significant at 10% and 5% level of significance and thus proves that these variables have long run association with economic growth. However in short run expenditure on social services over current year has negative relation with economic growth but is insignificant. But in previous year expenditure on social services has positive impact but is again insignificant to produce any change in NSDP which means in short run 1 percent increase in expenditure on social services in current year will decrease NSDP at -0.07859 percent and 1 percent increase in expenditure on social services over previous year will increase NSDP at 0.24025 percent but at both time lags t- statistic is insignificant. It might be due to the returns of investment. The expenditure incurred on social services like education, health, sanitation, water, transport, communication sports etc., return back their profit after long duration of time thus the expenditure on these services has no immediate return to economic but takes a long time to function in line with growth.

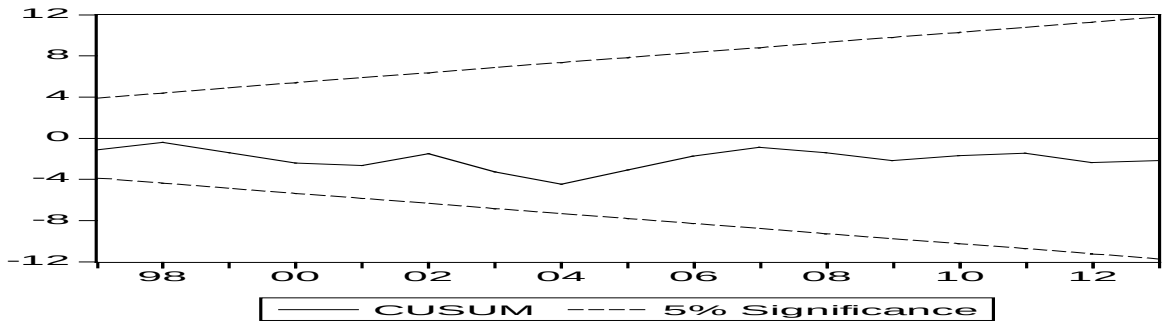
While as in short run expenditure on economic services has positive and significant impact on economic growth. Table shoes that 1 percent oncr4ese in expenditure on economic services in current year will increase NSDP by 0.339345 percent next year but 1 percent increase in expenditure on economic services in previous year will reduce NSDP by -0.14083 percent. Thus expenditure on economic services has significant impact on economic growth over lag 1 but on lag two it has negative and insignificant impact on NSDP. Further over long run the expenditure

on general services has negative and significant impact on economic growth. Table show that over long run 1 percent increase in expenditure on general services reduces NSDP by -0.12981 percent and t statistic is significant at 5% level of significance. Over short period the expenditure on general services is negative but is insignificant at both the time lags. It shows that I percent increase in expenditure on general services in current year will reduce NSDP by -0.079602 percent and 1 percent increase in expenditure on general services over previous year will reduce NSDP by -0.042637 percent but t statistic of both the variables in short run are insignificant.

The co-integrated of the variables justifies the use of VECM. The VECM permit the long term performance of the endogenous variables to converge to long term equilibrium while allowing a wide range of short dynamics. The table 6.9 shows the speed of adjustment indicated by the error correction terms in the co-integrating equation 4. The coefficients of the error correction terms are interpreted as speed of adjustment to long run equilibrium in dependent variable by short run stability in independent variables. The error coefficient term is negative signed and is significant at 5% level of significant which indicates long run co-integration and shows that any disequilibrium in dependent variable in long can be corrected 18 % in each short run period. This shows that any shock in NSDP will take longer time to adjust, it does not adjust immediately. The R-Square is analyzed for looking at goodness of fit and reliability of model. The table shows that the model explains a significant proportion of variability of the series for expenditure on social, economic and general services. The R square of the series shows that 51 percent variation in economic growth is explained by the variables respectively in the state and rest by other factors.

Various diagnostic tests have been analyzed to find out the adequacy of data and fitness of the results. From table 1.9, Breusch-Godfrey Serial Correlation LM test was tested on hypothesis that the model has no serial correlation. The results of the test accept the null hypothesis as the observed R^2 and its respected P value is greater than 5% level of significance. So there is no problem of serial correlation in the model Auto regressive conditional heterokedasticity test (ARCH Test) is used to asses that the significance of the model. The results show that as the respective P value of the observed R^2 is greater than 5% level of significance, so there is no Auto regression in the model which was our null hypothesis and our model is significant. Normality test for, date was under the normal distribution or not. Jarque-Bera test shows that the residuals of the model are normally distributed as the respected p value of Jarque-Bera test is more than 5% level of significance. So we accept our null hypothesis that the residuals are normally distributed. The CUSET (coefficient Specification Test) statistics figure (1.9), reveal no serious omission of variables, indicating the correct specification of the model.

Figure 1.9: Coefficient Specification Test



As mentioned early due to the problem of multi- collinearity we have divide equation in such a way so that we get better results. Thus VECM model has been used separately on another set of ECM equation due to the factor that the series of variables in that model were found co-integrated. The short run and long run estimates of variables like education expenditure , health expenditure, expenditure on agriculture and allied sectors, expenditure on industry and mining, expenditure on administrative services and expenditure on interest payments and servicing at debt to find out there impact on economic growth. Table 1.10 shows both long run and short run estimates of categories of public expenditure and NSDP followed by diagnostic tests.

Table 1.10: Long Run and Short Run Estimates of EMC Model 5

Long run estimates				
	Coefficient	standard error	T-statistic	Prob
NSDP(1)	1			
EDUEXP(1)	-1.694804	-0.12103	[-14.0029]	0.0002
HELATHEXP(1)	0.123201	-0.07143	[1.72466]	0.09075
AGRIALLIED(1)	-0.245924	-0.08172	[-3.00936]	0.00239
INDMING(1)	1.213715	-0.15725	[7.71814]	0.00517
ADMINS(1)	-0.077444	-0.05821	[-1.33043]	0.2112
C	-2.75464			
Short run estimates				
D(NSDP(-1))	-0.297897	-0.21892	[-1.36073]	0.1967
D(NSDP(-2))	0.10005	-0.22016	[0.45445]	0.657
D(EDUEXP(-1))	0.213794	-0.19223	[1.11216]	0.657
D(EDUEXP(-2))	-0.131311	-0.20903	[-0.62818]	0.2862
D(HELATHEXP(-1))	-0.006355	-0.07123	[-0.08921]	0.5408
D(HELATHEXP(-2))	0.073614	-0.07495	[0.98221]	0.9303
D(AGRIALLIED(-1))	-0.020652	-0.13552	[-0.15240]	0.3439
D(AGRIALLIED(-2))	-0.016386	-0.10314	[-0.15888]	0.8812
D(INDMING(-1))	0.02643	-0.19472	[0.13573]	0.8762
D(INDMING(-2))	-0.08417	-0.15651	[-0.53780]	0.8941
D(ADMINS(-1))	-0.255885	-0.16477	[-1.55294]	0.5998
D(ADMINS(-2))	0.092985	-0.18788	[0.49491]	0.1444
C	0.171721	-0.06946	[2.47233]	0.028**
ECT	-0.24018	-0.12311	[-1.95088]	0.073***
R-squared	0.75086	Adj. R-squared	0.501719	
Sum sq. resids	0.041227	S.E. equation	0.056314	
F-statistic	3.0138	Log likelihood	49.22944	

Table 1.10: Long Run and Short Run Estimates of EMC Model 5

Akaike AIC	-2.609588	Schwarz SC	-1.937673	
Diagnostic tests				
Breusch-Godfrey Serial Correlation LM Test				
F-statistic	1.624385	Prob*	0.240926	
Obs*R-squared	0.240926	Prob*	0.460409	
ARCH Test:				
F-statistic	1.422382	Prob*	0.24467	
Obs*R-squared	1.4547	Prob*	0.227775	
Normality test				
Jarque-Bera statistic	1.13821	Prob*	0.566032	
*** Significant at 5% level of Significance, **** Significant at 10% level of significance*				

The table shows that in long run expenditure on education has positive but significant impact on economic growth Osborn (2007) while as in short run it has positive impact on lag1 and negative impact on lag two but on both short run periods it is insignificant Kakar *et al.*, (2011). it suggest s that 1 percent increase in education expenditure led to 1.694804 increase in NSDP over long period and in short run 1 percent increase in expenditure on education will increase NSDP by 0.213794 percent in first period lag and in second 1 percent increase in expenditure on education in previous year will reduce NSDP by -0.131311 percent. This implies that the expenditure on education does not have immediate impact on economic growth due to its slow and late returns. However expenditure on health was found positive and significant over long run, Baldacci et al. (2008) and shows that 1 percent increase in health expenditure will increase NSDP by 0.123201 percent as the t statistic is significant at 10 % level of significance. While as in short run current year expenditure on health has negative but insignificant impact on NSDP as 1 percent increase in expenditure on health will reduce NSDP by -006355 percent and over previous period 1 percent increase expenditure on health will increase NSDP by 0.073614 percent. Thus expenditure on health will encourage economic growth in long run because its nature on expenditure is mostly falling under economic and social services were returns are more continue than education.

Further expenditure on agriculture and allied sectors has significant but negative impact on NSDP growth. Table shows that 1 percent increase in expenditure on agriculture and allied sectors will reduce state income by -0.245924 percent as t statistic is significant at 1% level of significance. It might be due to the subsistence level of farming in the state where most of the production is for subsistence live except few sectors like horticulture and saffron cultivation. Thus expenditure on vast agriculture dependent state will defiantly reduce economic growth. While as in short expenditure on agriculture and allied sectors have negative but are insignificant at both time lags which shows that 1 percent increase in expenditure on current and previous year will reduce the economic growth by -0.020652 and -0.16386 percent respectively. Thus it shows that expenditure on agriculture and allied sectors have not supported the economic growth in the state over the years. On other hand expenditure on industry and mining shows positive and significant impact on economic growth (NSDP). Table indicate that 1 percent increase in expenditure on industry and mining led to 1.213715 percent growth in

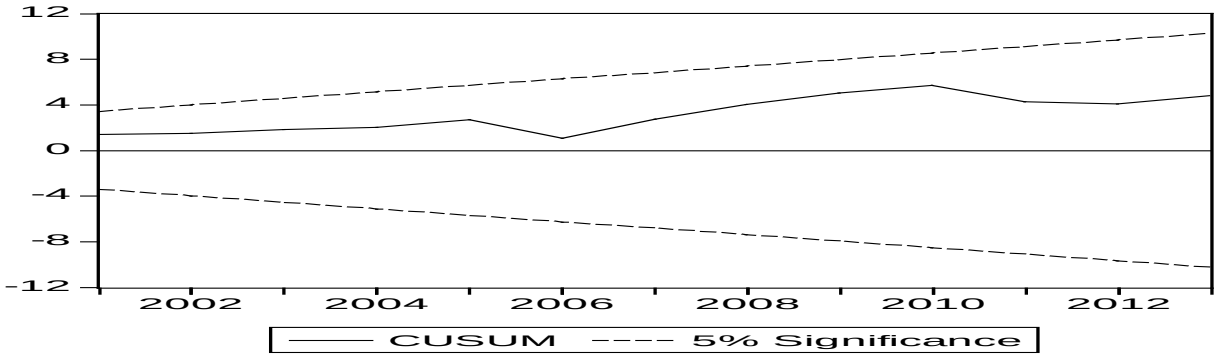
NSDP which means NSDP is more elastic with change in expenditure on industry and mining. The t statistic is significant at 1% level of significance.

It might be due to the reason that the expenditure incurred on industry and mining has direct association with NSDP like expenditure on cement industry, handicraft, handloom, mining etc., has direct involvement of employment, production and consumption which obviously increase economic output and thus economic growth as well. On other over short run expenditure on industry and mining has positive impact on first lag and negative impact on lag 2. It indicates that current year's expenditure has positive but insignificant Impact on NSDP while as previous year has negative and also insignificant impact. It must be due to the return of income from industry and mining which is neither immediate nor not efficient due to the economic and social atmosphere in the state over the years which destroy the industrial infrastructure in the state.

At last, expenditure on administrative services show negative relationship with NSDP but is insignificant to promote change in NSDP. Table shows that over long run 1 percent increase in expenditure on administrative services will reduce NSDP by -0.077444 percent. In short run at first lag expenditure on administrative has negative impact and at second lag it is positive but at both lags is insignificant. The R Square of the model suggests that 75 percent variation in NSDP is explained by these variables is quite satisfactory. The speed of adjustment towards long-run equilibrium carries the expected negative sign and it is very significant at the 5% level. The coefficient indicates a response of about 24.018% of the previous year's disequilibrium from the long-run elasticity of these variables. This means that the speed with which expenditure on education, health, agriculture and allied sectors, industry and mining and administrative services adjust from short-run disequilibrium to changes in economic growth in order to attain long-run equilibrium is only 24.018% within one year.

The diagnostic tests carried for checking reliability of data and of results are significant and robust. The Breusch-Godfrey Serial Correlation LM test reveals no significant serial correlation in the disturbance of error term as the p value of the test is greater than 5% thus we accept null hypothesis of no serial correlation. ARCH test suggest that the errors are homoskedastic and independent of the repressors. The p value of the observed R-square test is greater than 5% level of significance thus also null hypothesis accepted of no heterokidasticity. The normality test carried by Jargue-Bera statistic indicates that the disturbance of the repressors' is normally distributed as the null hypothesis is accepted at 5% level of significance. Apart from these tests, CUSET test for coefficient Specification in figure (1.10) reveals that there is no serious omission of variables and model is correctly specified.

Figure 1.10: CUSET test (Coefficient specification Test)



7. Conclusion

The primary aim of the study was, to analyze the impact of government expenditure and its different categories on economic growth in the state of Jammu and Kashmir. The analysis was carried out for a period of thirty years. The results of different models used together in this study suggest that government expenditure has positive but insignificant impact on economic growth of the state. The aggregate government expenditure itself has no association with economic growth long run while as in short run it is insignificant to promote stability in economic growth, if there happens to be any disequilibrium. Revenue expenditure on other hand comes out to be positive but insignificant to produce economic growth while capital expenditure remains significant and has a positive impact on economic growth. Also in short run these variables have adjustment power towards long run equilibrium in economic growth. This implies that if any disequilibrium occurs in economic growth of the state, government expenditure, revenue and capital expenditure can produce significant change in the economic growth with short run adjustments, but after long period. Expenditure on social, economic and general services have positive and significant impact on economic growth and can somehow adjust the long run disequilibrium by short run dynamics but the duration of period is very long enough. Furthermore expenditure on education, health, industry and mining has significant and positive impact on economic growth while as expenditure on agriculture and allied sectors and expenditure on administrative services were found negative impact on economic growth. The adjustment period of long run disequilibrium is satisfactory over short run stability of these periods but the duration is again very long.

Also developmental and non-developmental expenditure are not having any long run association with economic growth while in short run developmental expenditure of previous year has positive and significant impact on economic growth of current year's economic growth and non-developmental expenditure does not have significant impact but has negative association with economic growth on both time lags.

Therefore from the discussion it is obvious that government expenditure in the state of Jammu and Kashmir is broadly inconsistent and unproductive to produce significant change in economic growth. The reason might be the pattern of spending over the years which was mostly for general services and running of the state administration and less focus was for capital generation and resources development. It might be also due to the ongoing political and social tension in the state which has reduced economic efficiency; also the government spending is not very efficient due to the different political and economic constraints which block the output of the public spending. The 20 years of deep unrest in the state has also set back the social and physical infrastructure into deep stagnant phase where it was difficult to government to set efficient spending policies for long period of time especially in mid-90's and early 2000. The spending of government expenditure over economic services is also less efficient because of nature and limited economic activities in the state. Thus the conclusion of the paper can be like that the government expenditure in the state of Jammu and Kashmir is less significant and inefficient to promote economic growth in the state of Jammu and Kashmir despite the huge growth in government expenditure over the years.

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