CHAPTER – V

EMPIRICAL ECONOMIC ANALYSIS OF PUBLIC EXPENDITURE IN RELATION TO ECONOMIC DEVELOPMENT OF GUJARAT STATE

5.1.0 INTRODUCTION

In chapter IV, Analysis of Economic Development and Public Expenditure in Gujarat State has been discussed. In this chapter, therefore, empirical economic analysis of public expenditure in relation to economic development of Gujarat state is undertaken with a view to establish cross -sectional relationship between per capita income/ gross state domestic product and various development expenditure schemes for the study year 1986-87 to 2005-06 in Gujarat State by using computer software (E-views). This has been carried out with the help of year-wise secondary data as shown in table 5.5.0.

For this purpose, the statistical regression models analysis have been adopted. This chapter has been designed so as to examine the hypotheses as mentioned earlier in Chapter-II.

Here, statistical regression was employed as a tool for the analysis of relationship between the variables which we are predominantly concerned with. The dependent variables in this model is the year-wise total number of Per Capita Income / Gross State Domestic Product (in Rs. Crores) (PCI) / (GSDP) over twenty years in Gujarat State. On the other hand, the independent variables are the year-wise number of Education, Sports, Art and Culture Expenditure (EDSACEXP), Infrastructure Expenditure (INFRAEXP), Employment and Labour Welfare Expenditure (EMPLWEXP), Health and Family Welfare Expenditure (HFWEXP), Agriculture and Allied Activities Expenditure (AGRAAEXP), Industries and Minerals Expenditure (INDMEXP), General Economic Services Expenditure (GESSEXP) and Total Public Expenditure(TPEXP. These variables are seven in number.

All these data are collected from Gujarat Government Budget in brief Gujarat State An Analytical Summary, Directorate of Economics and Statistics Government of Gujarat, Gandhinagar. In this manner, we have an observation Matrix of size 20x7 where data of 20 years are

supposed to be represented in each column standing for the variables as shown in table 5.5.0

Largely, in all the Gujarat State study we are concerned with a cross- sectional economic development analysis for the study years 1985-86 to 2005-06.

Generally, as per the hypotheses as mentioned in earlier chapter-II, we expect a cross -sectional relationship between year -wise total Per Capita Income / Gross State Domestic Product and various development schemes expenditure / patterns in all years under study of Gujarat State's Economy.

Hence, the Model involves cross-sectional regression analysis for the study period under consideration. In this context, the relationship between cross-sectional economic development schemes and public expenditure in Gujarat state have been first estimated by fitting two variables regression models, secondly multiple regression analysis is undertaken in order to identify those factors which determine economic development in Gujarat State.. In the analysis of results, however, it was found that some geographical location factors are of no special importance in determining economic development. And they reflect high degree of Multi-collinearity which had permitted the study to apply a step-wise regression technique thereafter, as shown in table 5.4.1. In the models. We have taken both the dependent and independent variables in natural logarithmic (Log) form as below:

Model I : **Log PCI / GSDP = a + b_1 Log EDSACEXP + u ----** **(all other independent variables**

one by one)

Model II: **Log PCI/GSDP = a+b_1LogEDSACEXP + $b_2$logINFRAEXP --- + b_7LogX$_7$+U**

((Multivariate Independent Variables)

Model III: **Log PCI / GSDP = a + b_1 Log EDSACEXP ----- + b_2 LogXn +u (including one by one**

independent variable in step-wise)

In the above functional models (I) and (II) slope coefficient β_1------ β_7 measure a linear statistical relationship associated with a cross-sectional development schemes expenditure $Logx_1$ ---- $Logx_7$ (Independent variables) on year-wise total number of per capita income / gross state domestic product rates in the study years 1986-87 to 2005-06. Finally, we have also presented the correlation matrix of the independent variables in order to understand their interrelationship as shown in table 5.4.2. The methods of fitting the models have been explained fully by Konsoyannis.(1977).

In our empirical results and analysis, we have strong contention that not only in the short-run but also in the very long period of time, level of development activities expenditure would be positively and statistically strongly related with year-wise per capita income / gross state domestic product (PCI/GSDP).

First, we have estimated a two variable model I as mentioned above and then fitted double natural logarithmic (log) equations for disaggregated economic development schemes categories one by one as indicated in table 5.2.1.10 below with the corresponding statistical values of students t-statistics, R^2, R^2, F-value ,D-W Statistics and the regression coefficients.

5.2.0 THE RELATIONSHIP BETWEEN YEAR-WISE PER CAPITA INCOME AND VARIOUS DISAGGREGATED DEVELOPMENT SCHEMES / CATEGORIES EXPENDITURE.

By fitting the double natural logarithmic (Log) relationship as mentioned earlier in this chapter to the cross -sectional data (20x8) matrix expenditure of disaggregated development schemes / categories for the study years 1986-87 to 2005-06 as indicated in table 5,5.0 and having taken these schemes / categories as independent variables and year- wise total number of per capita income

as dependent variable, we have obtained the following results as shown in table 5.2.1.8 below by examining the relationship one after another.

Note: Koutsoyiannis,A., 1977, "Theory of econometrics" Book, ELBS second Ed.,Pub.with Macmillian press Ltd, University of Ottawa, Ontario.

5.2.1   TWO VARIABLE REGRESSION MODEL

Regression estimates as mentioned earlier in this chapter for this aspect covering period from 1986-87 to 2005-06 is presented with both dependent and independent variables in natural logarithmic (Log) below one after another.

5.2.1.1   Dependent Variable: Per Capita Income (PCI), Independent Variable: Education, Sports, Art and Culture Expenditure (EDSACEXP)

Independent

Model : Log PCI $= a + b_1$ Log EDSACEXP $+ u_1$

Where PCI stands for Total number of per capita Income year-wise and EDSACEXP stands for the year-wise total number of

Education, Sports, Art and Culture Expenditure of Gujarat state, and u_1 stands for error terms.

Regression results: (For 1986-87 to 2005-06 data)

Log PCI = 3.15378 + 1.5025 log (EDSACEXP)

(1.9568)   (4.820)*

R^2 = 0.684 $\bar{R}^2$ = 0.647   F = 8.455   DW = 2.243

* Significant at 5% level of significance

Regression results reveal that Education, Sports, Art and Culture Expenditure (EDSACEXP) has strong positive influence on the changes in the per capita income (PCI) of Gujarat State. Regression Coefficient is significant at 5% level of significance and it indicates that for Rs. 1 billion changes in the Education, Sports, Art and Culture Expenditure (EDSACEXP) variable, the changes in the per capital income (PCI) would change by Rs. 1.5025 billions. Thus during the entire study period from 1985-86 to 2005-06 a moderate impact on per capital income is observed. The R^2 indicates that the independent variable (EDSACEXP) explains 68% variation on per capital income (PCI) Variable. F-value is significant which suggests positive relationship between the variables for the whole result. D-W statistics shows absence of auto- correlation among residuals.

This result implies that the Education, Sports, Art and Culture Expenditure (EDSACEXP) is significant and has positive relationship on determination of Per Capita Income (PCI) in Gujarat State. This result also supports our hypothesis as mentioned earlier in Chapter-II.
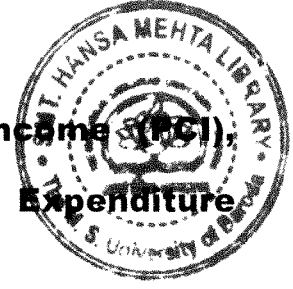
5.2.1.2. Dependent Variable: Per Capita Income (PCI); Independent Variable: Infrastructure Expenditure (INFRAEXP)

Model : Log PCI = $a + b_2$ log INFRAEXP $+ u_2$

Regression Results : (For 1986-87 to 2005-06 data)

Log PCI = 3.0968 + 1.0274 log INFRAEXP

(2.2284) (3.1373)[*]

R^2 = 0.6255 $\bar{R}^2$ = 0.578   F = 13.367   D-W = 2.312

* Significant at 5% level of significance

The above regression results supports the hypothesis that Infrastructure Expenditure (INFRAEXP) in Gujarat State is statistically significant at 5 % level of significance and has positive influence / relationship on the determination of Per Capita Income(PCI) in economic development during the study years 1985-86 to 2005-06. Regression coefficients of "INFRAEXP" indicate that for Rs. 1 billion change in the "INFRAEXP", the "PCI" would change by Rs. 1.0278 billions. The R^2 is significant which indicates that the independent variable (INFRAEXP) explains 63 % variation on the determination of Per Capita Income (PCI) during the study years. F-Value is also significant which suggests positive relationship between the variables for the whole results. D-W statistics value is significant and it indicates absence of auto-correlation among the residuals.

From the above analysis, we conclude that the Infrastructure Expenditure (INFRAEXP) in Gujarat State is significant and has positive relationship on the determination of Per Capita Income (PCI) year-wise. The analysis of these results confirms our hypothesis as stated earlier

in Chapter-II. This result also implies that the Infrastructure Expenditure (INFRAEXP) has the highest bearing on determination of Per Capita Income (PCI) in Gujarat State.

5.2.1.3. Dependent Variable: Per Capita Income (PCI), Independent Variable: Employment Labour Welfare Expenditure (EMPLWEXP)

Model : Log PCI = a +b_3 log (EMPLWEXP) + u_3

Regression Result: (For 1986-87 to 2005-06)

Log PCI = 3.5882 + 0.6566 log (EMPWD)

(2.1753)   (1.6823)*

R^2 = 0.427 R^2 = 0.396   F = 6.899   D-W = 1.96

* Significant at 5% level of significance

The regression result presented above supports the hypothesis that the Employment Labour Welfare (EMPLWEXP) in Gujarat state is statistically significant and has positive relationship on the determination of Per Capita Income (PCI) during the study period of 1985-86 to 2005-06. Regression coefficient is significant at 5% level of significance and it indicates that for Rs. 1 billion changes in the level of Employment Labour Welfare Expenditure (EMPLWEXP) variable, the changes in the Per Capita Income (PCI) would change by Rs. 0.6566 billions. The R^2 is low which suggests that the independent variable (EMPLWEXP) explains only 43 % of the percentage influence / variation on the determination of Per Capita Income (PCI) . F-value is significant meaning that there is a positive relationship between the variables. D.W statistics is 1.96 which confirm to some extent of presence of auto-correlation among residuals.

From the above analysis, we conclude that the Employment Labour Welfare Expenditure (EMPLWD) is significant and has positive relationship on the determination of Per Capita Income (PCI) in Gujarat state. This regression results confirms to our hypothesis as mentioned earlier in Chapter-II

5.2.1.4. Dependent Variable: Per Capita Income (PCI), Independent Variable: Health Family Welfare Expenditure (HFWEXP)

Model : Log PCI = a + b_4 log (HFWEXP) + u_4

Regression results : (For 1986-87 to 2005-06 data)

Log PCI = 2.8256 + 1.331 log HFWEXP

(1.9792)   (3.765)*

R^2 = 0.761 R^2 = 0.712   F = 19.218   D-W = 2.041

* Significant at 5% level of significance

The above results support the hypothesis that Health Family Welfare Expenditure (HFWEXP) coefficient is highly significant and it has positive relationship on the determination of Per Capita Income (PCI) year-wise in Gujarat State., The R^2 is also high which means that the level on Health Family Welfare Expenditure (HFWEXP) explains 76 % of the percentage influence of the Per Capita Income (PCI). Besides, F-value is statistically highly significant which reveals a positive relationship between the variables of the whole result. D-W statistics is significant and it indicates the absence of auto-correlation among the residuals.

Here, it is evident from the regression results that long-run changes in Health Family Welfare Expenditure (HFWEXP) are attributable to the level of Per Capita Income (PCI).This result implies that the level of Health Family Welfare Expenditure (HFWEXP) has the

highest bearing on the determination of Per Capita Income (PCI) year-wise in Gujarat State during the study period of 1985-86 to 2005-06.

From the above analysis, we conclude that the Health Family Welfare Expenditure (HFWEXP) is significant and has positive relationship on the determination of Per Capita Income (PCI) in Gujarat State. This result also supports our hypothesis in Chapter-II.

5.2.1.5. Dependent Variable: Per Capita Income (PCI), Independent Variable: Agriculture and Allied Activities Expenditure (AGRAAEXP)

Model : Log PCI = a + b_5 log (AGRAAEXP) + u_5

Regression Results : (For 1986-87 to 2005-06 data)

Log PCI = 1.1287 + 1.4428 Log AGRAAEXP

(0.7859)   (10.398)*

R^2 = 0.885 R^2 = 0.847   F = 20.400   D-W = 2.504

* Significant at 5% level of significance

The above regression results supports the fact that the relationship between Agriculture and Allied Activities Expenditure (AGRAAEXP) and Per Capita Income (PCI) is significant and positive as shown by the student's   t-values attached to it. The slope signifies that for the study years 1985-86 to 2005-06, year-wise number of Agriculture and Allied Activities Expenditure has positive influence on the determination of Per Capita Income year-wise. Coefficient of "AGRAAEXP" also indicates that for Rs. 1 billion change in the "AGRAAEXP", the" PCI" would change by Rs. 1.4428 billions. R^2 is significant which shows that year-wise number of 'AGRAAEXP 'is an important factor and explains 88 % of variations in Per Capita Income

(PCI). F-value is highly significant which show positive relationship between the variables for the whole result. Thus, Agriculture and Allied Activities Expenditure actually has positively influenced Per Capita Income in economic development of Gujarat State. D-W statistics indicates absence of auto-correlation among the residuals.

From the above analysis, we can conclude that the Agriculture and Allied Activities Expenditure is significant and has positive relationship on the determination of Per Capita Income for economic development in Gujarat State. This regression results confirms to our hypothesis as stated earlier in Chapter-II.

5.2.1.6. Dependent Variable: Per Capita Income (PCI), Independent Variable: Industries and Minerals Expenditure (INDMEXP)

Model : Log PCI = a + b_6 log INDMEXP + u_6

Regression Results : (For 1986-87 to 2005-06 data)

Log PCI = 1.9319 + 0.7529 log INDMEXP

(1.0866)   (2.495)*

R^2 = 0.597 R^2 = 0.526   F = 8.883   D-W = 2.340

*Significant at 5% level of significance

The above regression results, explains the fact that the Industries and Minerals Expenditure is statistically significant at 5 % level of significance and has positive influence / relationship or the determination of Per Capita Income year-wise in Gujarat State. This is indicated by the above critical level of student's t-value attached to 'INDMEXP'. However, R^2 is low meaning that the statistical relationship of 'INDMEXP explains only 59 % variation in Per Capita Income (PCI).

F-value however, is significant at 5 % level of significant with 7 degree of freedom which shows that the relationship between the two variables is significant. D-W statistics is significant which indicates the absence of auto-correlation among the residuals.

This result implies that the level of Industries and Minerals Expenditure has high bearing on the determination of Per Capita Income year-wise in Gujarat State during the study period of 1985-86 to 2005-06.

From the above analysis, we can conclude that the Industries and Minerals Expenditure is significant and has positive relationship on the determination of Per Capita Income in economic development of Gujarat State. This regression results confirms to our hypothesis as stated earlier in Chapter-II.

5.2.1.7 Dependent Variable: Per Capita Income (PCI), Independent Variable: General Economic Services Expenditure (GESSEXP)

Model : Log PCI = a + b_7 log (GESSEXP) + u_7

Regression Results : (For 1986-87 to 2005-06 data)

Log PCI = 5.6652 + 0.9187 Log GESSEXP

(4.4313)   (4.2780)*

R^2 = 0.705 R^2 = 0.668   F = 19.140   D-W = 2.411

* Significant at 5% level of significance

The above regression results supports the fact that the relationship between General Economic Services (GESSEXP) and Per Capita Income (PCI) is significant and positive as shown by the student's t-values attached to it. The slope signifies that for the study years 1985-86 to 2005-06, year-wise number of General Economic

Services (GESSEXP) has positive influence on the determination of Per Capita Income (PCI) year-wise. Coefficient of 'GESSEXP' also indicates that for Rs. 1 billion change in the "'GESSEXP', the "PCI" would change by Rs. 0.9187 billions

The R^2 is significant which shows that year-wise number of 'GESSEXP" is an important factor and explains 70 % of variations in Per Capita Income (PCI). F-value is significant which shows positive relationship between the variables for the whole result. Thus, General Economic Services actually has positively influenced Per Capita Income in economic development of Gujarat State D-W statistics is very poor and it indicates presence of auto-correlation among the residuals.

From the above analysis, we can conclude that the General Economic Services (GESSEXP) is significant and has positive relationship on the determination of Per Capita Income (PCI) in economic development of Gujarat State. This regression results confirms to our hypothesis as stated earlier in Chapter-II.

5.2.1.8. Dependent Variable: Per Capita Income (PCI), Independent Variable: Total Public Expenditure (TPEXP)

Model : Log PCI = a + b_8 log (TPEXP) + u_8

Regression Results : (For 1986-87 to 2005-06 data)

Log PCI = -2.1287 + 1.5731 Log TPEXP

(-0.8643)   (11.965)*

R^2 = 0.999 R^2 = 0.998   F = 895.412   D-W = 3.684

* Significant at 5% level of significance

The above regression results support the hypothesis that Total Public Expenditure (TPEXP) coefficient is highly significant and it has positive relationship on the determination of Per Capita Income (PCI) year-wise in Gujarat State., The R^2 is also high which means that the level of Total Public Expenditure (TPEXP) explains 99 % of the percentage influence of the Per Capita Income (PCI). Besides, F-value is statistically highly significant which reveals a positive relationship between the variables of the whole result. D-W statistics is significant and it indicates the absence of auto-correlation among the residuals.

Here, it is evident from the regression results that long-run changes in Total Public Expenditure (TPEXP) are attributable to the level of Per Capita Income (PCI).

This result implies that the level of Total Public Expenditure (TPEXP) has the highest bearing on the determination of Per Capita Income (PCI) year-wise in Gujarat State during the study period of 1985-86 to 2005-06.

From the above analysis, we conclude that the Total Public Expenditure (TPEXP) is significant and has positive relationship on the determination of Per Capita Income (PCI) in Gujarat State. This result also supports our hypothesis in Chapter-II.

Table- 5.2.1.9

Model I : The relationship between year-wise number of per capita income and various development schemes expenditure.

		A	B	R^2	R^2	F(1 , 8)	D-W
1	Log PCI= a + b_1Log EDSACEXP + U_1	3.15378 (1.9568)	1.5025 (4.820)*	0.684	0.647	9.455	2.680
2	Log PCI = a +b_2 Log INFRAEXP + U_2	3.0968 (2.2284)	1.0274 (3.137)*	0.625	0.578	13.367	2.312
3	Log PCI = a + b_3 Log EMPLWEXP + U_3	3.5882 (2.1753)	0.6566 (1.682)^x	0.427	0.396	6.899	2.243
4	log PCI = a + b_4 log HFWEXP + U_4	2.8256 (1.9792)	1.1331 (3.765)*	0.761	0.712	15.218	2.041
5	Log PCI= a + b_5 Log AGRAAEXP + U_5	1.1287 (0.7859)	1.4428 (10.398)*	0.885	0.847	20.400	2.504
6	Log PCI= a + b_6 Log INDMEXP + U_6	1.9319 (1.0866)	0.7528 (2.495)*	0.597	0.526	8.883	2.340
7	Log PCI= a + b_7 Log GESSEXP + U_7	5.6652 (4.4313)	0.9187 (4.2780)*	0.705	0.668	19.140	2..411
8	Log PCI= a + b_8 Log TPEXP + U_8	-2.1287 (-0.8643)	1.5731 (11.965)*	0.999	0.998	89.541	3.684

* Significant at 5% level

5.3.0 MULTIVARIATE MODEL

Model II : Log PCI = 1.1055 + 6.452 log EDSACEXP - 2.8964 log INFRAEXP

(2.657)   (4.998)*   (-3.5197)*

--0.2319   log   EMPWEXP+1.4377   log   HFWEXP   +   0.2453   Log AGRAAEXP

(-1.565)   (7.2698)*   (5.3851) *

- 1.5217 log INDMEXP + 0.5375 Log GESSEXP+ 1.1325 log TPEXP

(-12.769)*   (9.659)*   (19.420)*

R^2 = 0.999 R^2 = 0.998   F(1,9) = 902.319   D–W =2.85

*Significance at 5% level of significance

In the above multivariate regression result, it is evident that among that among independent variables, year-wise Total Public Expenditure (TPEXP),General Economic Services Expenditure (GESSEXP), Health Family Welfare Expenditure (HFWEXP), Agriculture and Allied Activities Expenditure (AGRAAEXP) , and Education, Sports, Art and Culture Expenditure (EDSACEXP) are statistically significant and have positive influence over the determination of Per Capita Income (PCI) year-wise in Gujarat State during the study years of 1986-87 to 2005-06. While the other variables namely year wise Industries and Minerals Expenditure (INDMEXP) and Infrastructure Expenditure (INFRAEXP) are highly significant with negative influence on the determination of Per Capita Income (PCI). Employment Labour Welfare Expenditure (EMPLWEXP) coefficient has negative sign and insignificant. The high values of R^2 and F-test suggest significant effect of the independent variables taken together. The R^2 value shows that the seven factors included together jointly

accounts to 99 % rate on the determination of Per Capita Income in Gujarat State, D-W statistics is moderate and it indicates absence of auto- correlation among residuals .And the insignificant of some of these variables, year wise indicates the existence of multi-collectivity among the independent variables.

This analysis reveals that when more independent variables are included together in the regression model they have a meaning relationship in the determination of year wise rate of Per Capita Income in Gujarat State. This result also supports our earlier hypotheses in chapter II.

The multiple regression analysis results discussed above are supported by a step-wise regression exercise in order to enable us to judge the effect of the inclusion of additional variable year-wise.

5.4.0   STEP-WISE REGRESSION ANALYSIS

(MODEL III)

The step-wise regression is often resorted in order to decide on the "best" explanatory variables year-wise throughout the study period of 1985-86 to 2005-06 in Gujarat State which determine the rate of Per Capita Income year-wise .We have however proceeded by introducing the independent variables one by one which is known as step-wise regression modeling. The functional forms of the regression models and results are given in table 5.4.1. Thus, we directly report the results for the cross-sectional relationship influence on determining the rate of Per Capita Income in economic development of Gujarat State.

Step I : Log PCI =   3.15378 + 1.5025 log (EDSACEXP)

(1.9568)   (4.820)*

R^2 = 0.684 R^2 = 0.647   F = 8.455   DW = 2.243

* Significant at 5% level of significance

The above equation indicates that year-wise number of Education, Sports, Art and Culture Expenditure (EDSACEXP) has positive influence on the determination of Per Capita Income year-wise in Gujarat State during the study period of 1985-86 to 2005-06. While R^2 is moderately significant and reveals 64 % influence of year-wise rate of Per Capita Income as shown by F statistical value. D-W is significant which indicates absence of auto- correlation among the residuals.

Step II : Log PCI = 2.7316 + 0.31204 log EDSACEXP + 0.8744 log INFRAEXP

$\quad\quad\quad$ (2.004) $\quad\quad$ (1.481) $\quad\quad\quad\quad$ (2.766)*

$R^2 = 0.699 \quad R^{-2} = 0.657 \quad F(1, 7) = 10.307 \quad$ D-W = 2.297

This result suggests that year-wise number of Infrastructure Expenditure (INFRAEXP) has a positive effect on determination of Per Capita Income which is not the case for first explanatory variable of Education, Sports, Art and Culture Expenditure (EDSACEXP) and this is supported by b and t – values of Infrastructure Expenditure coefficient in the above equation. Besides, R^{-2} statistics value indicates significant results and shows that 65 % variation in the rate of Per Capita Income in Gujarat State is explained by variable included in the model.

Step III : Log PCI = 6.918 – 1.291 log EDSACEXP + 1.944 log INFRAEXP

$\quad\quad$ (4.357) $\quad\quad$ (-2.184)* $\quad\quad\quad\quad$ (3.509)*

– 0.731 Log EMPLWEXP

(-2.657)**

$R^2 = 0.872 \quad R^2 = 0.760 \quad\quad F(1, 7) = 14.15 \quad$ D–W= 2.075

$\quad\quad\quad\quad$ * **significant at 5% level of significance**

$\quad\quad\quad\quad$ ** **significant at 1% level of significance**

The result indicates that among the independent variables, year-wise Infrastructure Expenditure (INFRAEXP) is highly significant and has positive relationship in determining the rate Per Capita Income during the study years 1986 to 2006 in Gujarat State Besides, year-wise Education, Sports, Art and Culture Expenditure (EDSACEXP) and Employment Labour Welfare Expenditure (EMPLWEXP) coefficient are significant with negative sign, R^2 statistic value is significant and reveals 76 % influence in the three factors jointly.

Step IV : Log PCI = 5.819 – 0.323 Log EDSACEXP + 1.284 Log INFRAEXP
(0.698) (-0.239) (4.325)*
-0.0572 log EMPLWEXP – 1.363 Log HFWEXP
(-2.157)* (-1.954)*
R^2 = 0.811 R^2 = 0.735 F(1 , 7) = 5.438 D–W = 0.85
* Significant of 1% level of significance

Step IV of the regression result, shows that among the independent variable, year wise Infrastructure Expenditure (INFRAEXP) is highly significant and has positive influence in determining the rate of Per Capita Income. Year-wise Employment / Labour Welfare Expenditure (EMPLWEXP) and Health Family Welfare Expenditure (HFWEXP) Coefficients are significant with a negative signs. Other variables namely Education, Sports, Art and Culture Expenditure (EDSACEXP) is insignificant with negative sign. The R^2 value shows that these variables included together have 73 % of the percentage influence for determining Per Capita Income of some of these variables. The values of R^2 and F-test along with most of the insignificant variables in the regression model suggest the existence of problem of multi co-linearity among the independent variables in Gujarat State.

Step V : Log PCI = 5.928 – 0.521 log EDSACEXP + 2.348 log INFRAEXP

$$(4.356) \quad (-6.765) \quad * \quad \quad (5.053)^{**}$$

$$- 0.75b \ \text{Log EMPLWEXP} - 1.314 \ \text{log HFWEXP} + 0.257 \ \text{Log}$$

AGRAAEXP

$$(-2.934)^{*} \quad\quad\quad (-1.833)^{*} \quad\quad (1.269)$$

$$R^2 = 0.884 \quad \bar{R}^2 = 0.768 \quad F\,(1,6) = 7.84 \quad D.W = 1.98$$

$*$ significant at 5% level of significance

$**$ significant at 1% level of significance

The above result indicates that only one explanatory variable namely, year-wise Infrastructure Expenditure (INFRAEXP) is highly significant and has positive correlation in the determination of the rate of year-wise Per Capita Income   in Gujarat State While, year-wise Education, Sports, Art and Culture Expenditure (EDSACEXP) , Health Family Welfare Expenditure (HFWEXP) Coefficients Employment / Labour Welfare Expenditure (EMPLWEXP) and Health Family Welfare Expenditure (HFWEXP) Coefficients are significant with negative signs besides, Agriculture and Allied Activities Expenditure (AGRAAEXP) is insignificant with   positive sign.. The R^2 value explains that these variables included together have 77 % of the percentage influence in determining the rate of Per Capita Income in Gujarat State as indicated by the significant of F-statistical value in the whole result D-w is low which indicates the presence of auto-correlation among residuals.

Step VI : Log PCI = 2.7196 - 0.303 log EDSACEXP + 1.011 log INFRAEXP

$$(12.88) \quad (-3.667)^{*} \quad\quad\quad (5.623)^{**}$$

$$- 0.347 \ \text{log EMPLWEXP} + 0.036 \ \text{log HFWEXP}$$

$$(-5.389)^{*} \quad\quad\quad\quad (0.344)$$

$$- \quad 0.0183 \ \text{log AGRAAEXP} + 1.1014 \ \text{Log INDMEXP}$$

$$(-0.536) \quad\quad\quad\quad (27.224)^{*}$$

$$R^2 = 0.9992 \quad \bar{R}^2 = 0.9979 \quad F\,(1,6) = 827.5 \quad D\text{–}W = 2.112$$

$*$ Significant at 5% level of significance

$**$ Significant at 1% level of significance

The above result suggests among the independent variables, year-wise Industries and Minerals Expenditure (INDMEXP) coefficient and Infrastructure Expenditure (INFRAEXP) coefficient are both highly significant and positively influenced by Per Capita Income doing the study years 1986 to 2006 in Gujarat State. Regression Coefficient of "INDMEXP" indicates that for Rs. 1 billion change in "INDMEXP", the "PCI" will change by Rs. 1.1014 billion. Coefficient of "INFRAEXP" indicates that for Rs. 1 billion change in "INFRAEXP", the "PCI" will change by Rs. 1.011 billions. While, year-wise Employment / Labour Welfare Expenditure (EMPLWEXP) coefficient and Education, Sports, Art and Culture Expenditure (EDSACEXP) coefficient are statistically significant and have strong negative influence on Per Capita Income. Agriculture and Allied Activities Expenditure (AGRAAEXP) is insignificant with negative sign. Health Family Welfare Expenditure (HFWEXP) coefficient has lowest positive impact on Per Capita Income. The R^2 value explains that these six economic development variables included together have 99 percent by the percentage influence by Per Capita Income in Gujarat State F-value shows high statistical significance which implies that the development independent variables have high influence on determining the rate Per Capita Income from the whole result in the study of Gujarat state economy D-w is moderate which indicates absence of auto correlation among residuals.

STEP VII : Log PCI = -2.1055 – 5.332 log EDSACEXP + 2.8289 log INFRAEXP

$$(-3.780) \quad (-4.222) \quad\quad (3.780)^*$$

--3.21319 log EMPLWEXP + 1.67167 HFWEXP + 0.2929 Log AGRAAEXP

$$(-1.625) \quad\quad (11.214)^* \quad (7.270)^*$$

- 1.31007 log INDMEXP + 0.5375 Log GESSEXP

$$(-17.317)^* \quad\quad (21.835)^*$$

$$R^2 = 0.999 \quad R^2 = 0.998 \quad F(1,9) = 902.319 \quad D\text{–}W = 1.99$$

*Significance at 5% level of significance

It is revealed from the above estimates that Regression coefficient of "GESSEXP" "HFWEXP" and "INFRAEXP" variables among the independent variables have strong positive impact on "PCI", while "INDMEXP" and "EDSACEXP" coefficient have strong negative influence on "PCI". About 98% of variables in PCI are explained by seven development variables jointly. D-W statistics indicates presence of auto-correlation among residuals. All tests of individual parameters show that each regression co-efficient is highly significant. Our estimate has high validity and regression result strongly confirms our view point about the relationship between Per Capita Income (PCI) and various development expenditure of Gujarat State as shown by F-test.

This analysis reveals that when more independent variables are included together in the regression model they have a meaning relationship in the determination of year wise rate of Per Capita Income in Gujarat State. This result also supports our earlier hypotheses in chapter II.

STEP VIII: Log PCI =1.1055 + 6.452 log EDSACEXP - 2.8964 log INFRAEXP

$$(2.657) \quad (4.998)^* \quad\quad\quad (-3.5197)^*$$

--0.2319 log EMPWEXP+1.4377 log HFWEXP + 0.2453 Log AGRAAEXP

$$(-1.565) \quad\quad\quad (7.2698)^* \quad\quad (5.3851)^*$$

- 1.5217 log INDMEXP + 0.5375 Log GESSEXP+ 1.1325 log TPEXP

$$(-12.769)^* \quad\quad\quad (8.659)^* \quad\quad\quad\quad (19.420)^*$$

$R^2 = 0.999$ $\quad$ $R^2 = 0.998$ $\quad$ F(1,9) = 902.319 $\quad$ D–W =2.85

*Significance at 5% level of significance

In the above multivariate regression result, it is evident that among that among independent variables, year-wise Total Public Expenditure (TPEXP),General Economic Services Expenditure (GESSEXP), Health Family Welfare Expenditure (HFWEXP),

Agriculture and Allied Activities Expenditure (AGRAAEXP) , and Education, Sports, Art and Culture Expenditure (EDSACEXP) are statistically significant and have positive influence over the determination of Per Capita Income (PCI) year-wise in Gujarat State during the study years of 1986-87 to 2005-06. While the other variables namely year wise Industries and Minerals Expenditure (INDMEXP) and Infrastructure Expenditure (INFRAEXP) are highly significant with negative influence on the determination of Per Capita Income (PCI). Employment Labour Welfare Expenditure (EMPLWEXP) coefficient has negative sign and insignificant. The high values of R^2 and F-test suggest significant effect of the independent variables taken together. The R^2 value shows that the seven factors included together jointly accounts to 99 % rate on the determination of Per Capita Income in Gujarat State, D-W statistics is moderate and it indicates absence of auto- correlation among residuals .And the insignificant of some of these variables, year wise indicates the existence of multi-collectivity among the independent variables.

This analysis reveals that when more independent variables are included together in the regression model they have a meaning relationship in the determination of year wise rate of Per Capita Income in Gujarat State. This result also supports our earlier hypotheses in chapter II.

Table- 5.4.1

Model III : Step-wise Regression results of Year-wise Per Capita Income by various Development Schemes Expenditure in Gujarat State for the study year 1986-87 - 2005-06.

		R_2	R_2	F	D-W
Step I: Log PCI	= 3.1537 + 1.502 log EDSACEXP (1.956) (4.820)*	0.684	0.647	8.455	2.243
Step II: Log PCI	= 2.7316 + 0.31204 log EDSACEXP + 0.8744 log INFRAEXP (2.004) (1.481) (2.766)*	0.699	0.657	10.307	2.297
Step III: Log PCI	= 6.918 – 1.291 Log PCI + 1.944 Log GSDP (4.357) (-2.184)* (3.504)* (-2.657)**	0.872	0.760	14.15	2.075
Step IV: Log PCI	= 5.819 – 0.323 Log EDSACEXP + 2289 Log INFRAEXP – 0.0572 Log EMPLWEXP – 1.363 Log HFWEXP (0.698) (-0.279) (4.325)* (-2.157)* (-1.833)*	0.811	0.775	5.435	1.975
Step V : Log PCI	= 5.928 – 0.521 log EDSACEXP + 2.348 log INFRAEXP- 0.75b Log EMPLWEXP – 1.314 log HFWEXP (4.356) (-6.765) (5.053)** (-2.934)* (-1.833)* + 0.257 Log AGRAAEXP 1.269	0.884	0.768	7.84	1.886
Step VI: Log PCI	= 2.7196 – 0.303 Log EDSACEXPI + 1.011 Log INFRAEXP – 0.347 Log EMPLWEXP + 0.036 LogHFWEXP (12.88) (-3.667)^{X} (5.623)^{XX} (-5.389)^{X} (0.344) – 0.0183 Log AGRAAEXP + 1.1014 Log INDMEXP (-0.536) (27.224)^{X}	0.999	0.997	827.5	2.112

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Condt... Table- 5.4.1 Model -III

	Equation			
Step VII : Log PCI	= -2.1055 - 5.332 log EDSACEXP + 2.8289 log INFRAEXP (-3.780) (-4.222) (3.780)* -3.21319 log EMPLWEXP + 1.67167 HFWEXP + 0.2929 Log AGRAAEXP (-1.625) (11.214)* (7.270)* - 1.31007 log INDMEXP + 0.5375 Log GESSEXP (-17.317)* (21.835)*	0.999	0.998	902.319	2..190
Step VIII : Log PC	= 1.1055 + 6.452 log EDSACEXP - 2.8964 log INFRAEXP - 0.2319 log EMPWEXP (2.657) (4.998)* (-3.5197)* (-1.565) +1.4377 log HFWEXP + 0.2453 Log AGRAAEXP (7.2698)* (5.3851)* - 1.5217 log INDMEXP + 0.5375 Log GESSEXP+ 1.1325 log TPEXP (-12.769)* (8.659)* (19.420)*	0.999	0.998	902.319	2.85

*Significant at 5% level of significance
**Significant at 1% level of significance

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Table 5.4.2

Correlation Matrix of Per Capita Income by various development Expenditure schemes

Correlation	PCI	EDSACEXP	INFRAEXP	EMPLWEXP	HFWEXP	AGRAAEXP	INDNEXP	GESSEXP	TPEXP
PCI	1.0000	0.5704	0.6589	0.6234	0.5751	0.7147*	0.4317	0.6789	0.8974**
EDSACEXP		1.0000	0.8965**	0.7586*	0.9461**	0.7513*	0.7769*	0.7307*	0.7895*
INFRAEXP			1.0060	0.9290**	0.9648**	0.8960**	0.7830*	0.8253**	0.9321**
EMPLWEXP				1.0000	0.8884**	0.8960**	0.7830*	0.7980*	0.9748**
HFWEXP					1.0000	0.8518**	0.7947*	0.8140*	0.8564**
AGRAAEXP						1.0000	0.8017*	0.9212**	0.9934**
INDMEXP							1.0000	0.9846**	0.9153**
GESSEXP								1.0000	0.8769*
TPEXP									1.0000

* significant at 1% level of significance (one failed)
** Significant at 0.1% level of significance (one failed)

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Table- 5.5.0

Year-wise total number of Per Capita Income Expenditure and various Economic Development Schemes in Gujarat State during the study years of 1985-86 to 2005-06

	PCI	EDSACEXP	INFRAEXP	EMPLWEXP	HFWEXP	AGRAEXP	INDMEXP	GESSEXP	TPEXP
1986-87	2688	47073	190.06	42.30	166.84	187.71	117.53	31.7	1882.53
1987-88	3756	580.02	234.3	40.22	177.34	250.48	135.33	43.96	2384.93
1988-99	4631	678.33	187.02	54.09	209.06	329.75	129.00	45.41	2463.24
1989-90	5372	810.71	314.62	42.76	238.19	255.42	107.79	56.62	3677.53
1990-91	6955	915.76	470.02	30.24	252.4	312.88	133.59	60.29	3838.02
1991-92	7734	1057.75	260.94	42.02	275.75	412.39	162.5	80.81	3958.43
1992-93	8285	1068.84	310.68	40.89	297.82	378.5	142.35	69.74	3998.08
1993-94	9796	1314.80	362.90	56.24	377.50	299.70	168.40	59.15	-
1994-95	1264	1571.74	384.45	63.85	414.57	357.94	180.98	70.95	1374.37
1995-96	13645	1886.94	465.38	67.31	470.89	492.18	353.8	133.08	6138.86

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Contd... Table- 5.5.0

Year									
1996-97	16183	17117	422.84	31.42	480.56	537.35	209.7	156.84	5566.40
1997-98	16585	2247.47	684.91	78.20	650.17	641.53	663.33	171.1	6778.65
1998-99	19001	3141.15	918.93	97.19	877.17	768.47	300.41	196.74	10804.68
1999.00	18831	2989.28	783.93	105.24	981.99	836.97	326.05	276.25	10092.39
2000-01	17938	3446.53	959.3	137.97	951.07	956.33	491.07	433.75	12476.03
2001-02	19713	3271.44	838.3	100.54	728.77	1024.31	376.85	213.8	15552.39
2002-03	22624	3640.65	1085.8	122.68	863.54	719.7	277.65	270.37	14707.37
2003-04	26672	3686.2	1222	122.61	885.6	955.28	282.3	397.06	14707.37
2004-05	28355	3736.96	1190.44	121.02	913.74	975.09	223.1	388.46	14235.78
2005-06	29234	4295.2	1888.3	133.49	1070.05	1101.13	353.4	418.89	14077.30

Data source: Gujarat Government Budget in brief Gujarat State An Analytical Summary, Directorate of Economics and Statistics Government of Gujarat, Gandhinagar.

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5.6.0   CONCLUDING REMARKS

From model I (Table 5.2.1.8) results analysis reveals that Total Public Expenditure, Agriculture and Allied Activities Expenditure, Education, Sports, Art and Culture Expenditure, General Economic Services Expenditure, Health Family Welfare Expenditure, Infrastructure Expenditure and Industries and Minerals Expenditure in Gujarat State are significant and they have positive influence on the determination of Per Capita Income year-wise. /While year-wise number of Employment Labour Welfare Expenditure is lagging behind. In this case, one could notice a variation in determining the rate of Per Capita Income with respect to economic development expenditure patterns in Gujarat State during the study year 1985-86 to 2005-06.

Modal III (Table 5.4.1) depicts that when more independent variables are included together jointly in the regression analysis, General Economic Services Expenditure, Health Family Welfare Expenditure, Agriculture and Allied Activities Expenditure, Infrastructure Expenditure, Industries and Minerals Expenditure, Education, Sports, Art and Culture Expenditure have meaningful relationship and influence in determining the rate of Per Capita Income year-wise in economic development. of Gujarat State. This analysis supports our hypotheses as stated in Chapter II. And it is also true that the rate of Per Capita Income is related to various development expenditure in Gujarat State. In this chapter, the empirical analysis already undertaken reveals experience in State Per Capita Income and various development expenditure. This analysis leads us to the conclusion that the rate of Per Capita Income is not only determined by economic development expenditure patterns alone, but there are a number of efficient government, planning and management and proper implementation of development schemes and socio-political factors which shape the nature and pattern of state economic development

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In the present study, we have already examined empirically economic analysis of public expenditure in relation to economic development of Gujarat State. Therefore, in further research, heuristic model could be developed to determine and establish a simultaneous causal relationship of existing and future Per Capita Income associated with various development expenditure patterns over space and time. The model will attempt to solve the two hypotheses simultaneously as stated in chapter II that Per Capita Income in a given state is function of various development expenditure schemes / patterns (Wagner's Law of Economic Growth to growth Public E.) and reciprocal proposition that various development expenditure schemes / patterns is function of Per Capita Income is also true (Keynes Model of expansion of public expenditure to economic growth). This would be worked out and developed with realistic assumption. Hence, the ability of the model to address practical concern to future economic development should also be considered.

5.7.0 THE RELATIONSHIP BETWEEN YEAR-WISE GROSS STATE DOMESTIC PRODUCT AND VARIOUS DISAGGREGATED DEVELOPMENT SCHEMES / CATEGORIES EXPENDITURE.

By fitting the double natural logarithmic (Log) relationship as mentioned earlier in this chapter to the cross -sectional data (20 x 8) matrix of disaggregated development · expenditure schemes / categories for the study years 1985-86 to 2005-06 as indicated in table 5,5.0 and having taken these schemes / categories as independent variables and gross state domestic product as dependent variable, we have obtained the following results as shown in table 5.7.1.8 below by examining the relationship one after another.

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5.7.1 TWO VARIABLE REGRESSION MODEL

Regression estimates as mentioned earlier in this chapter for this aspect covering period from 1986-87 to 2005-06 is presented with both dependent and independent variables in natural logarithmic (Log) below one after another.

5.7.1.1 Dependent Variable: Gross State Domestic Product (GSDP), Independent Variable: Education, Sports, Art and Culture Expenditure (EDSACEXP)

Model : Log GSDP = a + b_1 Log EDSACEXP + u_1

Where GSDP stands for total number of gross state domestic product year-wise and EDSACEXP stands for the year-wise total number of Education, Sports, Art and Culture Expenditure of Gujarat state, and u_1 stands for error terms.

Regression results: (For 1986-87 to 2005-06 data)

Log GSDP =   -2.4133 + 1.0684 log (EDSACEXP)

(-0.8827)   (3.256)*

R^2 = 0.580 R^2 = 0.527   F = 11.063   DW = 1.994

* Significant at 5% level of significance

The above regression results indicates that Education, Sports, Art and Culture Expenditure (EDSACEXP) in Gujarat State is statistically significant at 5% level of significance and has strong positive influence on the changes in the gross state domestic product (GSDP). Regression Coefficient indicates that for Rs. 1 billion changes in the Education, Sports, Art and Culture Expenditure (EDSACEXP) variable, the changes in the Gross State Domestic Product (GSDP) would

change by Rs. 1.0684 billions. Thus during the entire study period from 1985-86 to 2005-06 a moderate impact on Gross State Domestic Product is observed. The R^2 indicates that the independent variable (EDSACEXP) explains 58% variation on Gross State Domestic Product (GSDP) variable. F-value is significant which suggests positive relationship between the variables for the whole result. D-W statistics value is poor and it shows presence of auto- correlation among residuals.

This result implies that the Education, Sports, Art and Culture Expenditure (EDSACEXP) is significant and has positive relationship on determination of Gross State Domestic Product (GSDP) in Gujarat State. This result also supports our hypothesis as mentioned earlier in Chapter-II.

5.7.1.2. Dependent Variable: Gross State Domestic Product (GSDP), Independent Variable: Infrastructure Expenditure (INFRAEXP)

Model : Log GSDP = a + b$_2$ log INFRAEXP + u$_2$

Regression Results : (For 1986-87 to 2005-06 data)

Log GSDP = -1.1304 + 1.6889 log INFRAEXP

(-0.4019)   (2.6603)*

R^2 = 0.516 R^2 = 0.456   F = 8.536   D-W = 2.161

* Significant at 5% level of significance

The above regression results supports the hypothesis that Infrastructure Expenditure (INFRAEXP) in Gujarat State is statistically significant at 5 % level of significance and has positive influence on the changes in the Gross State Domestic Product (GSDP) of economic

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development during the study years 1985-86 to 2005-06. Regression coefficients of "INFRAEXP" indicate that for Rs. 1 billion change in the "INFRAEXP", the "GSDP" would change by Rs. 1.6889 billions. The R^2 is significant which indicates that the independent variable (INFRAEXP) explains 51 % variation on the Gross State Domestic Product (GSDP) in Gujarat State during the study years. F-value is also significant which suggests positive relationship between the variables for the whole results. D-W statistics value is significant and it indicates absence of auto-correlation among the residuals.

From the above analysis, we conclude that the Infrastructure Expenditure (INFRAEXP) in Gujarat State is significant and has positive relationship on the changes in the Gross State Domestic Product (GSDP) year-wise. The analysis of these results confirms our hypothesis as stated earlier in Chapter-II. This result also implies that the Infrastructure Expenditure (INFRAEXP) has high bearing on determination of Gross State Domestic Product (GSDP) in Gujarat State.

5.7.1.3. Dependent Variable: Gross State Domestic Product (GSDP), Independent Variable: Employment Labour Welfare Expenditure (EMPLWEXP)

Model : Log GSDP = a +b$_3$ log (EMPLWEXP) + u$_3$

Regression Result: (For 1986-87 to 2005-06)

Log GSDP = 2.7368 + 1.0688 log (EMPWD)

(0.9963)   (1.9586)*

R^2 = 0.447 R^2 = 0.366   F = 4.268   D-W = 2.188

* Significant at 5% level of significance

The regression result presented above supports the hypothesis that the Employment Labour Welfare (EMPLWEXP) in Gujarat state is statistically significant and has positive relationship on the determination of Gross State Domestic Product (GSDP) during the study period of 1985-86 to 2005-06. Regression coefficient is significant at 5% level of significance and it indicate that for Rs. 1 billion changes in the level Employment Labour Welfare Expenditure (EMPLWEXP) variable, the changes in the Gross State Domestic Product (GSDP) would change by Rs.1.0688 billions. The R^2 is low which suggests that the independent variable (EMPLWEXP) explains only 44 % of the percentage influence / variation on the Gross State Domestic Product (GSDP). F-value is significant meaning that there is a positive relationship between the variables. D.W statistics is 2.188 which confirm to some extent of absence of auto-correlation among residuals.

From the above analysis, we conclude that the Employment Labour Welfare Expenditure (EMPLWD) is significant and has positive relationship on the changes in the Gross State Domestic Product of Gujarat state. This regression results confirms to our hypothesis as mentioned earlier in Chapter-II.

5.7.1.4. Dependent Variable: Gross State Domestic Product (GSDP), Independent Variable: Health Family Welfare Expenditure (HFWEXP)

Model : Log GSDP = a + b_4 log (HFWEXP) + u_4

Regression results : (For 1986-87 to 2005-06 data)

Log GSDP = -1.2872 + 1.6208 log HFWEXP

(-0.4213)   (2.4289)*

R^2 = 0.59 R^2 = 0.52   F = 7.77   D-W = 2.120

* Significant at 5% level of significance

The above results support the hypothesis that Health Family Welfare Expenditure (HFWEXP) coefficient is significant and it has positive relationship on the changes in the Gross State Domestic Product (GSDP) year-wise in Gujarat State., The R^2 is also moderate which means that the level of Health Family Welfare Expenditure (HFWEXP) explains 59 % of the percentage influence of the Gross State Domestic Product (GSDP). Besides, F-value is statistically highly significant which reveals a positive relationship between the variables of the whole result. D-W statistics is significant and it indicates the absence of auto-correlation among the residuals. Here, it is evident from the regression results that long-run changes in Health Family Welfare Expenditure (HFWEXP) are attributable to the level of Gross State Domestic Product (GSDP).

This result implies that the level of Health Family Welfare Expenditure (HFWEXP) has a bearing on the changes in the Gross State Domestic Product (GSDP) year-wise in Gujarat State during the study period of 1985-86 to 2005-06.

From the above analysis, we conclude that the Health Family Welfare Expenditure (HFWEXP) is significant and has positive relationship on the Gross State Domestic Product (GSDP) in Gujarat State. This result also supports our hypothesis in Chapter-II.

5.7.1.5. Dependent Variable: Gross State Domestic Product (GSDP), Independent Variable: Agriculture and Allied Activities Expenditure (AGRAAEXP)

Model : Log GSDP = a + b_5 log (AGRAAEXP) + u_5

Regression Results : (For 1986-87 to 2005-06 data)

Log GSDP = -3.7266 + 2.16759 Log AGRAAEXP

(-0.9622)   (2.4524)*

R^2 = 0.684 $\bar{R}^2$ = 0.623   F = 7.77   D-W = 2.120

* Significant at 5% level of significance

The above regression results supports the fact that the relationship between Agriculture and Allied Activities Expenditure (AGRAAEXP) and Gross State Domestic Product (GSDP) is significant and positive as shown by the student's t-values attached to it. The slope signifies that for the study years 1985-86 to 2005-06, year-wise number of Agriculture and Allied Activities Expenditure has positive influence on the changes in the Gross State Domestic Product (GSDP) year-wise. Coefficient of "AGRAAEXP" also indicates that for Rs. 1 billion change in the "AGRAAEXP", the" GSDP" would change by Rs. 2.16759 billions. R^2 is significance which shows that year-wise number of 'AGRAAEXP 'is an important factor and explains 68 % of variations in Gross State Domestic Product (GSDP). F-value is highly significant which show positive relationship between the variables for the whole result. Thus, Agriculture and Allied Activities Expenditure actually has positively influenced Gross State Domestic Product (GSDP) in economic development of Gujarat State. D-W statistics indicates absence of auto-correlation among the residuals.

From the above analysis, we can conclude that the Agriculture and Allied Activities Expenditure is significant and has positive relationship on the determination of Gross State Domestic Product for economic development in Gujarat State. This regression results confirms to our hypothesis as stated earlier in Chapter-II.

5.7.1.6. Dependent Variable: Gross State Domestic Product (GSDP), Independent Variable: Industries and Minerals Expenditure (INDMEXP)

Model : Log GSDP = a + b_6 log INDMEXP + u_6

Regression Results : (For 1986-87 to 2005-06 data)

Log GSDP = 2.4180 + 1.6143 log INDMEXP

(0.6588)   (1.8994)*

R^2 = 0.507 R^2 = 0.462   F = 8.883   D-W = 2.350

*Significant at 5% level of significance

The above regression results, explains the fact that the Industries and Minerals Expenditure is statistically significant at 5 % level of significance and has positive influence / relationship on the changes in the Gross State Domestic Product (GSDP) year-wise in Gujarat State. This is indicated by the above critical level of student's t-value attached to 'INDMEXP'. However, R^2 is low meaning that the statistical relationship of 'INDMEXP explains only 50 % variation in the Gross State Domestic Product (GSDP). F-value however, is significant at 5 % level of significant with 7 degree of freedom which shows that the relationship between the two variables is significant. D-W statistics is significant and it indicates the absence of auto-correlation among the residuals.

This result implies that the level of Industries and Minerals Expenditure has high bearing on the changes in the Gross State Domestic Product year-wise in Gujarat State during the study period of 1985-86 to 2005-06.

From the above analysis, we can conclude that the Industries and Minerals Expenditure is significant and has positive relationship on the

changes in the Gross State Domestic Product in economic development of Gujarat State. This regression results confirms to our hypothesis as stated earlier in Chapter-II.

5.7.1.7 Dependent Variable: Gross State Domestic Product (GSDP), Independent Variable: General Economic Services Expenditure (GESSEXP)

Model : Log GSDP = a + b_7 log (GESSEXP) + u_7

Regression Results : (For 1986-87 to 2005-06 data)

Log GSDP = 2.6663 + 1.4314 Log GESSEXP

(1.4536)   (3.0298)*

R^2 = 0.702 R^2 = 0.657   F = 10.043   D-W = 1.994

* Significant at 5% level of significance

The above regression results supports the fact that the relationship between General Economic Services (GESSEXP) and Gross State Domestic Product (GSDP) is significant and positive as shown by the student's t-values attached to it. The slope signifies that for the study years 1985-86 to 2005-06, year-wise number of General Economic Services (GESSEXP) has positive influence on the changes in the Gross State Domestic Product (GSDP) year-wise. Coefficient of 'GESSEXP' also indicates that for Rs. 1 billion change in the "'GESSEXP', the "GSDP" would change by Rs. 1.4314 billions

The R^2 is significance which shows that year-wise number of 'GESSEXP" is an important factor and explains 70 % of variations in Gross State Domestic Product (GSDP). F-value is also significant which shows positive relationship between the variables for the whole result. Thus, General Economic Services actually has positively influenced

Gross State Domestic Product in economic development of Gujarat State D-W statistics is very poor and it indicates presence of auto-correlation among the residuals.

From the above analysis, we can conclude that the General Economic Services (GESSEXP) is significant and has positive relationship on the determination of Gross State Domestic Product (GSDP) in economic development of Gujarat State. This regression results confirms to our hypothesis as stated earlier in Chapter-II.

5.7.1.8 Dependent Variable: Gross State Domestic Product (GSDP), Independent Variable: Total State Public Expenditure (TSPEXP)

Model : Log GSDP = a + b_8 log (TSPEXP) + u_8

Regression Results : (For 1986-87 to 2005-06 data)

Log GSDP = 3.2175 + 1.6198 Log TSPEXP

(1.8624)   (7.1583)*

R^2 = 0.80 $\bar{R}^2$ = 0.79   F = 13.230   D-W = 2.431

* Significant at 5% level of significance

The above regression results supports the fact that the relationship between Total State Public Expenditure (TSPEXP) and Gross State Domestic Product (GSDP) is significant and positive as shown by the student's t-values attached to it. The slope signifies that for the study years 1985-86 to 2005-06, year-wise number of Total State Public Expenditure (TSPEXP) has positive influence on the changes in the Gross State Domestic Product (GSDP) year-wise. Coefficient of 'TSPEXP' also indicates that for Rs. 1 billion change in the "TSPEXP', the "GSDP" would change by Rs. 1.6198 billions

The R^2 is significance which shows that year-wise number of 'TSPEXP" is an important factor and explains 80 % of variations in Gross State Domestic Product (GSDP). F-value is also significant which shows positive relationship between the variables for the whole result.

Thus, General Economic Services actually has positively influenced Gross State Domestic Product in economic development of Gujarat State D-W statistics is very poor and it indicates presence of auto-correlation among the residuals.

From the above analysis, we can conclude that the Total State Public Expenditure (TSPEXP) is significant and has positive relationship on the determination of Gross State Domestic Product (GSDP) in economic development of Gujarat State. This regression results confirms to our hypothesis as stated earlier in Chapter-II.

Table- 5.7.1.9

Model I : The relationship between year-wise number of Gross State Domestic Product and various development expenditure schemes.

		A	b	R^2	R^2	F(1,8)	D-W
1	Log GSDP= a + b_1Log EDSACEXP + U_1	-2.4133 (-0.8827)	1.0684 (3.356)*	0.58	0.527	11.063	1.994
2	Log GSDP = a +b_2 Log INFRAEXP + U_2	-1.1304 (-0.4019)	1.6889 (2.6603)*	0.51	0.456	8.536	2.161
3	Log GSDP = a + b_3 Log EMPLWEXP + U_3	2.7368 (0.9963)	1.0688 (1.9586)^x	0.44	0.366	4.268	2.188
4	Log GSDP = a + b_4 log HFWEXP + U_4	-1.2872 (-0.4213)	1.6208 (2.6208)*	0.59	0.52	7.77	2.120
5	Log GSDP = a + b_5 Log AGRAAEXP + U_5	-3.7266 (-0.9622)	2.1659 (2.4524)*	0.68	0.623	8.79	2.120
6	Log GSDP = a + b_6 Log INDMEXP + U_6	2.4180 (0.6588)	1.6143 (1.8994)*	0.51	0.46	8.883	2.350
7	Log GSDP = a + b_7 Log GESSEXP + U_7	2.6663 (1.4536)	1.4314 (3.0298)*	0.70	0.66	10.043	1.994
8	Log GSDP = a + b_8 Log TSPEXP + U_8	3.2175 (1.8624)	1.6198 (7.1583)*	0.80	0.79	13.230	2.431

* Significant at 5% level

5.8.0   MULTIVARIATE MODEL

Model II : Log GSDP = -5.1736 + 0.94240 log EDSACEXP + 0.2987 log INFRAEXP

$$(-0.3587) \quad (2.8914)^* \quad\quad\quad (1.4538)$$

$$+ 1.2316 \text{ log EMPLWEXP} - 1.6190 \text{ HFWEXP} - 2.3109$$

Log AGRAAEXP

$$(2.9145)^* \quad\quad (-3.8706)^* \quad\quad (-1.9899)^*$$

$$+ 0.3189 \text{ log INDMEXP} - 0.4269 \text{ Log GESSEXP} + $$

1.6413 Log TPEXP

$$(9.4317)^* \quad\quad\quad\quad (-5.835)^*$$

$(13.325)^*$

$$R^2 = 0.999 \quad \bar{R}^2 = 0.998 \quad F(1,9) = 913.509 \quad D\text{--}W = $$

2.653

*Significance at 5% level of significance

In the above multivariate regression result, it is evident that among that among independent variables, Total Public Expenditure (TPEXP), Industries and Minerals Expenditure (INDMEXP), Employment Labour Welfare Expenditure (EMPLWEXP), Education, Sports, Art and Culture Expenditure (EDSACEXP) are statistically significant and have positive influence over the changes in the Gross State Domestic Product (GSDP) year-wise in Gujarat State during the study years of 1985-86 to 2005-06. While the other variables namely year wise General Economic Services (GESSEXP), Health Family Welfare Expenditure (HFWEXP) and Agriculture and Allied Activities Expenditure (AGRAAEXP) are highly significant with negative influence on the determination of Gross State Domestic Product (GSDP). Infrastructure Expenditure (INFRAEXP) coefficient has positive sign and insignificant. The high values of R^2 and F-test suggest significant effect of the independent variables taken together. The R^2 value shows that the seven factors included together jointly   accounts to 97 % rate on the determination of Gross State Domestic Product in Gujarat State. D-

W statistics is moderate and it indicates absence of auto-correlation among residuals .And the insignificant of some of these variables, year wise indicates the existence of multi-collectivity among the independent variables.

This analysis reveals that when more independent variables are included together in the regression model they have a meaning relationship in the determination of year-wise rate of Gross State Domestic Product in Gujarat State in Gujarat State. This result also supports our earlier hypotheses in chapter II.

The multiple regression analysis results discussed above are supported by a step-wise regression exercise in order to enable us to judge the effect of the inclusion of additional variable year-wise.

5.9.0 STEP-WISE REGRESSION ANALYSIS
(MODEL III)

The step-wise regression is often resorted in order to decide on the "best" explanatory variables year-wise throughout the study period of 1985-86 to 2005-06 in Gujarat State which determine the rate of Gross State Domestic Product year-wise .We have however proceeded by introducing the independent variables one by one which is known as step-wise regression modeling. The functional forms of the regression models and results are given in table 5.9.1. Thus, we directly report the results for the cross-sectional relationship influence on determining the rate of Per Capita Income in economic development of Gujarat State.

Step I : Log GSDP =   -2.4133 + 1.0684 log (EDSACEXP)

(-0.8827)   (3.256)*

$R^2 = 0.580$ $R^2 = 0.527$ F = 11.063   DW = 1.994

* Significant at 5% level of significance

The above regression results indicates that Education, Sports, Art and Culture Expenditure (EDSACEXP) in Gujarat State is statistically significant at 5% level of significance and has strong positive influence on the changes in the gross state domestic product (GSDP). Regression Coefficient indicates that for Rs. 1 billion changes in the Education, Sports, Art and Culture Expenditure (EDSACEXP) variable, the changes in the Gross State Domestic Product (GSDP) would change by Rs. 1.0684 billions. Thus during the entire study period from 1985-86 to 2005-06 a moderate impact on Gross State Domestic Product is observed. The R^2 indicates that the independent variable (EDSACEXP) explains 58% variation on Gross State Domestic Product (GSDP) variable. F-value is significant which suggests positive relationship between the variables for the whole result. D-W statistics value is poor and it shows presence of auto- correlation among residuals.

This result implies that the Education, Sports, Art and Culture Expenditure (EDSACEXP) is significant and has positive relationship on determination of Gross State Domestic Product (GSDP) in Gujarat State. This result also supports our hypothesis as mentioned earlier in Chapter-II.

Step II : Log GSDP = 2.6542 + 0.3224 log EDSACEXP + 0.9744 log INFRAEXP

$$(1.9870) \quad (1.681) \quad\quad\quad\quad (3.766)^*$$

$$R^2 = 0.75 \quad R^{-2} = 0.71 \quad F(1,7) = 16.47 \quad D\text{-}W = 1.98$$

This result suggests that year-wise number of Infrastructure Expenditure (INFRAEXP) has a positive effect on determination of Gross State Domestic Product (GSDP) which is not the case for first explanatory variable of Education, Sports, Art and Culture Expenditure (EDSACEXP) and this is supported by b and t – values of Infrastructure

Expenditure coefficient in the above equation. Besides, R^{-2} statistics value indicates significant results and shows that 71 % variation in the rate of Gross State Domestic Product in Gujarat State is explained by variable included in the model.

Step III : Log GSDP = -6.723 + 1.387 log EDSACEXP + 1.956 log INFRAEXP

$$(-4.357) \qquad (2.983)^* \qquad (4.852)^*$$

- 0.839 Log EMPLWEXP

$$(-5.657)^{**}$$

$R^2 = 0.89 \qquad R^2 = 0.84 \qquad F(1, 7) = 23.61 \qquad D–W = 2.11$

* significant at 5% level of significance

** significant at 1% level of significance

The result indicates that among the independent variables, Infrastructure Expenditure (INFRAEXP) and Education, Sports, Art and Culture Expenditure (EDSACEXP) are significant and has positive relationship in determining the rate of Gross State Domestic Product (GSDP) during the study years 1986 to 2006 in Gujarat State Besides, Employment Labour Welfare Expenditure (EMPLWEXP) coefficient are significant with negative sign, R^2 statistic value is significant and reveals 84 % influence in the three factors jointly.

Step IV : Log GSDP = 2.972 – 0.459 Log EDSACEXP + 1.632 Log INFRAEXP

$$(0.743) \quad (-0.186) \qquad\qquad (4.547)^*$$

-0.0673 log EMPLWEXP – 1.244 Log HFWEXP

$$(-2.990)^* \qquad\qquad\qquad (-3.588)^*$$

$R^2 = 0.80 \qquad R^2 = 0.77 \qquad F(1, 7) = 10.168 \qquad D–W = 1.89$

* Significant of 1% level of significance

Step IV of the regression result, shows that among the independent variable, Infrastructure Expenditure (INFRAEXP) is highly significant and has positive influence in determining the rate of Gross State Domestic Product (GSDP). Year-wise Employment / Labour Welfare Expenditure (EMPLWEXP) and Health Family Welfare Expenditure (HFWEXP) Coefficients are significant with a negative

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signs. Other variable namely Education, Sports, Art and Culture Expenditure (EDSACEXP) is insignificant with negative sign. The R^2 value shows that these variables included together have 77 % of the percentage influence for determining Gross State Domestic Product of some of these variables. The values of R^2 and F-test along with most of the insignificant variables in the regression model suggest the existence of problem of multi co-linearity among the independent variables in Gujarat State.

Step V : Log GSDP = -5.928 – 0.644 log EDSACEXP + 2.651 log INFRAEXP

                    (-4.356)   (-6.239)*   (5.195)**

- 0.756 Log EMPLWEXP – 1.251 log HFWEXP+ 0.437 Log AGRAAEXP

         (-3.875)*   (-1.994)*   (1.456)*

            R^2 = 0.96 R^2 = 0.93   F (1,6) = 27.021   D.W = 1.98

            *   significant at 5% level of significance

            ** significant at 1% level of significance

The above result indicates that only one explanatory variable namely, Infrastructure Expenditure (INFRAEXP) is highly significant and has positive correlation in the determination of the rate of year-wise Gross State Domestic Product (GSDP) in Gujarat State While, year-wise Education, Sports, Art and Culture Expenditure (EDSACEXP) , Health Family Welfare Expenditure (HFWEXP) and Employment / Labour Welfare Expenditure (EMPLWEXP) Coefficients are significant with negative signs. Besides, Agriculture and Allied Activities Expenditure (AGRAAEXP) is insignificant with positive sign. The R^2 value explains that these variables included together have 93 % of the percentage influence in determining the rate of Gross State Domestic Product in Gujarat State as indicated by the significant of F-statistical value in the whole result D-w is low which indicates the presence of auto-correlation among residuals.

Step VI : Log GSDP = 2.7196 - 0.303 log EDSACEXP + 1.011 log INFRAEXP

$$(12.88) \quad (-3.667)^* \qquad\qquad (5.623)^{**}$$

- 0.347 log EMPLWEXP + 0.036 log HFWEXP

$$(-5.389)^* \qquad\qquad (0.344)$$

0.0183 log AGRAAEXP + 1.1014 Log INDMEXP

$$(-0.536) \qquad\qquad (27.224)^*$$

$$R^2 = 0.9992 \quad R^2 = 0.9979 \quad F(1,6) = 827.5 \quad D–W = 2.112$$

* Significant at 5% level of significance

** Significant at 1% level of significance

⤙ The above result suggests among the independent variables, year-wise Industries and Minerals Expenditure (INDMEXP) coefficient and Infrastructure Expenditure (INFRAEXP) coefficient are both highly significant and positively influenced by Per Capita Income doing the study years 1986 to 2006 in Gujarat State. Regression Coefficient of "INDMEXP" indicates that for Rs. 1 billion change in "INDMEXP", the "PCI" will change by Rs. 1.1014 billion. Coefficient of "INFRAEXP" indicates that for Rs. 1 billion change in "INFRAEXP", the "PCI" will change by Rs. 1.011 billions. While, year-wise Employment / Labour Welfare Expenditure (EMPLWEXP) coefficient and Education, Sports, Art and Culture Expenditure (EDSACEXP) coefficient are statistically significant and have strong negative influence on Per Capita Income. Agriculture and Allied Activities Expenditure (AGRAAEXP) is insignificant with negative sign. Health Family Welfare Expenditure (HFWEXP) coefficient has lowest positive impact on Per Capita Income. The R^2 value explains that these six economic development variables included together have 99 percent by the percentage influence by Per Capita Income in Gujarat State F-value shows high statistical significance which implies that the development independent variables have high influence on determining the rate Per Capita Income from the whole result in the study of Gujarat state economy D-w is moderate which indicates absence of auto correlation among residuals.

STEP VII : Log GSDP = 8.4606 + 2.3783 log EDSACEXP + 0.4959 log INFRAEXP

$$(0.9126) \ (1.9460)^* \qquad\qquad (0.3236)$$

+ 1.05625 log EMPLWEXP - 1.8080 HFWEXP – 4.2200 Log AGRAAEXP

$$(2.4062)^* \qquad (-3.2285)^* \qquad\qquad (-1.9986)^*$$

- 0.61977 log INDMEXP + 1.4269 Log GESSEXP

$$(-7.4317)^* \qquad\qquad (12.835)^*$$

$$R^2 = 0.99 \quad R^2 = 0.98 \quad F(1,9) = 502.319 \quad D–W = 2.142$$

*Significance at 5% level of significance

In the above multivariate regression result, it is evident that among that among independent variables, General Economic Services (GESSEXP), Employment Labour Welfare Expenditure (EMPLWEXP), Education, Sports, Art and Culture Expenditure (EDSACEXP) are statistically significant and have positive influence over the changes in the Gross State Domestic Product (GSDP) year-wise in Gujarat State during the study years of 1985-86 to 2005-06. While the other variables namely year wise Industries and Minerals Expenditure (INDMEXP), Health Family Welfare Expenditure (HFWEXP) and Agriculture and Allied Activities Expenditure (AGRAAEXP) are highly significant with negative influence on the determination of Gross State Domestic Product (GSDP). Infrastructure Expenditure (INFRAEXP) coefficient has positive sign and insignificant. The high values of R^2 and F-test suggest significant effect of the independent variables taken together. The R^2 value shows that the seven factors included together jointly accounts to 97 % rate on the determination of Gross State Domestic Product in Gujarat State. D-W statistics is moderate and it indicates absence of auto- correlation among residuals .And the insignificant of some of these variables, year wise indicates the existence of multi-collectivity among the independent variables.

This analysis reveals that when more independent variables are included together in the regression model they have a meaning relationship in the determination of year-wise rate of Gross State Domestic Product in Gujarat State in Gujarat State. This result also supports our earlier hypotheses in chapter II.

STEP VIII : Log GSDP = -5.1736 + 0.94240 log EDSACEXP + 0.2987 log INFRAEXP

$$(-0.3587) \quad (2.8914)^* \quad\quad (1.4538)$$

+ 1.2316 log EMPLWEXP - 1.6190 HFWEXP – 2.3109 Log AGRAAEXP

$$(2.9145)^* \quad\quad (-3.8706)^* \quad\quad (-1.9899)^*$$

+ 0.3189 log INDMEXP - 0.4269 Log GESSEXP+ 1.6413 Log TPEXP

$$(9.4317)^* \quad\quad\quad (-5.835)^* \quad\quad\quad (13.325)^*$$

$$R^2 = 0.999 \quad \bar{R}^2 = 0.998 \quad F(1,9) = 913.509 \quad D–W = 2.653$$

*Significance at 5% level of significance

In the above multivariate regression result, it is evident that among that among independent variables, Total Public Expenditure (TPEXP), Industries and Minerals Expenditure (INDMEXP), Employment Labour Welfare Expenditure (EMPLWEXP), Education, Sports, Art and Culture Expenditure (EDSACEXP) are statistically significant and have positive influence over the changes in the Gross State Domestic Product (GSDP) year-wise in Gujarat State during the study years of 1985-86 to 2005-06. While the other variables namely year wise General Economic Services (GESSEXP), Health Family Welfare Expenditure (HFWEXP) and Agriculture and Allied Activities Expenditure (AGRAAEXP) are highly significant with negative influence on the determination of Gross State Domestic Product (GSDP). Infrastructure Expenditure (INFRAEXP) coefficient has positive sign and insignificant. The high values of R^2 and F-test suggest significant effect of the independent variables taken together. The R^2 value shows that the seven factors included together jointly accounts to 97 % rate on the determination of Gross State Domestic Product in Gujarat State. D-W statistics is moderate and it indicates absence of auto- correlation among residuals .And the insignificant of some of these variables, year wise indicates the existence of multi-collectivity among the independent variables.

This analysis reveals that when more independent variables are included together in the regression model they have a meaning relationship in the determination of year-wise rate of Gross State Domestic Product in Gujarat State in Gujarat State. This result also supports our earlier hypotheses in chapter II.

Table- 5.9.1

Model III : Step-wise Regression results of Year-wise Gross State Domestic Product by various Development Schemes Expenditure in Gujarat State for the study year 1986-87 – 2005-06.

		R_2	R_2	F	D-W
Step I: Log GSDPI	= 3.1537 + 1.502 log EDSACEXP (1.956)　(4.820)*	0.684	0.647	8.455	2.243
Step II: Log GSDP	= 2.7316 + 0.31204 log EDSACEXP + 0.8744 log INFRAEXP (2.004)　(1.481)　　(2.766)*	0.699	0.657	10.307	2.297
Step III: Log GSDP	= 6.918 – 1.291 Log PCI + 1.944 Log GSDP (4.357)　(-2.184)*　(3.504)*　(-2.657)**	0.872	0.760	14.15	2.075
Step IV: Log GSDP	= 5.819 – 0.323 Log EDSACEXP + 2289 Log INFRAEXP – 0.0572 Log EMPLWEXP – 1.363 Log HFWEXP (0.698)　(-0.279)　　　(4.325)*　　(-2.157)*　　　(-1.833)*	0.811	0.775	5.435	1.975
Step V : Log GSDP	= 5.928 – 0.521　log　EDSACEXP　+　2.348　log　INFRAEXP- 0.75b　Log EMPLWEXP – 1.314 log HFWEXP (4.356)　(-6.765)*　　　　　(5.053)**　　　　(-2.934)* (-1.833) + 0.257 Log AGRAAEXP 1.269)	0.884	0.768	7.84	1.886
Step VI: Log GSDP	= 2.7196 – 0.303 Log EDSACEXPI + 1.011 Log INFRAEXP – 0.347 Log EMPLWEXP + 0.036 LogHFWEXP　(12.88)　(-3.667)[X] (5.623)[XX]　(-5.389)[X]　　　　　　　　(0.344) – 0.0183 Log AGRAAEXP + 1.1014 Log INDMEXP (-0.536)　　　　　　　　(27.224)[X]	0.999	0.997	827.5	2.112

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Condt... Table 5.9.1. Model -III

Step VII : Log GSDP	= -2.1055 – 5.332 log EDSACEXP + 2.8289 log INFRAEXP
	(-3.780) (-4.222) (3.780)*
	    -3.21319 log EMPLWEXP + 1.67167 HFWEXP + 0.2929 Log AGRAAEXP
	        (-1.625) (11.214)* (7.270) *
	    - 1.31007 log INDMEXP + 0.5375 Log GESSEXP
	        (-17.317)* (21.835)*
		0.999	0.998	902.319	2..190

Step VIII: Log GSDP	= -5.1736 + 0.94240 log EDSACEXP + 0.2987 log INFRAEXP + 1.2316 log EMPLWEXP - 1.6190 HFWEXP
	(-0.3587) (2.8914)* (1.4538) (2.9145)*
	        (-3.8706)*
	    - 2.3109 Log AGRAAEXP + 0.3189 log INDMEXP - 0.4269 Log GESSEXP+ 1.6413 Log TPEXP
	        (-1.9899)* (9.4317)* (-5.835)*
	        (13.325)*
		0.999	0.998	913.509	2.653

*Significant at 5% level of significance

Table 5.9.2

Correlation Matrix of Gross State Domestic Product by various development schemes Expenditure

Correlation	GSDP	EDSACEXP	INFRAEXP	EMPLWEXP	HFWEXP	AGRAAEXP	INDNEXP	GESSEXP	TPEXP
GSDP	1.0000	0.5704	0.6589	0.6234	0.5751	0.7147*	0.4317	0.6789	0.7537*
EDSACEXP		1.0000	0.8965**	0.7586*	0.9461**	0.7513*	0.7769*	0.7307*	0.8669*
INFRAEXP			1.0060	0.9290**	0.9648**	0.8960**	0.7830*	0.8253**	0.9830**
EMPLWEXP				1.0000	0.8884**	0.8960**	0.7830*	0.7980*	0.8830*
HFWEXP					1.0000	0.8518**	0.7947*	0.8140*	0.9947**
AGRAAEXP						1.0000	0.8017*	0.9212**	0.8757*
INDMEXP							1.0000	0.9846**	0.9785**
GESSEXP								1.0000	0.8234*
TPEXP									1.0000

* significant at 1% level of significance (one failed)
** Significant at 0.1% level of significance (one failed)

Table- 5.10.0

Year-wise total number of Gross State Domestic Product and various Development Schemes Expenditure in Gujarat State during the study years of 1986-87 to 2005-06

	GSDP	EDSACEXP	INFRAEXP	EMPLWEXP	HFWEXP	AGRAEXP	INDMEXP	GESSEXP	TSPEXP
1986-87	2688	47073	190.06	42.30	166.84	187.71	117.53	31.7	1882.53
1987-88	3756	580.02	234.3	40.22	177.34	250.48	135.33	43.96	2384.93
1988-99	4631	678.33	187.02	54.09	209.06	329.75	129.00	45.41	2463.24
1989-90	5372	810.71	314.62	42.76	238.19	255.42	107.79	56.62	3677.53
1990-91	6955	915.76	470.02	30.24	252.4	312.88	133.59	60.29	3838.02
1991-92	7734	1057.75	260.94	42.02	275.75	412.39	162.5	80.81	3958.43
1992-93	8285	1068.84	310.68	40.89	297.82	378.5	142.35	69.74	3998.08
1993-94	9796	1314.80	362.90	56.24	377.50	299.70	168.40	59.15	-
1994-95	1264	1571.74	384.45	63.85	414.57	357.94	180.98	70.95	1374.37
1995-96	13645	1886.94	465.38	67.31	470.89	492.18	353.8	133.08	6138.86
1996-97	16183	17117	422.84	31.42	480.56	537.35	209.7	156.84	5566.40
1997-98	16585	2247.47	684.91	78.20	650.17	641.53	663.33	171.1	6778.65
1998-99	19001	3141.15	918.93	97.19	877.17	768.47	300.41	196.74	10804.68
1999.00	18831	2989.28	783.93	105.24	981.99	836.97	326.05	276.25	10092.39
2000-01	17938	3446.53	959.3	137.97	951.07	956.33	491.07	433.75	12476.03
2001-02	19713	3271.44	838.3	100.54	728.77	1024.31	376.85	213.8	15552.39
2002-03	22624	3640.65	1085.8	122.68	863.54	719.7	277.65	270.37	14707.37
2003-04	26672	3686.2	1222	122.61	885.6	955.28	282.3	397.06	14707.37
2004-05	28355	3736.96	1190.44	121.02	913.74	975.09	223.1	388.46	14235.78
2005-06	29234	4295.2	1888.3	133.49	1070.05	1101.13	353.4	418.89	14077.30

Data source: Gujarat Government Budget in brief Gujarat State An Analytical Summary, Directorate of Economics and Statistics Government of Gujarat, Gandhinagar.

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5.11.0 CONCLUDING REMARKS

From model I (Table 5.7.1.9) results analysis reveals that Total Public Expenditure, Education, Sports, Art and Culture Expenditure, General Economic Services Expenditure, Infrastructure Expenditure, Health Family Welfare Expenditure, Agriculture and Allied Activities Expenditure, and Employment Labour Welfare Expenditure in Gujarat State are significant and they have positive influence on the changes in the determination of Gross State Domestic Product. While year-wise number of Industries and Minerals Expenditure is lagging behind. In this case, one could notice a variation in determining the rate of Gross State Domestic Product with respect to various development expenditure patterns in Gujarat State during the study year 1985-86 to 2005-06.

Model III (Table 5.9.1) depicts that when more independent variables are included together jointly in the regression analysis, General Economic Services Expenditure, Infrastructure Expenditure, Employment Labour Welfare Expenditure and Education, Sports, Art and Culture Expenditure have meaningful relationship and influence in determining the rate of Gross State Domestic Product year-wise in economic development. of Gujarat State. This analysis supports our hypotheses as stated in Chapter II. And it is also true that the rate of Gross State Domestic Product is related to various development expenditure in Gujarat State. In this chapter, the empirical analysis already undertaken reveals experience in State Gross State Domestic Product and various development expenditure. This analysis leads us to the conclusion that the rate of Gross State Domestic Product is not only determined by economic development expenditure patterns alone, but there are a number of efficient government, planning and management and proper implementation of development schemes and socio-political factors which shape the nature and pattern of state economic development

In the present study, we have already examined empirically economic analysis of public expenditure in relation to economic development of Gujarat State. Therefore, in further research, heuristic model could be developed to determine and establish a simultaneous causal relationship of existing and future Gross State Domestic Product associated with various development expenditure patterns over space and time. The model will attempt to solve the two hypotheses simultaneously as stated in chapter II that Gross State Domestic Product in a given state is function of various development expenditure schemes / patterns (Wagner's Law of Economic Growth to growth Public E.) and reciprocal proposition that various development expenditure schemes / patterns is function of Gross State Domestic Product is also true (Keynes Model of expansion of public expenditure to economic growth). This would be worked out and developed with realistic assumption. Hence, the ability of the model to address practical concern to future economic development should also be considered.