## CHAPTER 3

## THE GROWTH OF GOVERNMENT EXPENDITURE AND NATIONAL INCOME IN INDIA

### 3.1. INTRODUCTION

Ever since Adolf Wagner, the German economist, put forth his well known "law of increasing state activity" in 1863, considerable interest has been generated in the study of public expenditure. As a result, since the later half of this century, numerous studies have been undertaken to investigate the behavioural pattern of the public expenditure and to explain the underlying factors responsible for the growth of government spending in different countries at various stages of development. These studies have partly rectified the imbalance in the literature pertinent to public finance which, in the past, mainly stressed the role of taxation in the economy.

Studies relating to the growth of government spending in both the developed and the developing countries can be broadly classified into three categories as follows:

(i) those explaining the growth of government expenditure relative to the growth of national income

(ii) those tracing the growth of government expenditure to permanent influences like prices, population, income, urbanization etc. or random occurrences like wars, natural calamities, depression etc.

(iii)those studying the trend and structure of the government expenditure

The studies under the first category are primarily concerned with the testing of the validity of the "Wagner's Law". These

studies include those carried by Ganti and Kolluri [1979], Pluta [1979], Mann [1980], Abizadeh and Gray [1985], Ram [1987]. In all of these, the investigators have employed their own version of the law and accordingly fitted regression equations relating public expenditure and national income. There have also been some studies concerning public expenditure and economic growth, like those of Gupta [1967], Landau [1983], Henning and Tussing [1974], Ram [1989], Afrentiou and Serletis [1990]. These studies are discussed later in this chapter in greater detail.

The trend for the studies in the second category was set by Fabricant's study for U.S. [1952], which emphasized the effect of permanent influences like prices, population and income on the growth of government expenditure. Also noteworthy was the Wiseman-Peacock study for U.K.[1961], which examined the effect of wars on the growth of government expenditure. Most studies in this category concentrated more on the "displacement effect" theory propounded by Wiseman and Peacock [1961]. Crowley [1971] has also analysed wars and government expenditures in Western Europe since the 11th century.

Studies in the third category investigated the changing pattern and the structure of the government expenditure for both the developed and the developing countries as a consequence of the economic development. These studies include those of Hook [1962] for Sweden, Pryor [1965] for Germany, Bird [1970] for Canada, Reddy [1970] for India, Goffman and Mahar [1968] for Carribean countries, Mahar and Rezende [1975] for Brazil,

Andre and Delorme [1978] for France, Pluta [1981] for some developing countries, Gould [1983] for some western industrialised countries, Lewis-Beck and Rice [1985] for U.S., Abizadeh and Yousefi [1988] for Canada. According to these studies, the pattern of government expenditure is indicative of not only the stage of development of a country but also of the concern for development and welfare. In other words, the pattern also reveals the importance attached by the government to providing education, medical & public health etc. in addition to the traditional functions of good administration, law & order, defence etc.

Reddy [1972], in his pioneering work for India, has studied the growth of public expenditure for the period 1872-1968, which is the longest covered by any study in this field pertaining to India. Various other studies on India have also been carried out but these have focused only on the analysis of government expenditure by classifying it into developmental and non-developmental expenditure, plan & non-plan expenditure and revenue and capital expenditure. However, Reddy in his second study has analysed the growth and structure of the Central Government expenditure by economic and functional categories for the period 1950-51 to 1977-78.

The present study covering the period 1950-51 to 1989-90, attempts to bring out the growth pattern of Central Government expenditure and national income for the forty year period covering the seven Five Year Plans. Periodic calculations of the growth rates of government expenditure and Gross National Product

(GNP), for the various Five Year Plans as well as the for the four decades covered by this study, have been made. The growth pattern of government expenditure and GNP is analyzed at current prices and at constant 1970-71 prices. The applicability of the two traditional hypotheses, viz. the Wagner's law and the Wiseman-Peacock "displacement effect" (to a developing country like India) explaining the behaviour of aggregate government expenditure has been considered in the study. While the effect of the permanent influences like prices, population and income, on the growth of expenditure has been considered in great detail in the chapter on "Determinants of Government Expenditure," the effect of temporary influences such as wars has been ascertained in this chapter by dividing the entire period of study into pre-war (1950-1961), war (1962-1971) and post-war (1972-1989) periods.

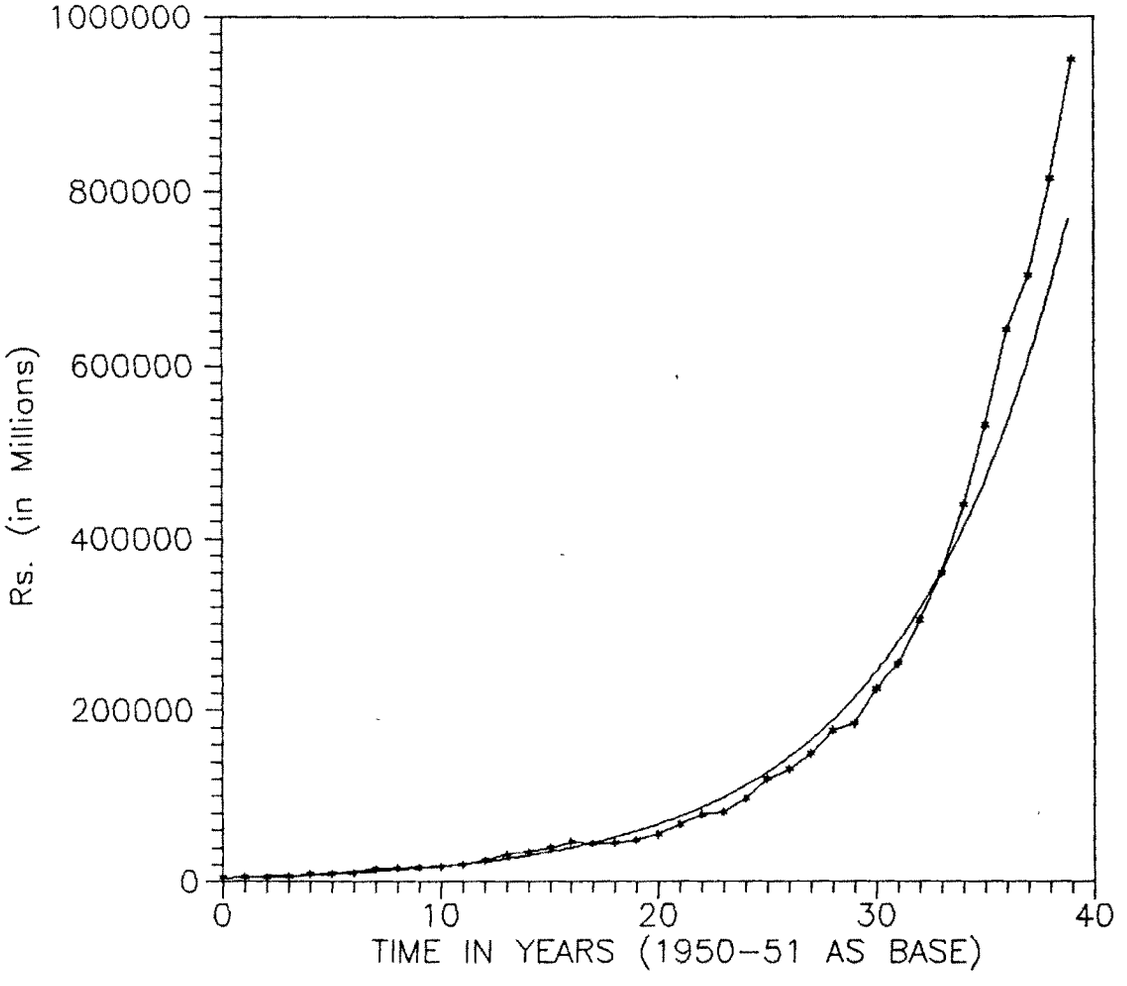
## 3.2. GROWTH PATTERN OF GOVERNMENT EXPENDITURE AND GNP IN INDIA (in Nominal and Real Terms)

Both the government expenditure and GNP in India show a rising trend over the entire study period 1950-51 to 1989-90, as can be seen from Chart 3.1 and Chart 3.2. These charts depict the growth, at current prices, of Central Government expenditure and GNP, respectively. The smooth curves on both charts represent the regression lines fitted using an exponential form as discussed in the following section. The curves with star symbols are drawn on the basis of the actual data on total Central Government expenditure and GNP. The period covered is from 1950-51 to 1989-90.

## CHART 3.1

## GROWTH OF CENTRAL GOVERNMENT EXPENDITURE IN INDIA

## AT CURRENT PRICES (1950-51 to 1989-90)




**Source:** Based on Table 3.1.

Notes:

(1) The smooth curve represents the line of best fit using the exponential model of the form

$$y = ae^{gt}$$

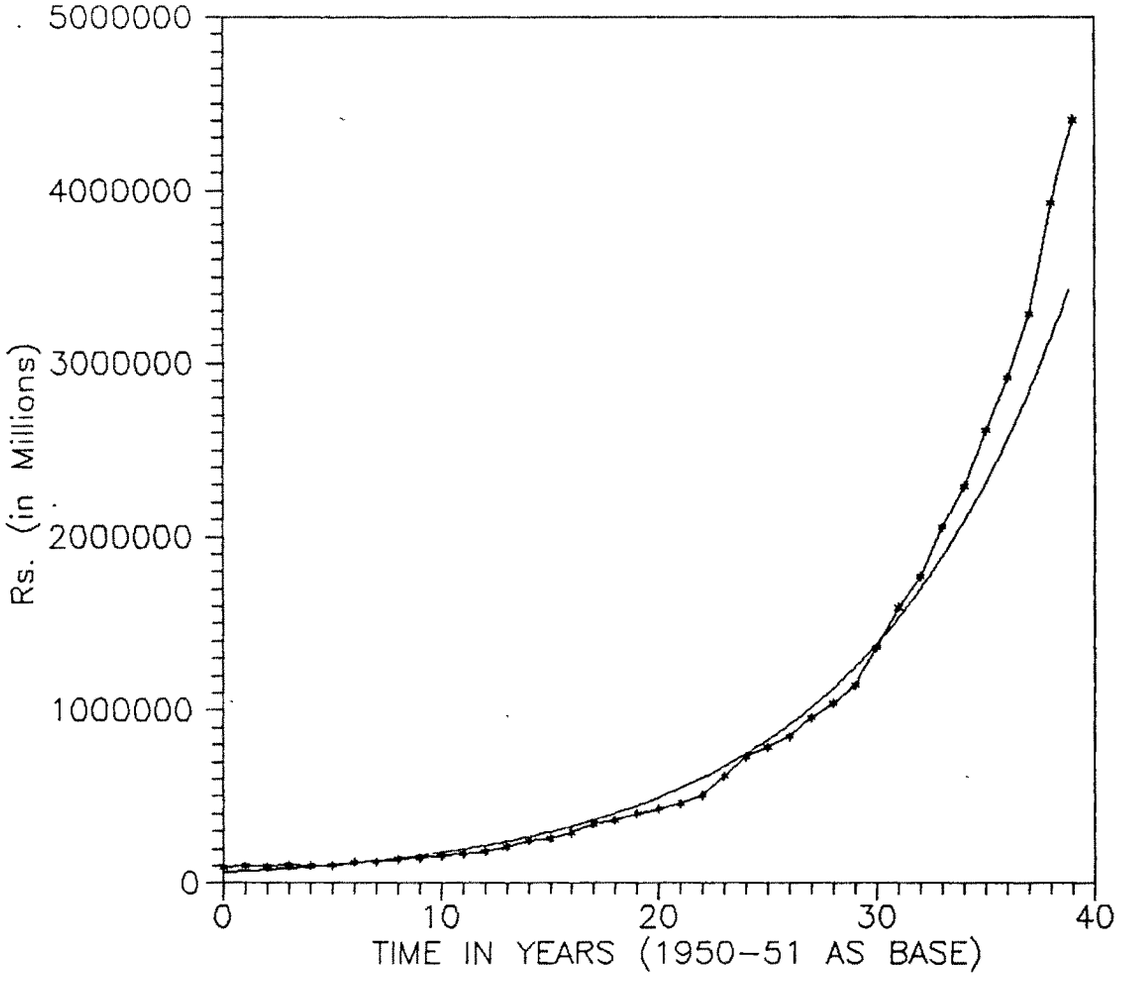
where y=Central Government Expenditure, t=time, g=growth rate and a=intercept term.

(2) The line with star symbols is plotted on the basis of actual data for the study period.

## CHART 3.2

## GROWTH OF NATIONAL INCOME IN INDIA AT CURRENT PRICES

## (1950-51 to 1989-90)




**Source:** Based on Table 3.1.

Notes:

(1) The smooth curve represents the line of best fit using the exponential model of the form

$$y = ae^{gt}$$

where y=GNP, t=time, g=growth rate and a=intercept term.

(2) The line with star symbols is plotted on the basis of actual data for the study period.

Table 3.1. gives the figures on Central Government expenditure, GNP and government expenditure as a proportion of GNP, at current and constant 1970-71 prices, for the entire study period. From this table, it can be seen that the government expenditure at current prices increased from Rs. 5035 million in 1950-51 to Rs. 950494 million in 1989-90, an increase of over 188 times. In real terms, it increased from Rs. 10517.6 million to Rs. 200668.5 million during the same period, the increase being about 19 times. It may be mentioned here that the expenditure showed a continuously increasing trend at current prices except for the slight dips in the years 1952-53 and 1967-68. At constant prices, although an overall rising trend was observed, there were sudden decreases in some of the years.

A similar pattern was observed for GNP, both at current and constant prices, although the dips in government expenditure and GNP did not always coincide. The GNP during the forty year period increased from Rs. 93250 million in 1950-51 (Rs.195574 million in real terms) to Rs. 4401500 million in 1989-90 (Rs.965643 million in real terms), an increase of about 47 times (5 times, in real terms). The government expenditure as a proportion of GNP at current prices increased from 5.4% (5.3% in real terms) in 1950-51 to 21.6% (20.7% in real terms) in 1989-90, with some fluctuations in between, as indicated in Table 3.1. Since there is a tremendous increase in both government expenditure and GNP at current prices in absolute terms, as compared to the increase at constant prices, it can be said that the increase in expenditure and GNP at current prices is mainly on account of inflationary pressures. As the proportion of

## TABLE 3.1

## CENTRAL GOVERNMENT EXPENDITURE, GROSS NATIONAL PRODUCT AND CENTRAL GOVERNMENT EXPENDITURE AS PERCENTAGE OF GROSS NATIONAL PRODUCT FOR INDIA AT CURRENT AND 1970-71 PRICES (1950-51 TO 1989-90)

(Rs.in millions)

| Year | Central Government Expenditure | Gross National Product | Central Government Expenditure as Percent of Gross National Product |
|---|---|---|---|
| | (1) | (2) | (3) |
| 1950-51 | 5035 | 93250 | 5.40 |
| 1951-52 | 6101 | 99310 | 6.14 |
| 1952-53 | 5851 | 97490 | 6.00 |
| 1953-54 | 6610 | 106190 | 6.22 |
| 1954-55 | 9205 | 100440 | 9.16 |
| 1955-56 | 9745 | 102480 | 9.51 |
| 1956-57 | 11175 | 122000 | 9.16 |
| 1957-58 | 15510 | 125780 | 12.33 |
| 1958-59 | 16392 | 139990 | 11.71 |
| 1959-60 | 17093 | 147360 | 11.60 |
| 1960-61 | 18056 | 161290 | 11.19 |
| 1961-62 | 20392 | 170790 | 11.94 |
| 1962-63 | 25325 | 183680 | 13.79 |
| 1963-64 | 32066 | 211250 | 15.18 |
| 1964-65 | 34889 | 246200 | 14.17 |
| 1965-66 | 39936 | 259810 | 15.37 |
| 1966-67 | 46654 | 293410 | 15.90 |
| 1967-68 | 44972 | 343530 | 13.09 |
| 1968-69 | 45258 | 364190 | 12.43 |
| 1969-70 | 49247 | 401160 | 12.28 |
| 1970-71 | 55766 | 428790 | 13.01 |
| 1971-72 | 67096 | 459660 | 14.60 |
| 1972-73 | 78493 | 507030 | 15.48 |
| 1973-74 | 81308 | 616820 | 13.18 |
| 1974-75 | 97849 | 729440 | 13.41 |
| 1975-76 | 120365 | 785060 | 15.33 |
| 1976-77 | 131501 | 846610 | 15.53 |
| 1977-78 | 149856 | 958340 | 15.64 |
| 1978-79 | 177172 | 1040340 | 17.03 |
| 1979-80 | 185043 | 1145090 | 16.16 |
| 1980-81 | 224948 | 1361570 | 16.52 |
| 1981-82 | 254010 | 1594600 | 15.93 |
| 1982-83 | 304937 | 1769540 | 17.23 |
| 1983-84 | 359877 | 2057370 | 17.49 |
| 1984-85 | 438789 | 2291670 | 19.15 |
| 1985-86 | 531124 | 2610780 | 20.34 |
| 1986-87 | 640231 | 2916030 | 21.96 |
| 1987-88 | 703043 | 3286590 | 21.39 |
| 1988-89 | 814023 | 3923730 | 20.75 |
| 1989-90 | 950494 | 4401500 | 21.59 |

.....(Table 3.1. continued)

.....(Table 3.1. continued)

(Rs.in millions)

| Year | Central Government Expenditure at 1970-71 Prices | Gross National Product at 1970-71 Prices | Central Government Expenditure at 1970-71 Prices as Percent of Gross National Product at 1970-71 Prices |
|---|---|---|---|
| | (4) | (5) | (6) |
| 1950-51 | 10517.6 | 195574 | 5.38 |
| 1951-52 | 11671.7 | 201890 | 5.78 |
| 1952-53 | 12072.0 | 206634 | 5.84 |
| 1953-54 | 12782.0 | 219355 | 5.83 |
| 1954-55 | 18948.0 | 230208 | 8.23 |
| 1955-56 | 20969.8 | 237112 | 8.84 |
| 1956-57 | 22170.3 | 249897 | 8.87 |
| 1957-58 | 30283.5 | 248921 | 12.17 |
| 1958-59 | 30245.6 | 266495 | 11.35 |
| 1959-60 | 30866.5 | 272939 | 11.31 |
| 1960-61 | 31109.7 | 292192 | 10.65 |
| 1961-62 | 34350.0 | 302283 | 11.36 |
| 1962-63 | 40670.7 | 310480 | 13.10 |
| 1963-64 | 47961.5 | 328129 | 14.62 |
| 1964-65 | 48958.3 | 352267 | 13.90 |
| 1965-66 | 52397.0 | 341990 | 15.32 |
| 1966-67 | 55234.6 | 342768 | 16.11 |
| 1967-68 | 49078.6 | 369267 | 13.29 |
| 1968-69 | 47740.7 | 380951 | 12.53 |
| 1969-70 | 50466.5 | 406443 | 12.42 |
| 1970-71 | 55766.0 | 428790 | 13.01 |
| 1971-72 | 63446.4 | 436441 | 14.54 |
| 1972-73 | 69601.0 | 436229 | 15.96 |
| 1973-74 | 61976.2 | 452711 | 13.69 |
| 1974-75 | 62273.9 | 460156 | 13.53 |
| 1975-76 | 75237.5 | 508228 | 14.80 |
| 1976-77 | 78518.9 | 516257 | 15.21 |
| 1977-78 | 84855.7 | 550295 | 15.42 |
| 1978-79 | 97746.6 | 586437 | 16.67 |
| 1979-80 | 89610.2 | 560741 | 15.98 |
| 1980-81 | 97716.9 | 597887 | 16.34 |
| 1981-82 | 99291.7 | 636033 | 15.61 |
| 1982-83 | 110509.4 | 654657 | 16.88 |
| 1983-84 | 120050.8 | 704072 | 17.05 |
| 1984-85 | 136416.6 | 729088 | 18.71 |
| 1985-86 | 152735.0 | 774758 | 19.71 |
| 1986-87 | 171254.1 | 807742 | 21.20 |
| 1987-88 | 173706.1 | 838266 | 20.72 |
| 1988-89 | 184443.0 | 919573 | 20.06 |
| 1989-90 | 200668.5 | 965643 | 20.78 |

Sources: (1) "An Economic-Cum-Functional Classification of Central Government Budget," Ministry of Finance, Govt. of India (various annual issues). (2) 'Macroeconomic Aggregates at Current and 1980-81 Prices," from "INDIA DATABASE: The Economy," Vol.I, by H.L.Chandhok and The Policy Group, Living Media India Ltd., 1990. (3) National Accounts Statistics, Central Statistical Organisation, Govt. of India (various annual issues).

government expenditure in the GNP is on the increase, it indicates that the government involvement in the economic activities in the country is rising.

Chart 3.3. depicts the government expenditure and GNP curves drawn on a logarithmic scale. The narrowing gap between the government expenditure and GNP curves in Chart 3.3 lends support to the fact that the government expenditure, as a proportion of GNP, is on the increase and that the rate of growth of government expenditure is faster than that of GNP. This is also reflected by the higher slope of government expenditure curve as compared to the GNP curve.

### 3.2.1. Calculation of Growth Rates of Government Expenditure and GNP for India

The rate of growth of expenditure and GNP is calculated using an exponential fit of the form

$$y = ae^{gt} \qquad (3.1)$$

where y is the government expenditure or GNP, t is the time period and g is the rate of growth. The above equation can be further transformed into

$$\ln y = \ln a + gt \qquad (3.2)$$

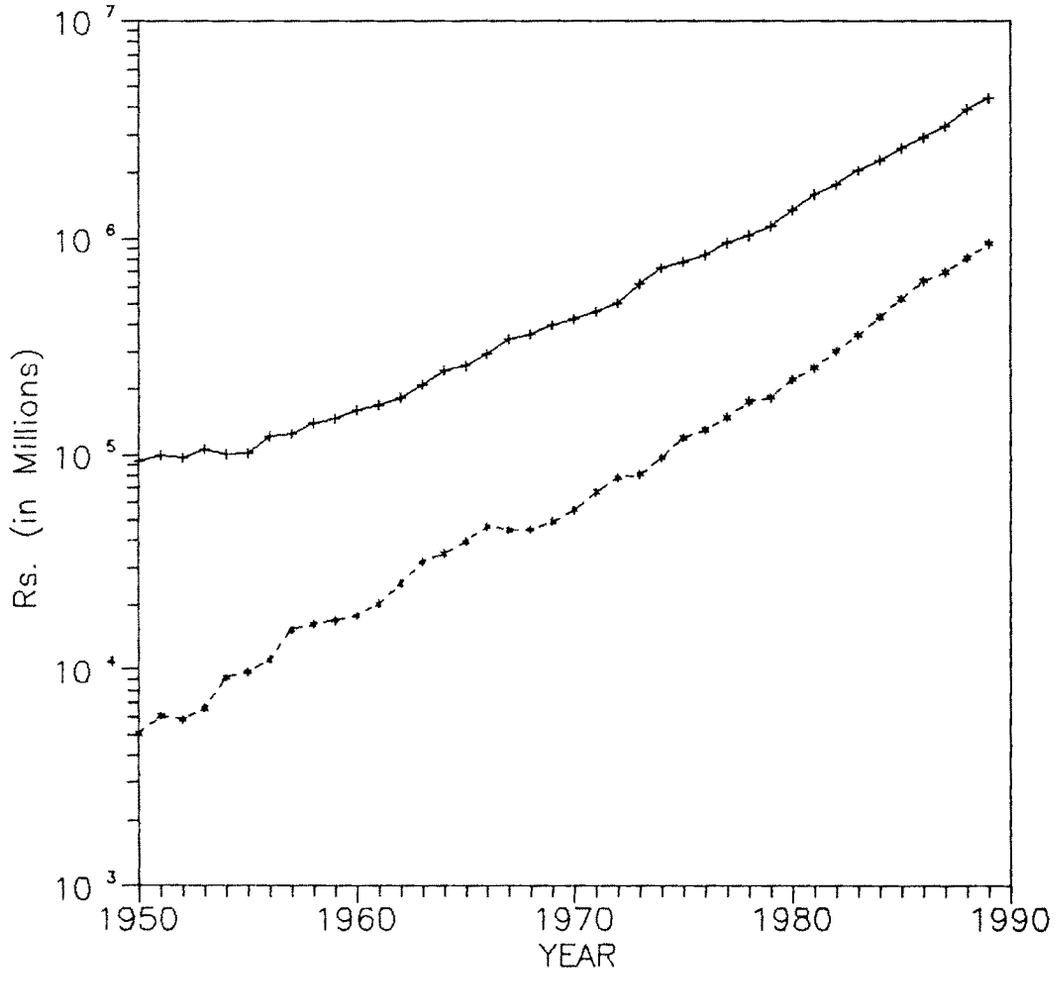
Thus, by regressing (ln y) on t, the regression coefficient gives the growth rate 'g' while (ln a) is the intercept term.

Adopting the above approach, and using the data for the forty year period from 1950-51 to 1989-90 for the regression analysis, the growth rates of government expenditure ($y_1$) and GNP ($y_2$) have been calculated. The results obtained are discussed below. The coefficient of determination '$R^2$' and the estimated

CHART 3.3

CENTRAL GOVERNMENT EXPENDITURE AND GNP FOR INDIA

AT CURRENT PRICES (1950-51 to 1989-90)




**Source:** Based on Table 3.1.

**Note:** *-*-*-* Government Expenditure
+-+-+-+ GNP

t-statistic (t-stat) obtained from the regression analysis are also provided.

For government expenditure:

(at current prices) $\ln_2 y_1 = 8.52 + 0.1295\ t^*$
($R^2$=0.9935; 't-stat'=76.73)

(at constant prices) $\ln_2 y_1 = 9.60 + 0.0665\ t^*$
($R^2$=0.9568; 't-stat'=29.02) (3.3)

For GNP:

(at current prices) $\ln_2 y_2 = 11.05 + 0.1027\ t^*$
($R^2$=0.9858; 't-stat'=51.49)

(at constant prices) $\ln_2 y_2 = 12.16 + 0.0391\ t^*$
($R^2$=0.9947; 't-stat'=85.08) (3.4)

(* denotes that the estimates are significant at 1 % level).

Equations (3.3) and (3.4) indicate that the rate of growth of government expenditure is 12.95% per annum and that of GNP is 10.27% per annum in nominal terms. The corresponding figures in real terms are seen to be 6.65% per annum and 3.91% per annum, respectively, i.e. almost half of those at current prices. Obviously, the higher growth rate obtained at current prices in both government expenditure and GNP are on account of inflation. The values of intercept term (ln a) indicated in the equation (3.3) and (3.4) above , represent the mean or average effect on expenditure and GNP of all variables like population, technical change, accumulation of capital etc. not included in the regression model.

The estimated 't' values (both at current and constant prices) are much greater than the tabulated 't' value of 2.715 at 1% level of significance. Hence, the coefficients are statistically significant in all the above cases for both the

regression coefficients (i.e. the growth rate 'g') and the intercept term (ln a). The coefficient of determination '$R^2$', which varies between 0 and 1, is indicative of the goodness of fit (a value of 1 corresponding to a perfect fit) and it measures the proportion or percentage of the total variation in the dependent variable explained by the independent variables(s) in the regression model. The $R^2$ values for both equations (3.3) and (3.4) are seen to be close to 1. The values of the 't' statistic (being statistically significant) and the coefficient of determination $R^2$ (being closer to 1) for equations (3.3) and (3.4) lead to the conclusion that, over the forty year period 1950-51 to 1989-90, both the government expenditure and the national income have been significantly time-influenced. The two are seen to have grown tremendously, the rate of growth of expenditure being faster than that of the national income over the study period.

In order to examine the growth pattern of government expenditure and GNP in India during the period 1950-51 to 1989-90, periodical calculation of the growth rates has been resorted to. The methodology used for calculation of the growth rates is the same as in the above section. Since India has adopted the system of Five Year Plans for a planned economic development, the growth rates have been calculated for each of the Five Years Plans. Decade-wise growth rates have also been determined to ascertain the period of rapid growth. The main purpose here is only to state the facts rather than look for the underlying causes responsible for the rapid or slow growth of

expenditure and GNP.

### 3.2.2. Growth Rates of Government Expenditure and GNP for India During Various Decades

The decade-wise growth rates of expenditure and GNP during the four decades which are covered by the present study are given in Table 3.2 and it can be seen that, when the effect of price changes is removed, the growth rates in both cases are highly affected. At current prices, the decade of most rapid growth in expenditure was the 1980's with a growth rate of almost 17% per annum while in the 1960's the growth rate was the lowest at 11% per annum. Since the growth rate of expenditure for the entire period of study is 12.95% per annum, the rate of growth during the decade of 1960's is below the average while it is above average in the other three decades covered by the period of study. In real terms, the most rapid growth occurred in the 1950's at the rate of 13.76% per annum. It came down considerably to 4.9% per annum during the next decade but maintained an increasing trend thereafter.

The growth rate of GNP at current prices showed a continuously rising trend through the decades. The growth rate at current prices which was nearly 5% per annum in the 1950's increased to 10.71% per annum in the 1960's and finally to 12.81% per annum in the 1980's. At constant prices, the variation in the annual growth rate of GNP was not significant as it ranged only between 3.36% during 1960-61 to 1969-70 and 5.21 % during 1980-81 to 1989-90. However, except for the decade 1980-81 to 1989-90, the growth rate of GNP in real terms remained below the average growth rate of 3.91% per annum for the entire period.

TABLE 3.2

DECADE-WISE GROWTH RATES OF CENTRAL GOVERNMENT EXPENDITURE OF INDIA AND ITS GNP (AT CURRENT PRICES AND AT 1970-71 PRICES)

| Period | Government Expenditure | | Gross National Product | |
|---|---|---|---|---|
| | At current prices | At 1970-71 prices | At current prices | At 1970-71 price |
| | (1) | (2) | (3) | (4) |
| I 1950-51 to 1959-60 | 14.80 | 13.76 | 4.98 | 3.81 |
| II 1960-61 to 1969-70 | 11.35 | 4.90 | 10.71 | 3.36 |
| III 1970-71 to 1979-80 | 13.62 | 5.56 | 11.37 | 3.71 |
| IV 1980-81 to 1989-90 | 16.49 | 8.63 | 12.81 | 5.21 |
| 1950-51 to 1989-90 | 12.95 | 6.65 | 10.27 | 3.91 |

Source : Based on Table 3.1

Note : The growth rates are given in percent per annum.

### 3.2.3. Growth Rates of Government Expenditure and GNP for India During Various Five Year Plans

From Table 3.3, it is evident that the growth rates of government expenditure at current prices during the various Five Year Plans varied between 10.56% for the IInd Five Year Plan and 16.84% for the VIth Five YEar Plan, and except for the IInd Five Year Plan it remained above the average growth rate of 12.95% for the entire study period.

At constant prices, the Ist Five Year Plan showed the highest growth rate at 16.22% per annum while the VIIth Five Year Plan with an annual growth rate of 6.20 % per annum exhibited the lowest growth rate in government expenditure. Except for the IVth and the VIIth Five Year Plans, the growth rate of government expenditure in real terms remained above the average for the whole period, i.e. 6.65 % per annum.

The growth rate of GNP at current prices showed wide-ranging fluctuations. The growth rate of 0.92% per annum during the Ist Five Year Plan picked up considerably in the IInd Five Year Plan to 7.16% per annum , and finally increased to 13.41% per annum in the VIIth Five Year Plan. However, for Ist,IInd and IVth Five Year Plans these where below the average of 10.27% per annum for the entire period. At constant prices, the growth rate of GNP was seen to vary insignificantly during the different Five Year Plans, ranging as it did only between 2.32% per annum in the IVth Five Year Plan and 5.7% per annum in the VIIth Five Year Plan and except for IIIrd and IVth Plans, it remain above the average of 3.91 % per annum for the whole period.

TABLE 3.3

PLAN-WISE GROWTH RATES OF CENTRAL GOVERNMENT EXPENDITURE OF INDIA AND ITS GNP (AT CURRENT PRICES AND AT 1970-71 PRICES)

| Period | Government Expenditure | | Gross National Product | |
|---|---|---|---|---|
| | At current prices | At 1970-71 prices | At current prices | At 1970-71 prices |
| | (1) | (2) | (3) | (4) |
| I 1951-52 to 1955-56 | 13.89 | 16.22 | 0.92 | 4.29 |
| II 1956-57 to 1960-61 | 10.56 | 6.96 | 7.16 | 4.04 |
| III 1961-62 to 1965-66 | 16.64 | 10.29 | 11.31 | 3.73 |
| IV 1969-70 to 1973-74 | 13.44 | 6.32 | 10.28 | 2.32 |
| V 1974-75 to 1978-79 | 14.06 | 10.21 | 9.09 | 5.64 |
| VI 1980-81 to 1984-85 | 16.84 | 8.57 | 12.96 | 4.98 |
| VII 1985-86 to 1989-90 | 14.04 | 6.20 | 13.41 | 5.70 |
| 1950-51 to 1989-90 | 12.95 | 6.65 | 10.27 | 3.91 |

Source : Based on Table 3.1

Note : The growth rates are given in percent per annum.

After having ascertained the periods of rapid growth of government expenditure and GNP in India, the validity of the two traditional hypotheses (concerning the growth of public expenditure), namely the Wagner's "Law of Increasing State Activity" and Wiseman-Peacock's "displacement effect" hypothesis have been put to test for India. The results of this analysis are discussed below.

### 3.3. WAGNER'S LAW OF INCREASING STATE ACTIVITY

Adolf Wagner, the German economist, presented his famous "law of the increase of state activities" in the later part of the 19th century in the following terms, quoted in translation by Bullock [1924]: "Comprehensive comparisons of different countries and different times show that, among progressive peoples, with which alone we are concerned, an increase regularly takes place in the activity of both the Central and the Local Governments. The increase is both extensive and intensive : the Central and the Local Governments constantly undertake new functions while they perform both old and new functions more efficiently and completely. In this way, the economic needs of the people, to an increasing extent and in a more satisfactory fashion, are satisfied by the Central and the Local Governments."

From Wagner's statement of his "law," it follows that, there exists a functional relationship between the growth of economy and the growth of government activities such that the public sector grows faster than the economy. The activities of different levels of government (such as Central, State or local governments) increases both intensively and extensively. This

intensification and extensification of the public sector activities is due to the following reasons:

(1) The expansion of the traditional functions of the State, like defence, administration, justice, law & order etc. grow both in scope and magnitude over time. As the society progresses, the coordination of the various activities like administration, defence, law and order etc. becomes more complex and expensive because of which the public expenditure goes up.

(2) The increase in the coverage of State activities: With the government becoming more conscious of its responsibilities towards the society, it undertakes various measures towards increasing welfare. These measures include enrichment of the cultural life of the society, provision of social security, subsidies for and direct provision of various merit goods like medical facilities, education, housing etc. State activities also increase due to its efforts towards redistribution of income and wealth.

(3) The increasing need to expand the range of public goods : In the initial stages of development, there exists a need for creating overhead capital such as roads, harbours, etc.. These items are such that the benefits are largely external and require huge investment efforts. The returns on these goods are spread over a long period of time and hence the private sector is not very much inclined to undertake such investment activity. Hence, the government has to step in to provide such public goods, because of which the volume of expenditure goes up. After this

stage of development is reached the expenditure on other public services such as higher education, improved health services, high-speed highways, space-explorations etc. increases, as demand for these increase with increase in GNP and per capita income of a country.

Due to lack of preciseness and because of the ambiguous nature of Wagner's original version of the law, it is difficult to exactly define empirically the relationship between economic progress and the "growth of state activity." This has led to several versions of the law (see Gandhi [1972] and Mann [1980]) which have been tested for India in the following section.

3.3.1. Empirical Testing of Wagner's Law

In most of the recent empirical studies of the public expenditure growth, Wagner's Law takes this form : income elasticity of demand for public goods and services is greater than unity or a given percentage change in GNP (or income) leads to a greater percentage change in the government expenditure. Six different formulations attributed to various researchers have been put to test for India on a time series basis. These have been specified in the double-log form so that the slope coefficient ß gives the elasticity measure directly. The double-log form is given by

$$\log Y = \alpha + \beta \log X \qquad (3.5)$$

where $\alpha$ is the intercept term and ß the slope coefficient. Here 'Y' stands for government expenditure (dependent variable) and 'X' represents GNP (independent variable ). Hence, value of 'ß' denotes the income elasticity of government expenditure.

The explanations for each of the six versions of Wagner's Law are given below:

Equation I : Wiseman-Peacock 'Traditional" Version

According to Wiseman and Peacock [1961], the rate of growth of public expenditure should be faster than the rate of growth of the community output and hence the functional form relating the government expenditure and the national output (GNP) is.

$$E = f(GNP) \quad \text{or} \quad \log E = \alpha + \beta \log (GNP) \tag{3.6}$$

where E is the level of aggregate government expenditure and GNP is the gross national product for all the six versions discussed and $\alpha$ is the intercept and $\beta$ the regression coefficient, giving the income elasticity of expenditure.

Equation II : Fredrick Pryor Version The version of Pryor [1968] suggests that, in growing economies, the share of government consumption expenditure in the national income increases. Here the consumption expenditure refers to the current expenditures on goods and services and the transfer payments by the government that are financed exclusively through taxation or public borrowing. The functional form runs as follows:

$$C_g = f(GNP) \quad \text{or} \quad \log C_g = \alpha + \beta \log(GNP) \tag{3.7}$$

where $C_g$ is the level of government consumption expenditure.

Equation III : Irving Goffman Version

Goffman [1968] argued , "as the nation experiences economic development and growth, an increase must occur in the activities of the public sector and that the ratio of increase, when

converted into expenditure terms, would exceed the rate of increase in output per capita". This indicates that as an economy progresses, a given percentage change in per capita income leads to a larger percentage change in government expenditure.

The functional relationship in this case becomes

$$E = f(GNP/P) \text{ or } \log E = \alpha + \beta \log (GNP/P) \qquad (3.8)$$

where P is the population for respective versions.

Equation IV : Richard Musgrave Version

According to Musgrave [1969], as an economy moves from low to high per capita income, the ratio of public expenditure to GNP rises. Hence, the functional relationship takes the form

$$E/GNP = f(GNP/P) \text{ or } \log (E/GNP) = \alpha + \beta \log (GNP/P) \qquad (3.9)$$

This implies that the proportion of expenditure in GNP depends upon per capita income.

Equation V : S.P.Gupta/Nicolas Michas Version

The Gupta/Michas [1967/1975] version of the Wagner's Law concerns the verification of the fact whether or not the elasticity of public expenditure per capita with respect to per capita output is greater than unity. The relationship here is

$$(E/P) = f(GNP/P) \text{ or } \log (E/P) = \alpha + \beta \log (GNP/P) \qquad (3.10)$$

This implies that per capita expenditure is a function of per capita income.

Equation VI : Wiseman-Peacock "Share" Version

The main consideration of the Wiseman-Peacock "Share" version [1961] is that, as an economy progresses, the proportion of government expenditure in the national output increases. The

functional form is

$$(E/GNP) = f(GNP) \quad \text{or} \quad \log (E/GNP) = \alpha + \beta \log (GNP) \qquad (3.11)$$

For Equations I,II,III and V, Wagner's Law holds if $\beta>1$ while, for Equations IV and VI, it holds if $\beta>0$. This is because, in Equations I,II,III and V, $\beta$ represents the elasticity between government expenditure E and GNP in aggregate or per capita terms. In other words, the ratio E/GNP is not involved in these equations. Hence, $\beta$ can be said to represent the straight income elasticity (e). In Equations IV and VI, $\beta$ represents the ratio income elasticity ($e_r$), as it involves the ratio E/GNP. Furthermore, it can be shown that the ratio income elasticity '$e_r$' and the straight income elasticity 'e' are related by the expression $e_r=(e-1)$ as demonstrated in the note at the end of this chapter.

The statistical results for the above six formulations of the Wagner's Law are given in Table 3.4. The estimated 't' values for the equations range between 9.3929 and 61.3021 at current prices and between 11.8239 and 28.9550 at constant 1970-71 prices. The tabulated 't' value at 38 degrees of freedom (degrees of freedom = N-2, where N equals 40 for the present study) and 1% level of significance is 2.715. Hence, the 't' values are statistically significant at 1% level of significance, as the estimated 't' values are far greater than the tabulated 't' values. This leads to the acceptance of Wagner's hypothesis for all the six formulations in case of India for the period of study 1950-51 to 1989-90. It also means that the income elasticity of the public goods is greater than one, indicating that a given percentage change in the national income leads to a

TABLE 3.4

STATISTICAL RESULTS OF THE WAGNER'S THEORY FOR INDIA FOR THE PERIOD 1950-51 TO 1989-90
(AT CURRENT PRICES AND AT 1970-71 PRICES)

| Eqn. No. | Equations | | Elasticity coefficient 'B' | Coefficient of determination $R^2$ | t-value | Durbin-Walson statistic |
|---|---|---|---|---|---|---|
| | | | (1) | (2) | (3) | (4) |
| I | Wiseman-Peacock 'traditional' version Log E=α+ß log (GNP) | At current prices | 1.2460‡ | 0.9844 | 49.6650 | 0.3512 |
| | | At 1970-71 prices | 1.6961‡ | 0.9566 | 28.9550 | 0.4073 |
| II | Fredrick Pryor Version Log C=α+ß log (GNP) | At current prices | 1.1505‡ | 0.9897 | 61.3021 | 0.4936 |
| | | At 1970-71 prices | 1.5191‡ | 0.9437 | 25.2495 | 0.5102 |
| III | Irving Goffman version Log E=α+ß log (GNP/P) | At current prices | 1.5680‡ | 0.9788 | 42.4831 | 0.3431 |
| | | At 1970-71 prices | 3.7341‡ | 0.9504 | 26.9897 | 0.6576 |
| IV | Richard Musgrave version Log (E/GNP)=α+ß log (GNP/P) | At current prices | 0.3065‡ | 0.6910 | 9.3929 | 0.3431 |
| | | At 1970-71 prices | 1.5359‡ | 0.7862 | 11.8239 | 0.5102 |
| V | S.P.Gupta/Nicholas Michas version Log (E/P)=α+ß log (GNP/P) | At current prices | 1.3065‡ | 0.9762 | 40.0290 | 0.3431 |
| | | At 1970-71 prices | 2.5359‡ | 0.9093 | 19.5223 | 0.5102 |
| VI | Wiseman-Peacock 'share' version Log (E/GNP)=α+ß log (GNP) | At current prices | 0.2460‡ | 0.7093 | 9.8067 | 0.3512 |
| | | At 1970-71 prices | 0.6961‡ | 0.7879 | 11.8837 | 0.4073 |

Source : Same as for Table 3.1

.....(Table 3.4 continued)

.....(Table 3.4 continued)

Notes : (1) E = Central Government expenditure
GNP = Gross National Product
C = Consumption Expenditure
P = Polulation

(2) The relevant tabulated t value at 38 degrees of freedom (N-2, where N=40) and 1% level of significance is 2.715.

(3) The tabulated Durbin-Warson statistic with K = 1 (where K is the no.of explanatory variables excluding constant term) and n = 40 are $d_L$ = 1.25 and $d_u$ = 1.34

If estimated d-statistic is less than $d_L$ then it indicates presence of positive serial autocorrelation.
If estimated d-statistic is greater than $d_u$ then there is no serial autocorrelation.
If estimated d-statistic lies between $d_L$ and $d_u$ then the test is inconclusive.

(4) For explanation of all the equations, see the text.

(5) * denotes that the estimates are significant at 1% level of significance.

greater percentage increase in the government expenditure. This is also in accordance with Ernst Engel's observation. He finds the similarity between the behaviour of family income and expenditure and the national income and the government expenditure. As the family income rises, the proportion of income spent on the luxury goods increases. Similarly, as an economy progresses, the national income goes up, more is spent on luxury type of public goods such as higher education, advanced health services, parks, space explorations etc.. Hence, a greater proportion of national income is spent on the public goods.

The coefficient of determination '$R^2$' ranges between 0.6910 (equation IV) and 0.9897 (equation II) at current prices and between 0.7862 (equation IV) and 0.9566 (equation I) at constant 1970-71 prices. This indicates that 70-99% of the variations in the government expenditure are explained by GNP or (GNP/P) as the case may be. The Durbin-Watson d-statistic ranges between 0.3431 (equations III,IV and V) and 0.4936 (equation II) at current prices and between 0.4073 ( equations I,VI) and 0.6576 (equation III) at 1970-71 prices. These values are less than the tabulated $d_L$ value of 1.25 for K=1 (where K is the number of explanatory variables excluding the constant term) and N=40. This indicates that there is positive serial correlation.[1] However, such positive correlation is only to be expected as the various formulations of the Wagner's Law under discussion here exclude many other important determinants of expenditure, based on Wagner's original hypothesis that the government expenditure is primarily governed by the growth of the economy.

(1) Positive serial correlation is the correlation between members of series of observations ordered in time (as in time series data) in the regression.

## 3.4. WISEMAN AND PEACOCK'S "DISPLACEMENT EFFECT" HYPOTHESIS

According to Wiseman and Peacock, the permanent influences like prices, population and income alone cannot explain the growth pattern of expenditure. Hence, they propounded the "displacement effect" hypothesis.

The main point of emphasis of the "displacement effect," hypothesis is that the public expenditure does not increase in a smooth or continous manner, but in jerks or step-like fashion. Whenever some violent social upheavals like wars take place, the need for increased public expenditure is felt to meet the expenditure arising out of it. Under the changed circumstances the community becomes more tolerant to a higher level of taxes and revenue raising methods, as the inadequacy of the existing level of revenue is felt by every one. This is called the 'inspection effect'. They are now ready to tolerate a greater 'burden of taxation'. As a result, the tolerance limit shifts to a higher level, thereby causing an upward shift in the level of public expenditure. In this way the public expenditure and revenue get stabilised at a new higher level till another disturbance occurs to cause an upward shift in revenue and public expenditure or causes a 'displacement effect'.

However, many doubts have been raised regarding the meaning and the validity of the "displacement effect" (Bird [1970], Pryor [1968] and Musgrave [1969]). Bird questioned it on the ground that, from statement of the "displacement effect" hypothesis, the exact meaning of tolerable burden of taxation and correspondingly more 'burdensome' taxation is not clear. Bird

further questions the existence of the 'displacement effect' as, according to him, Wiseman and Peacock themselves maintain that they get their war-time displacement even when war-related military and defense expenditures are eliminated from the total of government spending.

Pryor [1968] finds little evidence of the displacement effect in the U.K. and little logical basis for the Wiseman-Peacock formulation of the hypothesis. Musgrave [1969] points out that the "displacement hypothesis" gives rise to several possibilities for its interpretation:

(1) After the war, expenditures return to their pre-war trend-line

(2) War-time trend of public expenditure increase is more or less maintained as a result of the post-war upward shift in civilian expenditure

(3) There is a temporary increase in civilian expenditure (and, hence, the total expenditure) in order to cover the war-time back logs.

Wiseman and Peacock themselves cannot stand by their original displacement hypothesis as is evident from the introduction to the second edition of their book [1967]. Originally, their hypothesis concerned with the secular growth of government expenditure related to GNP and also the pattern of displacement in the growth. However, subsequently the emphasis seems to have shifted to the examination of the government expenditure classified by economic categories (capital and current expenditure, goods & services and transfer expenditure) and according to functions (education, medical & public health,

industry etc.) to look for the behaviour of data when so classified. In other words, originally their hypothesis concerned the behavioural pattern of the total public expenditure; but now it seems to emphasize the change in the composition of the public expenditure. Quoting Bird, "the final verdict on the displacement effect, whether in Canada or elsewhere, cannot yet be handed down because an appropriate hypothesis has not yet been rigorously formulated and tested," reflecting the fact that the essential nature of the "displacement effect" is neither properly understood nor satisfactorily investigated to date.

The developing countries also can experience noteworthy shifts in public expenditure, not only on account of wars but also because of the social, political and economic characteristics which are so very different from those of the developed countries. Since the developing countries are at the initial stages of development, their priorities, targets and strategies for economic growth and development vary considerably from those of the developed world. Hence, the relative importance of various heads of expenditure depends largely on the stage and path of economic development chosen. For example, if the government in power lays greater emphasis on capital investment, then the allocation of resources to this particular item of expenditure would tend to be greater, thereby pushing up the level of total government expenditure. The displacement effect hypothesis lays emphasis on the concept of "tolerable burden of tax," which can vary for the developing countries where

the methods of raising the revenue and the tax structure differ from the developed countries. Hence, while relating the displacement effect concept to the developing countries, the above points would also have to be considered.

Rosenfeld [1973], while studying the displacement effect in Canada, has used the ratio of government expenditure to national income (that is, the ratio E/GNP) and the relative rates of growth during the war period and the post-war period as an indicator of the displacement effect. The trend of the ratio E/GNP has already been explained earlier in Section 3.2 of this chapter while discussing the growth of government expenditure and GNP (in nominal and real terms). In order to find out the effects of the wars (those with China, in 1962, and with Pakistan, in 1965 and 1971) on the growth rate of government expenditure, the period of study has been divided into three sub-periods: pre-war (1950-51 to 1960-61), war period (1961-62 to 1970-71) and the post-war period (1971-72 to 1989-90). One would expect the growth rate for the war-period to be the highest, if there is a displacement in aggregate government expenditure on account of wars. Appreciable shifts in expenditure levels are not observed even during the severe drought conditions faced during the three annual plans of 19966-67, 1967-68 and 1968-69. This is a pointer to the fact that the natural calamities are not a sufficient cause for displacement in the expenditure level.

As indicated from the series in Table 3.1, there has been a uniform increase in the E/GNP ratio and it shows no sudden shifts in any given year, especially during the years of wars (1962,

1965 and 1971). From Table 3.5, it can be seen that the growth rate of government expenditure has been the lowest during the war period contrary to the expectation of Wiseman-Peacock proposition. However, the growth rates of GNP show an increasing trend throughout. The growth curves in Chart 3.1 and Chart 3.2 show that the government expenditure and national income exhibit a continuously increasing trend (no jumps during the war years). All the above results are indicative of the fact that the displacement hypothesis is not substantiated for India.

In short, the government expenditure did not grow in a step-like manner or did not show any sudden shifts in the levels of expenditure during the years of wars, rather it grew continuously. The traditional approach of looking at wars as a possible explanation for the increase in expenditure level was not observed for a developing country like India. Hence, while attempting to analyze the growth of public expenditure in developing countries, the factors which predominantly exist in these countries should be closely studied. Of special mention here is the rapidly changing domestic political situation as well as the influence of developed nations on various development programmes of the developing countries.

**NOTE:**

The relationship between the ratio income elasticity '$e_r$' and the straight income elasticity 'e' can be shown to be

$$e_r = (e - 1) \qquad (3.12)$$

TABLE 3.5

SUBPERIOD-WISE GROWTH RATES OF CENTRAL GOVERNMENT EXPENDITURE OF INDIA AND ITS GNP (AT CURRENT PRICES AND AT 1970-71 PRICES)

| Period | Government Expenditure | | Gross National Product | |
|---|---|---|---|---|
| | At current prices | At 1970-71 prices | At current prices | At 1970-71 price |
| | (1) | (2) | (3) | (4) |
| Pre-war 1950-51 to 1960-61 | 14.08 | 12.68 | 5.39 | 3.91 |
| War-period 1961-62 to 1971-72 | 10.03 | 3.97 | 10.29 | 3.63 |
| Post-war 1972-73 to 1989-90 | 15.08 | 6.98 | 12.34 | 4.55 |
| Entire period 1950-51 to 1989-90 | 12.95 | 6.65 | 10.27 | 3.91 |

Source : Based on Table 3.1

Note : The growth rates are given in percent per annum.

Let 'e' be the proportionate change in expenditure with respect to a proportionate change in GNP.

Therefore,

$$e = \frac{dE/E}{dGNP/GNP}$$

$$= \frac{dE}{E} \times \frac{GNP}{dGNP}$$

$$e = \frac{dE}{dGNP} \times \frac{GNP}{E} \qquad (3.5)$$

Let '$e_r$' be the proportionate change in the ratio (E/GNP) with respect to a proportionate change in GNP.

Therefore,

$$e_r = \frac{d(E/GNP)/(E/GNP)}{dGNP/GNP}$$

$$= \frac{d(E/GNP)\ GNP}{E} \times \frac{GNP}{dGNP}$$

$$e_r = \frac{d(E/GNP)(GNP)^2}{E(dGNP)} \qquad (3.6)$$

Simplifying equation (3.6) gives :

$$e_r = \frac{\frac{GNPdE - EdGNP}{(GNP)^2} \times (GNP)^2}{E(dGNP)}$$

$$= \frac{GNPdE - E(dGNP)}{E(dGNP)}$$

which yields

$$e_r = \frac{GNPdE}{E(dGNP)} - 1 \qquad (3.7)$$

Hence, from equations ( 3.5) and ( 3.7) it can be readily seen that

$$e_r = e - 1$$