

CHAPTER 5

DETERMINANTS OF PUBLIC EXPENDITURE IN INDIA

5.1. INTRODUCTION

The degree of government intervention in economically important activities has expanded in every country of the world, especially so in the developing countries. In these countries, the government is seen as an instrument for change and, hence, the trend and pattern of public expenditure reveals the extent to which the government influences the economy. The role of the government has shifted from provision of goods and services of a collective nature (defence, law and order, administration etc.) to direct intervention in the income generation (by undertaking capital formation) and distribution process (through transfers and subsidies).

A number of factors contributing to the government expenditure growth have been identified by various researchers for different countries. These factors include the demographic structure, urbanization, price escalation, high income elasticity of demand for public and quasi-public goods (especially in the social welfare area), Wiseman-Peacock "displacement effect" relating to social upheavals, technical change, per capita income, tax revenue etc. Under the influence of some or all of the above mentioned factors, the government expenditure attains a higher level as time passes. Many difficulties are encountered while modeling and testing the effects of the above mentioned factors. Some factors, being qualitative in nature, can not be easily quantified while some others may be inter-dependent.

Furthermore, the list of factors may not be an exhaustive one. Under the influence of some or all of these factors, the government expenditure attains a higher level.

5.2. STUDIES PERTAINING TO DETERMINANTS OF PUBLIC EXPENDITURE

A number of studies have been carried out to ascertain the determinants of public expenditure in various countries. Some of the important ones are listed and briefly discussed below.

Fabricant's study [1952] for U.S.A. set the trend for pursuing this particular line of investigation. Three factors, namely population density, per capita income and urbanization, were found to be responsible for growth in public spending. Studies by Khan for Pakistan [1988], Niskanen for U.S.A. [1978] and Provopoulos for Greece [1982] conclude that federal deficits are a major cause of growth in public spending. Here, deficits signify public expenditure in excess of public revenue. Solano [1983] has studied the institutional factors responsible for public expenditure growth among high-income democracies. The institutional factors stand for the political structures, processes as well as fiscal policies that transform individual and group needs into different types of government actions in the form of different expenditure programmes. The above study indicated substantial support for four such factors, namely coalition governments, tax centralization, federal and unitary systems and central legislative decision rules, as being the dominant factors governing differences in expenditure levels among high income democracies. Saunders [1988] conducted a study of OECD (Organization of Economic Cooperation and

Development) countries to investigate the factors behind the size and growth of public expenditure. The variables found to be important were the demographic structure of the population, the tax structure and the size of the economy. The last two studies mentioned used the ordinary least square estimation method and found the coefficient of determination, R^2 , to be between 0.57 and 0.87.

India being a developing country, its social, economic and political characteristics differ from those of the developed countries. Hence, the factors that govern the growth of public expenditure also differ. For this reason, the factors that are most relevant for a developing country, like per capita income, availability of tax revenue, expenditure on non-traditional functions and urbanization are considered. The relationship between the above mentioned factors and government expenditure is found out using the least-squares multiple regression analysis. Such an exercise can serve as an important guideline for formulating various expenditure programmes.

5.3. EXPLANATORY VARIABLES AND HYPOTHESIS

1. Per Capita Income (X_1): As the development process of an economy progresses, the low-income agrarian economy transforms to a high-income industrial one and the per capita income rises. In the course of development, the share of government purchases, especially the civilian purchases such as those on education, housing and community development, sanitation, fire and police, recreation, post & telegraph, space explorations, transportation,

natural resources etc., increase considerably. This renders the income elasticity of per capita expenditure to be greater than one, i.e., the ratio of percentage increase in per capita expenditure to percentage increase in per capita GNP exceeds one. To put it differently, the product mix between private and social goods changes as per capita income rises, and this change leads to a rising share of social goods.

Ernst Engel tried to provide a logical basis for the above fact. He drew a similarity between the consumption pattern of a family and the nation as a whole. As the family income rises, a smaller share is spent on necessities and a large share on luxuries and, thus, the consumption pattern of the family changes. Similarly, as the economy progresses, the national income as well as per capita income, both are expected to grow. In the initial stages of development, the demand for services related to basic needs such as elementary education, primary health services, safety, sanitation etc., rises, inducing the government to spend more. As the economy grows further, the demand for luxury-type of public goods like parks, marinas high-speed highways, space explorations etc. increases, leading to increased government expenditure on luxury-type of public goods.

Therefore, a positive relationship is assumed between the growth of government expenditure and per capita income, which takes into account the population changes. That is, higher the per capita income, higher is the level of government expenditure and vice-versa. Here, per capita income refers to the ratio of GNP to the population.

2. Availability of Tax Revenue (X_2) : The extent to which a government can finance the expenditure is dependent upon the instruments through which it can generate revenue. The greater the availability of tax revenue, larger will be the ability of the public sector to spend. In a low-income economy, it is difficult to impose and collect taxes because the skills and facilities of tax administration are less developed. Also, a limitation is imposed on the amount of tax revenue collected due to the absence of adequate sources on which to attach taxes. However, as an economy develops, the per capita income rises and with it the revenue through taxation of income. The indirect taxes (such as excise, sales tax etc.) also increase with industrialization. The direct and indirect taxes, which form the total tax revenue, thus become principle sources of the funds made available to the government. Hence, a positive relationship is assumed between the tax revenue and the size of government expenditure.

In the present analysis, the tax revenue is taken with one year lag. This is done on the assumption that the tax revenue in year 't' affects the expenditure level in year 't+1'. Hence, it is assumed that higher (lower) the tax revenue in year 't' the larger (smaller) would be the level of government expenditure in year 't+1'. In other words, a direct relationship is assumed between the level of government expenditure in a given year and the tax revenue in the previous year.

3. Expenditure on Non-Traditonal Functions (X_3) : The Wagner's law states that, as the economy grows, the sphere of government

activities increases, resulting in the growth of government expenditure. The growth in expenditure can be attributed mainly to the three following factors :

- (a) expansion of traditional functions of State like defence, justice, law and order, maintenance of the State, social overheads etc.
- (b) increase in the scope of government functions to include provision of various merit & public goods (health facilities, education, transport and communication etc.) and redistribution of income and wealth.
- (c) shift in the composition of national produce in favour of public goods, necessitates the expansion of the investment activity of the government

Hence, a positive relationship is assumed between the increase in the scope of government functions and the growth of government expenditure to finance such welfare-oriented activities.

The expenditure on non-traditional functions includes expenditure on social services (like education and medical & public health), economic services (like agriculture, industry and transport & communication), broadcasting media, museums, archaeology, research and development etc. In short, expenditure on defence, administration, organs of state, currency, coinage & mint, justice, police etc., is excluded as being expenditure on the traditional functions. It is assumed here that, with

widening (narrowing) of non-traditional functions of the government, the government expenditure increases (decreases).

4. Urbanization (X_4) : The process of migration of people from the rural areas to the industrial nerve centres in the urban areas in search of employment is called urbanization. Usually, an indication of urbanization in a country is expressed as a ratio of the population staying in the urban areas to the total population of the country.

As new industries come up, people from rural areas start migrating towards the new industrial centres in search of jobs, thus initiating the process of urbanization. As more and more people migrate, thereby speeding up the process of urbanization, the resulting congestion increases the demand for health facilities, sanitation, water supply, housing etc. Since these goods are of mass consumption and generate external benefits, need for public provision of these goods arises, resulting in increased level of public expenditure.

The present study is aimed at analyzing only the Central Government Expenditure of India. However, India being a Federal State, its economic functions and powers are divided between the Central Government, as the apex body, followed by the state and local governments. Since urbanization and resulting congestion are mainly the responsibilities of the local governments, the related aspects are dealt with by the respective Municipal Corporations. The facilities which are expected to be provided with large scale migration of people to urban areas are basically provided by the local governments, e.g., water supply,

sanitation, housing etc. Hence, we intend to examine whether or not urbanization affects Central Government Expenditure in India.

Over and above these variables, following factors were also tried, considered and eventually dropped from the multiple regression. The effect of inflation on the level of government expenditure has been already considered in Chapter 3. Hence, it was not repeated for this analysis. As regards the transfer payments on the care of children and the aged, it is expected that in the initial stages of development of the country, these would form a negligible proportion of the total expenditure of the government. Hence, it is expected that, though their absolute amounts may increase over time, these may not constitute a major determinant of Central Government expenditure in India. Although the transfer payments show an increasing trend, they have still not attained a level so as to cause an upward shift in India's Central Government expenditure. An attempt was also made to include the variable 'dependency ratio', i.e., the ratio of population under 15 and over 60 years of age in the total population, into the regression model. However, the results for its coefficient turned out to be statistically insignificant. Hence, for the present analysis, it has also been dropped.

After having discussed the explanatory variables, the relationship between the dependent variable (government expenditure) and the explanatory variables can be specified as follows.

5.4. SPECIFICATION OF THE MODEL

The functional relationship between the dependent variable Y and the explanatory variables X_1 , X_2 , X_3 and X_4 is specified in the double-log form. The advantage of adopting the double-log form is that the slope coefficient ' β ' measures the elasticity of ' Y ' with respect to ' X '. The regression model can be written as

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + u \quad (5.1)$$

where,

Y = government expenditure

α = the intercept term and represents the average effect of all the variables on government expenditure not included in the model.

X_1 = per capita income

X_2 = tax revenue with one year lag

X_3 = expenditure on non-traditional functions

X_4 = ratio of urban population to total population

u = error term

Several other regression models were tried in linear, semi-log and double-log forms but equation (5.1) performed best as far as the statistical significance of various ' β ' coefficients and the coefficients of determination R^2 was concerned.

5.5. MAIN FINDINGS OF THE REGRESSION ANALYSIS

Table 5.1. summarizes the results of the regression analysis of the determinants of government expenditure in India for the period 1961-62 to 1989-90. Since the tax revenue is taken with a one year lag, the analysis is carried out for the period 1961-62

TABLE 5.1

**RESULTS OF THE MULTIPLE REGRESSION ANALYSIS OF THE
DETERMINANTS OF CENTRAL GOVERNMENT EXPENDITURE IN INDIA
(Time Series Analysis: 1961-62 to 1989-90)**

Intercept Term	Per Capita Income	Tax Revenue With One Year Lag	Expenditure on Non-Traditional Functions	Ratio of Urban Population to Total Population	Coefficient of Determination	Durbin Watson d-Statistic
α	B_1	B_2	B_3	B_4	R^2	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
8.62	0.65*	0.51*	0.36*	-3.49*	0.998*	1.73 [@]
	(3.89)	(4.34)	(6.27)	(-3.42)	(3345.41)	

Source: Based on Table 3.1 and APPENDIX Table VA-1

Notes :

(1) Regression Equation :

$$Y = \alpha + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + u$$

where

α = intercept term
 X_1 = per capita income
 X_2 = tax revenue
 X_3 = expenditure on non-traditional functions
 X_4 = ratio of urban population to total population.
 u = error term

(2) Figures in brackets below the coefficients B_1 , B_2 , B_3 and B_4 denote estimated t-values.

(3) The tabulated t-value at 5% level of significance is 2.048 and that at 1% level is 2.763, with 27 degrees of freedom (for N observations, the degrees of freedom are N-2. N=29 for this study).

(4) Figures in bracket below R^2 denote the estimated F-value.

.....(Table 5.1 continued)

.....(Table 5.1 continued)

(5) * denotes 1% level of significance.
** denotes 5% level of significance.

(6) @ denotes the absence of autocorrelation at 1% level of significance.

(7) The presence of autocorrelation, i.e., correlation between members of series of observations ordered in time (as in time series data), in the regression can be found out by using the conventional Durbin-Watson d-test. If the estimated d-value $< d_L$, then autocorrelation is present; if $d > d_U$, then there is no autocorrelation in the regression; and if $d_L \leq d \leq d_U$ then the test is inconclusive, i.e., one cannot conclude whether autocorrelation does or does not exist. The tabulated $d_L = 0.91$ and $d_U = 1.51$, for $N=29$ (number of observations) and $k=4$ (number of explanatory variables) at 1% level of significance. The estimated d-value is 1.73 which is greater than d_U , implying that autocorrelation is absent.

(8) The statistical software, ABSTAT, used for estimation of the multiple regression model indicates the presence of multicollinearity. Multicollinearity means 'perfect' or exact linear relationship among some or all of the explanatory variables of a regression model. Our sole purpose of the regression analysis here is prediction and not exact estimation of the ' β ' coefficients. Hence, multicollinearity is not a serious problem because higher the R^2 , the better the prediction.

to 1989-90 (29 year period), thereby causing a loss of one degree of freedom. The following conclusion can be drawn from Table 5.1.

1. The coefficient of determination R^2 is the most commonly used measure of the goodness of fit of a regression and it measures the proportion or percentage of the total variation in Y (dependent variable) explained by all the independent variables in the regression model. R^2 ranges between 0 and 1; the closer it is to 1, the better the fit.

In the present study, the double-log multivariate model has proved to be a 'good fit'. This is obvious from the fact that the R^2 with a value of 0.998 is highly significant at 1% level, since the estimated F-value 2614.69 is far greater than the tabulated F-value of 7.68 with 1 and 27 degrees of freedom (i.e., $N=2$ and $N=29$). It also indicates that 99.8% of the variations in the dependent variable, i.e., government expenditure, are explained jointly by the explanatory variables considered in the model.

2. If the estimated t-value is greater than the tabulated t-value of a coefficient, then the coefficient of the explanatory variable is statistically significant. From Table 5.1., it can be seen that per capita income (X_1) with $\beta_1=0.65$ is the most dominant factor influencing government expenditure growth. β_1 is statistically significant at 1% level and this represents that a 1% change in X_1 (per capita income) leads to a 0.65% change in Y (government expenditure). The above observation once again confirms Wagner's law that, with increase in economic growth, the

level of government expenditure also goes up. It is also in accordance with the positive relationship assumed between per capita income and government expenditure.

3. The next most important factor is the tax revenue (X_2) with $\beta_2 = 0.51$, which is statistically significant at 1% level and 27 degrees of freedom and implies that a 1% change in X_2 (tax revenue) leads to 0.51% change in Y (government expenditure). This is also in accordance with the relationship we had assumed, that higher the tax revenue collected in the previous year, higher will be the level of government expenditure in the following year.

4. The expenditure on non-traditional functions of the state (X_3), aimed mainly at promoting welfare and development, has also been influential in causing a shift in the level of expenditure in the upward direction. β_3 , with a value of 0.36, is statistically significant at 1% level of significance and 27 degrees of freedom. It also indicates that a 1% change in X_3 causes a 0.36% change in Y (government expenditure). This finding also substantiates the Wagner's theory of "increasing State activity". With economic growth, government indulges in activities other than merely providing administration, justice, police etc. Such activities include provision of education, health facilities, communication facilities, development of industry and agriculture etc. On account of these, the government expenditure goes up. This finding is also in tune with the positive association between government expenditure and non-traditional functions of the state assumed in this study.

5. The coefficient of X_4 (ratio of urban population to the total population) is β_4 with a value of -3.49, which is statistically significant at 1% level and 27 degrees of freedom. A negative and significant value of β_4 indicates that urbanization is negatively associated with Central Government expenditure in India. The provision of facilities necessitated by the process of urbanization comes under the function of local governments. Hence, rather than getting a positive association between Central Government expenditure and urbanization, the model gives a negative association, implying that a 1% rise in ratio of urban population to total population, causes a 0.51% decrease in Central Government expenditure. This is contrary to the generally assumed positive association between these two variables, due to reasons explained earlier in section 5.3. Also, it was observed while investigating the structure of Central Government expenditure that the Centre spends a meager amount on the provision of various social services like education, medical and public health, sanitation, water supply, housing etc., although provision of these services is important on account of urbanization.

5.6. SOME IMPLICATIONS OF THE RESULTS

Following are the implications of results of the above regression analysis :

(i) The important role played by per capita income in the growth of expenditure suggests that, with economic growth, the need for undertaking more developmental activities requiring higher volume

of investment necessitates an increasing role of the government in economic field. This is a logical fall-out of the development and growth process.

(ii) The tax revenue is also one of the important determinants of expenditure growth. The level of tax revenue has also been on the increase as can be seen from the APPENDIX Table VA-1. As more funds become available to the government through various sources of tax, the spending capacity of the government increases. Also, this indicates that India is slowly moving from a low-income economy (which is characterized by inadequacy of tax handles) to a higher one so that the government has more sources available on which to attach taxes, thereby increasing the level of tax revenue collected and the government expenditure incurred thereafter.

(iii) An increased expenditure on non-traditional functions leads to an upward shift in the level of government expenditure. This is a healthy sign and is in accordance with the various objectives laid down while adopting planning for accelerating the process of economic growth. The building up of roads, railways and means of communication helps to give a fillip to production, trade and commerce. The investment on human resource development by providing education, medical and public health and other social services leads to physical well-being of the people. Public expenditure on development of agriculture and industry, investment on irrigation works, agriculture and industrial research etc. helps an all-round development of the economy.

5.7. CONCLUDING REMARKS

This chapter has been concerned with an empirical investigation of the factors governing the growth of public expenditure in India. Per capita income, lagged tax revenue and welfare-oriented expenditure (or expenditure on non-traditional functions of the State) emerge as the dominant factors influencing the size of expenditure in the upward direction. Though urbanization has turned out to be a statistically significant factor, it is found to be negatively associated with the Central Government expenditure in India. Given the importance of such findings, the result obtained should be seen as being no more than suggestive, pointing to areas where more detailed analysis may be warranted.

APPENDIX TABLE VA-1

EXPLANATORY VARIABLES FOR MULTIPLE REGRESSION

Year	Per Capita Income Tax (Rs.)	Tax Revenue (Rs. in million)	Expenditure on Non-Traditional Functions (Rs. in million)	Ratio of Urban Population to Total Population (%)
	(1)	(2)	(3)	(4)
1961-62	384.66	7300	5397.9	18.00
1962-63	404.58	8750	7127.4	18.19
1963-64	455.28	10610	8192.0	18.38
1964-65	519.41	13740	8933.8	18.57
1965-66	535.69	15630	8845.4	18.76
1966-67	592.75	17850	8368.7	18.95
1967-68	678.91	19340	7943.3	19.14
1968-69	703.07	19370	8548.9	19.33
1969-70	758.34	20190	9511.5	19.52
1970-71	792.59	22010	10813.4	19.71
1971-72	829.71	24510	14807.1	19.90
1972-73	894.23	29280	15423.7	20.24
1973-74	1063.48	34430	16203.1	20.58
1974-75	1230.08	39000	24352.9	20.92
1975-76	1293.34	50970	32912.2	21.26
1976-77	1365.50	60100	32978.3	21.60
1977-78	1511.58	65810	41921.5	21.94
1978-79	1605.46	70600	43724.2	22.28
1979-80	1724.53	85680	50414.0	22.62
1980-81	2005.26	85680	64306.3	22.96
1981-82	2297.69	93880	77921.1	23.30
1982-83	2499.35	115730	84897.6	23.54
1983-84	2841.67	130560	108192.0	23.78
1984-85	3101.04	154760	137431.0	24.02
1985-86	3457.99	176940	183346.0	24.26
1986-87	3787.05	211800	190881.0	24.50
1987-88	4186.74	243620	182217.0	24.74
1988-89	4904.66	283910	214144.0	24.98
1989-90	5394.00	319380	242413.0	25.22

Sources: (1) "INDIA DATABASE: The Economy," Vol.I, by H.L.Chandhok and The Policy Group (Annual Time Series Data), Living Media India Ltd., New Delhi 1990.

(2) "Basic Statistics Relating to Indian Economy," Vol.I (All India), Centre for Monitoring Indian Economy, Bombay (various annual issues).