

CHAPTER - III

DATA AND METHODOLOGY

3.1 Introduction : Nature and Period of Data Set.

In this study Gross National Product (GNP) with 1985 = 100) has been used to measure output level and M_2 for money supply in Indian economy. Wholesale Price Index (WPI) is used for price level with 1985 as the base year (1985 = 100).

We have used the historical data set in this study for estimation of the models. It is a yearly data set. The data set has been taken for the period 1950-92. This data set has been presented in the table 3.1.

3.2 Data for Money Supply :

We have used M_2^1 instead of M_1 , since M_2 very often shows greater stability when new kind of checking accounts is introduced. M_2 is free from this problems and, therefore, considered to be a better barometer of economic activity. Again, recent research works support the view that changes in the inflation rate over time can be predicted on the basis of actual M_2 money growth relative to the growth of potential output.²

3.3 Sources of Data :

The data for GNP, Money Supply (M_2) and wholesale Price Index(WPI) have been collected from International Financial Statistics (IFS). The IFS data set of the relevant variables have been collected for the period 1950-59 from the Year Book 1979 for the period 1960-85 from the Year Book 1988, and for the period 1986-92 from the IFS 1993 issue.

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1. Reserve Bank of India uses several concepts of Money Supply, viz. M_1 , M_2 , M_3 and M_4 following the recommendation of the 'Second Working Group on Money Supply. [Report of the Second Working Group "Money Supply in India". Concepts, Compilation and Analysis" Reserve Bank of India, 1977.
 2. Hallman, Jeffrey, Richard, Porter. and David, Small. " M_2 per unit of potential output as an Anchor for the price level". Board of Governors of Federal Reserve System, Staff papers no. 117, April 1989.

Table-3.1 : Price level , GNP and Money Supply (data)

Year	Price level base year 1985	GNP billion of Rs.	Money supply (billion of Rs.)
1950	20	66.0	21.64
1951	21.9	65.7	21.07
1952	19.2	68.3	20.60
1953	19.0	73.2	21.09
1954	18.2	67.8	22.66
1955	16.7	71.8	25.26
1956	18.8	82.7	27.12
1957	19.9	83.9	29.87
1958	20.3	94.1	32.90
1959	21.1	97.9	36.94
1960	15.3	104.7	38.92
1961	15.7	111.20	40.17
1962	16.2	118.9	44.03
1963	16.8	136.8	48.69
1964	18.6	160.3	53.27
1965	20.1	167.7	59.07
1966	22.5	192.0	65.69
1967	25.9	224.3	71.84
1968	25.8	231.1	78.68
1969	26.3	256.1	89.32
1970	27.9	279.9	100.05
1971	29.3	301.5	111.14
1972	31.9	332.9	135.17
1973	37.7	410.3	161.52
1974	47.7	485.1	181.27
1975	49.6	516.8	206.74
1976	48.7	559.8	257.35
1977	52.4	627.3	306.67
1978	52.2	683.1	371.54
1979	58.2	753.9	437.35
1980	70	953.1	506.88
1981	78.5	1116.2	595.33
1982	80.5	1238.7	697.75
1983	86.8	1444.3	815.58
1984	94.2	1596.8	962.26
1985	100.0	2608.1	1124.72
1986	105.6	2911.4	1326.35
1987	112.9	3305.8	1505.38
1988	122.7	3921.0	1825.00
1989	131.1	4482.6	2112.00
1990	142.9	5240.3	2430.30
1991	162.2	6026.7	2875.4
1992	181.4	**	3357.3

** The GNP data for 1992 was not available during the registration of the thesis. Consequently, this present study involves output money supply relationship until 1990-91. While the price money relationship has been studied until 1992.

3.4 Rationale Behind the use of IFS data set:

In this study IFS data set have been used in the presence of Reserve Bank of India data. This is done in view of the fact that several researchers observe that the Reserve Bank of India collects detailed data which it does not

release in India. It does, however, make these data set available to the World Bank and the International Monetary Fund so that the foreigners with access to these institutions can easily get hold of them. It is the common place for Indian researchers to realise³ for the correct data on the external and internal debt, on actual payments made on the total defence account, one has to turn to foreign publications which use data made available by India Government. This has motivated our choice of the IFS as the source of data set used in this study.

3.5 Methodology :

The study involves the use of econometric method of estimation. Ordinary Least Square (OLS) method is used for the estimation of the models. The General Least Square (GLS) method is applied, when the OLS estimation suffers from serial or auto-correlation. Due care is also taken for detecting the presence of the "Single Equation Problem" like auto-correlation and heteroscedasticity. The Durbin-Watson Test is performed in case of each regression estimation for detecting the presence of auto-correlation. D-W statistic is reported along with each estimated regression equation. The goodness of fit of the estimated relationship is measured through R^2 . It has further been corroborated by F-test. The significance of Regression constant and Regression Co-efficient have been determined through the standard error and test of 't' tests for structural changes. With this end in view "Standard Error" of each estimation is reported, along with the estimated regression equations. These t-tests are essentially one Tailed Tests.

Graphs depicting Time plots of relevant variables have been used in the study for explanatory exposition of the relationships among the variables concerned.

3. The Front Line : July 20 August (91 Vol.8 No.15, p. 11).

Again graphical method has been undertaken to supplement the quantitative method of identifying sub-periods in which structural changes have occurred in the relationship of macro-variables concerned.

'Window- Search' for structural changes has been carried through 'Chow Tests'. The basic methodology in this respect , has been explained in the appropriate text of the thesis.

Under the 'Chow Tests' a series of iterative regression equation have been estimated and the results have been subjected to battery of Tests. The relevant formulae and forms have been given in the appropriate text of the study.

3.6 Data Transformation :

In case of auto-correlation in the estimated regression equations , the data set is transformed with appropriate methods like the Cochrane - Orcutt Method⁴ and Generalised Least Square Method. Again, in some cases, logarithm of the original data set is used in order to avoid the problem of heteroscedasticity.

4. Cochrane, D. and G. H. Orcutt, " Application of Least Square Regressions to Relationships Containing Autocorrelated Errors" In : Journal of the American Statistical Association, Vol. 44, 1949, pp. 32-61.

Wallace T. Dudley & J. Lew Silver, Econometrics Addison-Wesley Publishing Company, 1988, p. 296.