Collection of Data and Methodology

Basically the nature of the present study “Critical Analysis of Fiscal Policy of India Since 1971 With Special Reference to Personal Income Tax Administration” is such that it requires secondary data. In this chapter, source of data and research methodology of the study has been discussed. The chapter is divided in two sub sections First section of this chapter presents the database of the study and second section presents the various statistical and econometric techniques used in the study.

6.1 Source of Data

The study is mainly based on secondary data covering a time period of forty-four years from 1970-71 to 2013-14. However, different sources of data have been consulted to prepare a continuous set of data as per the requirements of the study. The followings are the main sources of data:

6.1.1 Reserve Bank of India Publications

Two main secondary data sources published by Reserve Bank of India were heavily consulted and relied upon for the present study. These sources are, namely: A Hand Book of Statistics on Indian Economy, different issues; and Report on Currency and Finance, different issues. Data regarding Gross Domestic Product (GDP), Expenditure, Deficits, Government liabilities etc. has been taken from these reports.

6.1.2 Publications by Government of India

Various publications by Ministry of Finance, Government of India, and other government agencies were also used for the present study. These sources include: India Public Finance Statistics, Ministry of Finance, various issues; Economic Surveys, various Issues; Annual Union Budget Speeches of Finance Ministers of different years; All India Income Tax Statistics, Directorate of Income Tax, various issues; Income Tax
Department Performance Statistics, Directorate of Income Tax, various issues; Compliance report on Direct Taxes, Comptroller and Auditor General of India, various issues; Income Tax Act, 1961 as amended from time to time; and various reports of different Finance Commissions constituted from time to time. Data regarding various components of taxes were collected and used from these sources.

6.1.3 Reports of various Committees

The following reports of various committees appointed by Government of India from time to time have also been considered to analyse the policy changes on direct taxes and administrative reforms introduced during the post-independence period. These reports include: The India Taxation Enquiry Committee, 1924-25; Income Tax Enquiry Committee, 1935-36; Income Tax Investigation Commission, 1948; Taxation Enquiry Commission, 1953-54; Indian Tax Reforms- A Survey, 1956; Rationalization and Simplification of the Tax Structure, 1968; Direct Tax Enquiry Committee Report, 1971; Taxation of Agricultural Income and Wealth, 1972; Direct Tax Laws Committee, 1978; Tax Measures to Promote Employment, 1980; Long Term Fiscal Policy, 1985; Interim Report of Tax Reforms Committee, 1991; Final Report (Part I & II) of Tax Reforms Committee, 1992, 1993; Advisory Group on Tax Policy and Tax Administration for the Tenth Plan; Report of the Task Forces on Direct Taxes, 2002; The Fiscal Responsibility and Budget Management (FRBM) Act, 2003; The Fiscal Responsibility and Budget Management Rules, 2004; and The Direct Tax Code Bill, 2010. These policy documents have been consulted to achieve the objective of analyzing policy reforms in India.

Furthermore, Ministry of Finance Publication- Indian Public Finance Statistics was relied upon for indirect taxes; and, Reserve Bank of India Publication-A Handbook of Database on Indian Economy was relied upon for data relating to other variables. The direct tax reforms undertaken since 1991 and their effects have been examined in detail. The study has focused mainly on two major direct taxes, namely, personal income tax and corporation tax. Reference of other taxes like wealth tax, gift tax etc. has also been made wherever it was required.
6.2 Research Methodology

The following variables have been identified to achieve the objectives of the study. It includes:

- Gross Domestic Product (GDP);
- Total Tax Revenue (TTR);
- Direct Tax Revenue (DTR);
- Indirect Tax Revenue (ITR);
- Personal Income Tax Revenue (PITR);
- Total Tax to GDP Ratio;
- Direct Tax to GDP Ratio;
- Indirect Tax to GDP Ratio;
- Tax Buoyancy for all type of Taxes; etc.

The above variables have been chosen on the basis of review of vast literature available on the similar studies conducted by other researchers.

6.3 Hypothesis To Be Tested

To achieve the objectives of the study, the following hypothesis has been framed and tested:

**Hypothesis -1**

(A)  \( H_0: \) The Tax/GDP ratio (TGDPR) is independent to time in post reform period.

\[ \text{i.e. } H_0: \beta_1 = 0 \text{ and} \]

\( H_A: \) The Tax/GDP ratio (TGDPR) is statistically significant dependent on time in post reform period.

\[ \text{i.e. } H_A: \beta_1 \neq 0 \]
(B)  \( H_0: \) The Direct Tax/GDP ratio (DTGDPR) is independent to time in post reform period.

i.e. \( H_0: \beta_1 = 0 \) and

\( H_A: \) The Direct Tax/GDP ratio (DTGDPR) is statistically significant dependent on time in post reform period.

i.e. \( H_A: \beta_1 \neq 0 \)

(C)  \( H_0: \) The Indirect Tax/GDP ratio (IDTGDPR) is independent to time in post reform period.

i.e. \( H_0: \beta_1 = 0 \) and

\( H_A: \) The Indirect Direct Tax/GDP ratio (IDTGDPR) is statistically significant dependent on time in post reform period.

i.e. \( H_A: \beta_1 \neq 0 \)

(D)  \( H_0: \) The Personal Income Tax/GDP ratio (PITGDPR) is independent to time in post reform period.

i.e. \( H_0: \beta_1 = 0 \) and

\( H_A: \) The Personal Income Tax/GDP ratio (PITGDPR) is statistically significant dependent on time in post reform period.

i.e. \( H_A: \beta_1 \neq 0 \)

**Hypothesis No. 2**

\( H_0: \) There is no significant change in the mean value of Direct Tax Revenue during the pre & post reform periods.

\( H_A: \) There is statistically significant change in the mean value of Direct Tax Revenue during the pre and post reform periods.
**Hypothesis No. 3**

**H₀**: There is no significant change in the mean value of Indirect Tax Revenue during the pre & post reform periods.

**Hₐ**: There is statistically significant change in the mean value of Indirect Tax Revenue during the pre and post reform periods.

**Hypothesis No. 4**

**H₀**: There is no significant change in the mean value of Total Tax Revenue during the pre & post reform periods.

**Hₐ**: There is statistically significant change in the mean value of Total Tax Revenue during the pre and post reform periods.

**Hypothesis No. 5**

**H₀**: There is no significant change in the mean value of Personal Income Tax Revenue during the pre & post reform periods.

**Hₐ**: There is statistically significant change in the mean value of Personal Income Tax Revenue during the pre and post reform periods.

**Hypothesis No. 6**

**H₀**: There is no significant change in the mean value of Direct Tax GDP Ratio during the pre & post reform periods.

**Hₐ**: There is statistically significant change in the mean value of Direct Tax GDP Ratio during the pre and post reform periods.

**Hypothesis No. 7**

**H₀**: There is no significant change in the mean value of Indirect Tax GDP Ratio during the pre & post reform periods.
Hₐ: There is statistically significant change in the mean value of Indirect Tax GDP Ratio during the pre and post reform periods.

**Hypothesis No. 8**

H₀: There is no significant change in the mean value of Total Tax GDP Ratio during the pre & post reform periods.

Hₐ: There is statistically significant change in the mean value of Total Tax GDP Ratio during the pre and post reform periods.

**Hypothesis No. 9**

H₀: The variance of Direct Tax Revenue for post reform period is same as variance of Direct Tax Revenue in pre reform period.

Hₐ: The variance of Direct Tax Revenue is statistically significant different in pre and post reform periods.

**Hypothesis No. 10**

H₀: The variance of Indirect Tax Revenue for post reform period is same as variance of Indirect Direct Tax Revenue in pre reform period.

Hₐ: The variance of Indirect Tax Revenue is statistically significant different in pre and post reform periods.

**Hypothesis No. 11**

H₀: The variance of Total Tax Revenue for post reform period is same as variance of Total Tax Revenue in pre reform period.

Hₐ: The variance of Total Tax Revenue is statistically significant different in pre and post reform periods.
Hypothesis No. 12

H₀: There is no significant change in the variance of Personal Income Tax Revenue during the pre and post reform period.

Hₐ: There is statistically significant change in the variance of Personal Income Tax Revenue during the pre and post reform period.

6.4 Statistical and Econometric Tools used

The data collected for the purpose of the study have been analysed using different statistical and econometric tools, which are as follows:

- Tabular analysis
- Ratios and percentages
- Averages
- Standard Deviation
- Coefficient of Variation
- Compound Annual Growth Rates (CAGR)
- Simple regression etc.

6.5 Compound Annual Growth Rates (CAGR)

To evaluate the performance of tax reforms, compound annual growth rates have been computed. To estimate the compound annual growth rates of various variables, the following formula has been used:

\[ \hat{r} = anti \log \left[ \frac{1}{t} \{ \log y_t - \log y_0 \} \right] - 1 \]

where \( r = \) compound annual growth Rate

\( y_t = \) value of the variable in current period (2013-14)

\( y_0 = \) value of the variable in initial period (1970-71)
6.6 Simple Regression Analysis to calculate Buoyancy of Taxes

To calculate buoyancy of tax revenue during the pre and post-reforms period, the following regression function has been used by regressing log of tax revenue on the log of the base (GDP at fixed cost 2004-05 prices):

\[ \log T_t = \alpha + \beta \log Y_t \]

Where

- \( T_t \) = tax revenue (including discretionary changes) of each type of tax (individually) for the period \( t \)
- \( \alpha \) = Constant
- \( \beta \) = Buoyancy coefficient
- \( Y_t \) = GDP at current price for period \( t \)

If \( \beta < 1 \), tax revenue is considered to be less buoyant

If \( \beta > 1 \), tax revenue is considered to be more buoyant

If \( \beta = 1 \), tax revenue is considered to be equally or proportionately buoyant

6.7 For Testing of the Hypothesis

For testing of the Hypothesis ‘t’ statistics has been used (for testing difference of mean) Further for testing the variance of tax revenues in pre and post reform period ANOVA statistics has been used the formula for ‘t’ statistics and ANOVA statistics is given below.
Formula for Calculating ‘t’

\[
t = \frac{\bar{X} - \bar{Y}}{s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}
\]

where \( \bar{X} \) is mean value of variable in pre reform period

\( \bar{Y} \) is mean value of variable in post reform period

\( s^2 \) is variance

\( n_1 \) & \( n_2 \) are number of observation

Formula for Calculating ANOVA

\[
F = \frac{Sx^2}{Sy^2}
\]

where \( Sx^2 \) is variance of series one

\( Sy^2 \) is variance of series two

Further an attempt has been made to estimation of trend in Tax/GDP Ratio, Direct Tax GDP ratio, Indirect Tax GDP ratio, and PIT GDP ratio for years 1989-90 to 2012-13 for this the data of GDP has been collected on constant prices(2004-05).

For the estimation of trend in Tax/GDP Ratio, Direct Tax GDP ratio, Indirect Tax GDP ratio, and PIT GDP ratio we have presumed Linear model in general

Ratio \( Y = f (Time) \)

\[
i.e. \ Y = \beta_0 + \beta_1 t + u_t
\]

Where \( \beta_0 \) & \( \beta_1 \) are parameters to be estimated with the help of OLS technique and the formula for estimation of
\[
\beta_i = \frac{\sum (Y_i - \text{mean of } Y_i)(t_i - \text{mean of } t_i)}{\sum (t_i - \text{mean of } t_i)^2}
\]

and \( \hat{\beta}_0 = \text{mean of } Y_i - \hat{\beta}_1 \times \text{mean of } t_i \)

After estimation of parameters \( \hat{\beta}_0 \) and \( \hat{\beta}_1 \), "t statistics" has been used because sample size is small.

### 6.8 Limitations of the Study

Limitations have always been a part of any research work. The present study is also not an exception of this. Some of the limitations of the study have been listed as under:

- The study is totally based on secondary data only. Therefore, it suffers from all the limitations suffered by a research based on secondary data.

- There are many governmental and non-governmental agencies in India which collect data relating to public finance and taxes. All of these agencies follow different methodology to collect the data. So the problem of data mis-match was faced many a times during the study.

- Due to non-availability/non-publication of data, the study period had to be adjusted accordingly for part of analysis. There were huge gaps in data in regard to some of the variables, so the necessary adjustments were required to be done in the data to make it compatible.

- Due to paucity of time, the possibility of collection of primary data to know the tax-payers’ perception in regard to the various aspects of direct tax reforms has not been carried out.