

CHAPTER 4

RESEARCH METHODOLOGY

From the literature survey, we derive two lessons : Firstly, profit function approach provides a better understanding of the overall constant economies of scale in the banking industry than the cost function. Secondly, the cost function method permits examination of variable economies of scale.

The method adopted in this study is of estimating the cost function and profit function both from time-series and cross-sectional data of the Indian banking system.

4.1 COST FUNCTION APPROACH TO THE ECONOMIES OF SCALE

4.1.1 The Model

The cost function used in this study is :

$$C = f (Q, Q_m, TB, RB)$$

where

C = Cost
Q = Output
Q_m = Output-mix
TB = Total number of branches
RB = Ratio of rural branches to total branches

Cost (C)

The total cost [C] is defined as total operating expenses net of interest cost. The inclusion of interest costs results in the elimination of much reduced operating cost scale economies, as derived from the literature survey.

In the case of time-series analysis, labour cost, EC, (establishment expenses), a major cost component and for cross sectional analysis, two major cost components, viz., labour cost and other current expenses, OC, (rent, stationary, printing, advertising) have also been estimated separately to investigate the source of economies/diseconomies of scale.

Output (Q)

The definition of output of commercial banks continues to be a controversial subject, in particular, because of its importance in the estimation of economies of scale. Hence, no general consensus seems to have arisen on an appropriate definition as noted in the previous chapter.

We have identified five different measures of output used in different studies with a dual objective; to select the best measure on the basis of statistical inferences and to find out the sensitivity of each output measure to the economies of scale results.

The five output measures used in this study are :

1. Volume of Business (VB)
2. Total Assets (TA)
3. Earning Assets (EA)
4. Total Deposits (TD)
5. Total Operating Earning (TOE)

The total assets and earning assets data are from the asset side and total deposits from the liability side of the bank balance sheet. Volume of business includes items from both, liability and assets and shows the bank's business turnover. The above

four variables are stock variables. On the other hand, the total operating earning is a flow variable taken from the profit and loss account. All the variables discussed above are in monetary terms. However, for the cross section analysis, the total numbers of branches (TB) is included as the sixth variable. For time-series analysis, we have not taken total number of branches as size variable for avoiding the controversial issue of relating the monetary and physical variables together in the absence of an appropriate series of deflator.

The definition of each one of the output variable is given below:

1. Volume of Business (VB)

$$VB = \text{Earning Assets} + \text{Total Deposits} + \text{Borrowings}$$
2. Total Assets (TA)

$$TA = \text{Earning Assets} + \text{Cash on Hand} + \text{Fixed Assets} + \text{Other Assets}$$
3. Earning Assets (EA)

$$EA = \text{Call Money} + \text{Investment} + \text{Advances}$$
4. Total Deposits (TD)

$$TD = \text{Fixed Deposits} + \text{Saving Deposits} + \text{Current Deposits}$$
5. Total Operating Earning (TOE)

$$TOE = \text{Commission Earned} + \text{Interest Earned}$$
6. Total Number of Branches (TB)

$$TB = \text{Rural} + \text{Semi-Urban} + \text{Urban} + \text{Metropolitan Branches}$$

Output-mix (Q_m)

Output-mix relates to the output measure used in the model. As seen from the literature, banks with identical output can have different costs if the output-mix is different. Hence, it is essential in cost-output relationship to be sure that the output-mix (or composition of output) has remained constant over time

and across banks. Hence, the output-mix ratios are used to net out the effects of changes in output-mix on costs.

Output-mix variables are calculated as the percentage (%) share of output components to respective total output.

Output-mix of -

1. Volume of Business (VB)
 % share of -
 - i) Earning Assets to VB
 - ii) Total Deposits to VB
 - iii) Borrowings to VB
2. Total Assets (TA)
 % share of -
 - i) Earning Assets to TA
 - ii) Cash in Hand to TA
 - iii) Fixed Assets to TA
 - iv) Other Assets to TA
3. Earning Assets (EA)
 % share of -
 - i) Call Money to EA
 - ii) Investments to EA
 - iii) Advances to EA
4. Total Deposits (TD)
 % share of -
 - i) Fixed Deposits to TD
 - ii) Saving Deposits to TD
 - iii) Current Deposits to TD
5. Total Operating Earning (TOE)
 % share of -
 - i) Commission earned to TOE
 - ii) Interest Earned to TOE
6. Total Number of Branches (TB)
 % share of -
 - i) Rural Branches to TB
 - ii) Semi-urban Branches to TB
 - iii) Urban Branches to TB
 - iv) Metropolitan Branches to TB

Here, we have identified the major components of a respective output variable and subsequently arrived at output-mix (ratios) variables. However, for the estimation, to avail the degree of freedom, we have used all the output-mix variables but one at a time using different combinations. The final choice of the output-mix variables is made on the basis of statistical inferences. All the ratios which turned out to be significant were retained in the model.

Total Number of Branches (TB)

This variable is included in the model on the hypothesis that an increase in number of bank branches leads to an increase in costs. More importantly, this variable is used to find out the branch economies.

Ratio of Rural Branches to Total Branches (RB)

In India, in the post-nationalisation period, the rapid branch expansion in hitherto neglected rural areas, with rural branches accounting for around 58 per cent of total branches in 1989, the profitability and cost efficiency of banks have asserted a constant pressure. To find out the net impact of this rapid rural branch expansion on operating cost, this variable is included in the model. It is hypothesised here that there is a negative relationship between a change in this variable and corresponding change in the costs.

4.1.2 Limitation of the Model

In time series analysis, cost and output variables are measured at current prices. Ratio variables are of course free of unit measure. It is recognised that the cost is influenced by rate of price change over time and so is the output variable. Thus, in this study, there is no need of deflating cost and output variables.

We realise that the rate of inflation in various cost components may not be the same as in output variable, but because there is no appropriate or specific price series for these two variables, it is not possible to deflate them. Hence, the analysis is subject to this minor data constraint.

4.1.3 Functional Forms

As discussed in Chapter II, economic theory suggests the likely shape of the cost curves. Traditionally, this is supposed to be a total cost curve, rising and convex from below (to output axis), and U shaped average cost and marginal cost curves. However, there is evidence of a linear total cost curve, a horizontal (parallel to output axis) MC curve and L shaped average cost curve. Thus, there is no conclusive evidence about the nature of the cost-output relationship.

The Cobb-Douglas and translog functional forms suffer from many limitations as noted in Chapter III. Hence, we have tried the following four functional forms to explore the cost output relationship which can be deduced mathematically for finding out

the shape of the average and marginal cost curves and also the optimum size of a firm or an industry.

The four forms of the total cost function tried are :

- i) Cubic Total Cost Function
- ii) Quadratic Total Cost Function
- iii) Linear Total Cost Function
- iv) Double-Log Total Cost Function

A cubic functional form gives U shaped AC and MC curves, a quadratic cost function gives a U shaped AC and monotonously rising MC curves, a linear form implies a constant MC and L shaped AC curves, a double-log functional form results in a constant, falling or rising AC and MC curves with a constant elasticity. All these results depend upon the 'a priori' signs of the coefficients, discussed later in the chapter.

Using both, the time-series and cross-sectional data , we have estimated all the four forms of various cost functions. The cost equations estimated are :-

1. Cubic

$$C = a + b Q + c Q^2 + d Q^3 + E \sum_{m=1}^n e_m Q_m + f TB + g RB$$

2. Quadratic

$$C = a + b Q + c Q^2 + E \sum_{m=1}^n e_m Q_m + f TB + g RB$$

3. Linear

$$C = a + b Q + E \sum_{m=1}^n e_m Q_m + f TB + g RB$$

4. Double-Log

$$\log C = a + b \log Q + \sum_{m=1}^n e_m \log Q_m + f \log TB + g \log RB$$

Based on the theory of cost and our hypothesis, we have the following expected signs of the coefficients :-

- a) In the total cost cubic functions, for the MC curve to be U shaped, the coefficient of output cube (d) must be positive and the coefficient of output square (c) must be negative. It then follows that if MC curve is U shaped, AC curve will be U shaped too.
- b) If the total cost functional form is quadratic, under no condition, MC curve will be U shaped. Further, for a U shaped AC curve, the coefficients of constant term (a) must be positive.
- c) Linear total cost function gives a horizontal (to output axis) MC curve and L shaped or inverted L shaped AC curve depending on the intercept term being positive or negative, respectively.
- d) A double-log (Cobb-Douglas) total cost function results into a constant, falling or rising AC and MC curves.
- e) It is difficult to hypothesise the signs of the coefficients of output-mix variables. Hence, the choice of the variables to be included in the cost equation is made strictly on the basis of the statistical inference.

- f) We hypothesise a positive sign of the coefficient of TB variable (f), assuming that an increase in the number of branches would certainly bring about increase in the operating cost. A positive sign of f means the presence of diseconomies of branches whereas a negative sign of f implies the presence of branch economies.
- g) The coefficient of RB variable (g) is hypothesised to have negative sign, meaning thereby that an increase in the RB variable is cost advantageous.

For testing the hypothesis of U shaped AC and MC curves, cubic form has been preferred over all other forms. Further, the quadratic form is considered better than linear and double-log forms, and linear form better than double-log form. Otherwise also, the cubic function incorporates quadratic and linear forms where coefficients of both, output and output square, are zero respectively.

Further, if the linear cost functions are found to be best fitting to economic and statistical requirements and are giving an L shaped average cost curve, it does not mean that the firm or industry is not facing the U shaped average cost curve but it does mean that the firm or industry has not yet reached its optimum size. Optimum size can be worked out only if the total cost function is cubic or quadratic.

All the four functional forms of total costs have been tried for estimation. Finally, the best fit equation for each output variable and for each bank has been chosen on the basis of both,

economic theory and statistical inferences, in particular, 'a priori' signs of the coefficients, t-values, the contribution of each new independent variable in the explanation of variation in the dependent variable (R^2).

4.1.4 Output Elasticity of Cost

After the appropriate total cost equation have been estimated, these are used to estimate the elasticity of total cost (and also of cost components) with respect to total output (economies/diseconomies of scale) of a bank.

For a cubic total cost function, the elasticity of total cost with respect to output (e) is :-

$$e = \frac{\text{Proportionate change in total cost (C)}}{\text{Proportionate change in total output (Q)}}$$

or

$$e = \left\{ \frac{\partial C}{\partial Q} \right\} \times \left\{ \frac{Q}{C} \right\}$$

we have

$$C = a + bQ + cQ^2 + dQ^3 \quad [\text{cubic}]$$

then

$$e = \left\{ \frac{\partial C}{\partial Q} \right\} \times \left\{ \frac{Q}{C} \right\} = \left\{ b + 2cQ + 3dQ^2 \right\} \times \left\{ \frac{Q}{C} \right\}$$

Here, the elasticity of total cost is computed for each observation on total cost and corresponding observation on output.

4.1.5 Economies of Scale

Economies of Scale (SCE) could be defined in terms of output elasticity of cost (e).

$$SCE = e = \{ C / Q \} \times \{ Q / C \}$$

if $e > 1$; there are diseconomies of scale
if $e < 1$; there are economies of scale
if $e = 1$; neither economies nor diseconomies of scale

Branch Economies (SCB) is the branch elasticity of cost and is calculated as :-

$$SCB = e_{TB} = \{ \partial C / \partial TB \} \times \{ TB / C \}$$

Cubic, quadratic and linear cost functional forms allow these elasticities to vary with the size of bank.

4.2 PROFIT FUNCTION APPROACH TO THE ECONOMIES OF SCALE

Donald J. Mullineaux (1978) was the first to use profit function for estimating economies of scale in American Banking. His study was inspired by the theoretical foundations developed by McFadden (1966) and Lau (1969) who developed the theory of profit function for competitive and non-competitive forms and examined its relationship with the production function. The profit-function incorporates both, technical and price efficiencies and we can avoid the difficulties involved with the output definition as usually faced in the cost function approach.

By definition, profit-function explains the maximised profit for a firm in competitive situations as a function of prices of

output and variable factor inputs and quantities of the fixed factors (capacity variables) of production.

In terms of equation :

$$p = f (P_i, Q_j, Z_k)$$

where

p = Current revenue less current variable cost
 P_i = Input prices ($i = 1, 2, \dots, n$)
 Q_j = Output prices ($j = 1, 2, \dots, n$)
 Z_k = Fixed factors of production ($k = 1, 2, \dots, n$)

The derivation of profit function from production function assumes that firms are profit maximising and price takers into both, the output and the variable input markets.

Mullineaux (1978) estimated the above mentioned model using a hybrid profit function which is quadratic in log in labour input prices and Cobb-Douglas in the prices of output and other variables. Warapatr (1983) estimated risk-adjusted profit function to find out the economies of scale in American Banking Industry, using Cobb-Douglas form of function.

4.2.1 The Model

In this study, we have developed a model for estimating social banking factors and risk factors adjusted profit-function to examine the economies of scale in Indian banking. The social banking factors are introduced keeping in mind the structure and operation of Indian banking system and for that matter, the banking system in the developing countries.

The profit-function estimated in this study, for both, time-series and cross-sectional data is :

$$p = f (P_i, Q_j, Z_k, R_l, S_m)$$

where

p = current operating revenue minus variable cost
 P_i = input prices ($i = 1, 2, \dots, n$)
 Q_j = output prices ($j = 1, 2, \dots, n$)
 Z_k = fixed factors of production ($k = 1, 2, \dots, n$)
 R_l = risk factors ($L = 1, 2, \dots, n$)
 S_m = social banking factors ($m = 1, 2, \dots, n$)

The detailed description of the independent variables used in the time series analysis is given below :

Input Prices

Inputs are defined in terms of the factors that cause a bank to incur the cost. Thus, we have three types of inputs namely, deposits, borrowings and labour. The total cost of employing these inputs varies from 85 % to 92 % to total operating costs throughout the period of our analysis. As no interest is paid on current deposits, we have taken only interest bearing deposit liabilities (fixed deposits + saving deposits) for the analysis.

The prices of fund inputs (deposits and borrowings) are calculated by dividing the total interest incurred to the bank in a year for holding these fund liabilities by the total amount of these liabilities in that year respectively. The price of labour is arrived at by dividing the total wage/salary bill by the number of employees in the bank, as given in Table No. I.

Table I
INPUT PRICES

Inputs (in Rs.)	Cost of Inputs (in Rs.)	Input prices (in Rs.)
B1 = Total Dep. - Current	b1 = Int.paid on B1	P1 = b1/B1
B2 = Borrowings	b2 = Int.paid on B2	P2 = b2/B2
B3 = No. of Employees	b3 = Amt.paid on B3	P3 = b3/B3

Output Prices

"The production process of a financial firm, from the firm's viewpoint, is a multistage production process involving intermediate outputs, where, loanable funds borrowed from depositors and other sources and serviced by the firm with the use of capital labour and other material inputs are used in the production of earning assets".

Following this argument by Sealey and Lindley (1977) regarding bank inputs and outputs, we have chosen three types of earning assets as three outputs namely, investments, loans/advances and amount of bills purchased/discounted. The prices of these outputs are determined by dividing the income earned by the banks from these outputs in a year by the total amount of these output in that year. Thus, the output prices are average return on the earning assets as shown below in Table No. II.

Table II
OUTPUT PRICES

Output (in Rs.)	Income from Output (in Rs.)	Output prices (in Rs.)
A1 = Investment	a1 = Int. earning from A1	Q1 = a1/A1
A2 = Loans/Advances	a2 = Int. earning from A2	Q2 = a2/A2
A3 = Bills Pur./Dis.	a3 = Int. earning from A3	Q3 = a3/A3

The Fixed Factors of Production

The fixed factors of production of any firm represent the size of a firm. Mullineaux (1978) used number of branch offices and a proxy variable for office size.

In our analysis, we have used total number of branches as one of the fixed factors of production and identified two proxy variables for office size viz., fixed assets per branch and total deposits per branch and used them alternatively with the fixed factors of production.

These variables are :-

- Z1 = Total number of branches
- Z2 = Fixed assets per branch (fixed assets/total no.of branches)
- Z3 = Total deposits per branch (total deposits/total no. of branches)

Risk Variables

We have used two different risk factors affecting profits in the time-series study. These variables are :-

- R1 = Ratio of total credit to total assets
- R2 = Ratio of total borrowed funds to total liabilities

The Risk-Adjusted profit function was originally used by Warapatr (1983). In view of the social banking responsibilities discharged by the Indian banks, this function needs to be improvised. It is only by addition of social banking factors that a realistic estimation of profit function in Indian banking can be arrived at. The two variables added in the profit function to make for the social accountability of the banking system are :

S1 = Ratio of priority sector advances to total advances
S2 = Ratio of rural branches to total branches.

For the cross-sectional study, due to non-availability of detailed bank-groupwise data base, we had to re-define certain variables as follows :

Fixed factors of production are defined in the same way as discussed in time-series analysis. These are :-

Z1 = Total number of branches
Z2 = Fixed assets per branch
Z3 = Total deposits per branch

Z2 and Z3 have been used alternatively with Z1, like the time series analysis.

Risk Factors

For cross-sectional analysis, three variables have been identified as risk factors. These are :

R1 = Ratio of total credit to total assets
R2 = Ratio of total borrowed funds to total liabilities
R3 = Ratio of equity capital to total assets

In time-series analysis, where the analysis is for three bank groups, it was observed that the equity capital has not changed during the period of analysis and with increasing amount of total assets, the ratio of equity capital to total assets becomes negligible, and hence, not included in the profit function.

Social Banking Factors

We have identified two social banking factors but used only one namely, ratio of rural branches to total branches. Because, firstly, in the time-series analysis, it was found that these two variables used together in the estimation lead to the problem of multicollinearity, perhaps, due to the high degree of correlation between the two. Secondly, the bank-wise data was not available on the priority sector advances for 1987 at the time of the analysis. The social banking factor used in cross-sectional analysis is :-

S1 = Ratio of rural branches to total bank branches

In both, the time-series and cross-sectional study, the dependent variable profits (p) has been defined as total current operating revenue minus total current operating expenses.

4.2.2 Limitation of the Model

As all the data for this study are derived from published bank balance-sheets, there are some restrictions in defining the variables specified in the profit function model. Particularly, due to this restriction, input and output prices are measured on an average.

4.2.3 Functional Form

The four profit functions estimated using both, the time-series and cross-sectional data are :

1. Conventional !

$$p = f (P_i, Q_j, Z_k)$$
2. Risk factors adjusted !

$$p = f (P_i, Q_j, Z_k, R_l)$$
3. Social banking factors adjusted !

$$p = f (P_i, Q_j, Z_k, S_m)$$
4. Risk and social banking factors adjusted !

$$p = f (P_i, Q_j, Z_k, R_l, S_m)$$

The full Cobb-Douglas specification of the profit function has major properties which makes it very convenient to estimate the economies of scale. Lau and Yotopolous (1971), who proved a test of hypothesis of constant returns to scale used Cobb-Douglas profit function which allows to test for scale economies or diseconomies by simply adding the coefficients of all the fixed factors of production to see whether the sum is equal to, greater than or smaller than unity.

Mullineaux (1978) used a hybrid profit function, which is transcendental logarithmic in labour input prices and Cobb-Douglas in the prices of outputs and other inputs and the quantities of factors of production. This sort of functional form is not possible for the profit function using Indian banking industry data, as detailed break up of salaries of different types of bank employees is not published in India.

Yotopolous, Lau and Somei (1970) tried other alternative functional forms, but, the Cobb-Douglas (double-log) function appeared to be more appropriate and superior through complicated tests for finding out the returns to scale.

Hence, we have used Cobb-Douglas functional form of profit function for estimation for both time series and cross-sectional study, using OLS method.

The complete profit functions estimated are :-

1. Time-Series

$$p = a + \sum_{i=1}^3 a_i \log P_i + \sum_{j=1}^3 b_j \log Q_j + \sum_{k=1}^2 c_k \log Z_k \\ + \sum_{l=1}^2 d_l \log R_l + \sum_{m=1}^2 e_m \log S_m$$

2. Cross-section

$$p = a + \sum_{i=1}^2 a_i \log P_i + b \log Q + \sum_{k=1}^2 c_k \log Z_k \\ + \sum_{l=1}^3 d_l \log R_l + e_m \log S_m$$

The theory of profit function and our hypotheses suggest the following specifications of signs of the coefficients in the above equations.

Negative (-) signs of coefficients of :

input prices (a_i)
risk factors (d_l)
social banking factors (e_m)

Positive (+) signs of coefficients of :

output prices (b_j)
fixed factors of production (c_k)

The theoretical formulation of the profit function assumes that firms are price takers in output and input markets. Lau (1969) has suggested that the profit function can be used to test whether a firm is price taker in a given market. A finding that output prices make no significant contribution to the empirical explanation of firm's profit could imply that firms are not price takers in any of the market for their products or services. A firm may operate competitively for a subset of their products in which case, a subset of output prices would appear in the profit function.

4.2.4 Economies of Scale

Lau (1972) proved that the elasticities of profit function with respect to fixed factors of production show the degree of return to scale. Yotopolous and Lau (1973) used this concept to test the hypothesis of constant returns to scale to factors of production in the Indian agriculture using a Cobb-Douglas production function.

Accordingly, for our analysis,

- | | | | |
|--------|----------------------------------|-------|-------------------------------------------------------|
| if, 1. | $\sum_{k=1}^2 \epsilon_{ck} > 1$ | then, | there are economies of scale |
| 2. | $\sum_{k=1}^2 \epsilon_{ck} < 1$ | then, | there are diseconomies of scale |
| 3. | $\sum_{k=1}^2 \epsilon_{ck} = 1$ | then, | there are neither economies nor diseconomies of scale |

Where ϵ_k ($k = 1, 2$) are the elasticities of profit function with respect to fixed factors of production and in a Cobb-Douglas function are given directly as coefficients of the fixed factors of production. These elasticities are constant for the whole data.

4.4 Conceptualisation of Variables

The variables used in our analysis are drawn from the balance sheets (stock variables) and profit and loss accounts (flow variables) of banks. Each variable is discussed in detail below:

Bank Assets

Bank assets include all things owned by a commercial bank and represent the uses of funds available with the bank. Conceptually, the assets of a commercial bank can be divided into two parts : (a) Earning assets (b) Non-earning assets. The earning assets can further be classified into three categories - Money at Call and Short Notice (Call Money), Investments and Advances.

Call Money is the most liquid earning asset. It is short-term money lent by a commercial bank to other banks and financial institutions. This asset undergoes maximum fluctuations due to its unique characteristic of not being subjected to any statutory regulations and high sensitivity to the variations in the funds available for investment purposes and to the market conditions such as seasonality.

Investments are less liquid assets than call money. The dual objective of investment is to earn interest as well as keep the funds liquid and safe. The commercial banks' investments are mostly in the central and state government securities, approved securities and treasury bills, having low rates of interest. Such investments are mandatory under the statutory liquidity ratio (SLR), stipulated by the Reserve Bank of India. Secondly, banks invest in government securities over and above the SLR requirement when credit demand is weak.

Loans and advances are one of the principle and risky assets, constituting the main source of banks' earnings. Basically, there are two types of credit assets :

- (1) Commercial bills discounted and purchased by banks, which are self liquidating short term purely commercial loans given against the security of bills. There are two types of bills viz., inland bills and foreign bills. These bills exclude bills discounted with RBI and other financial institutions.
- (2) Loans, cash credit and overdrafts, which are short-term or medium-term advances mainly for working capital. In the post nationalisation era, there is more emphasis on giving credit to priority sector advances for agricultural, small scale industry, exports and poor class of the society. Some banks also provide long-term credit for project (to industries) financing, under consortium lending arrangements with term-lending institutions.

Non-earning assets can be divided into :-

- (a) **Cash assets**, which include cash on hand with the bank, with RBI and balances with other banks, held just for maintaining liquidity, yielding no income to the bank.
- (b) **Fixed assets**, which include premises, furniture/fixtures, gold, silver and non-banking assets acquired, which are not intended for conversion into cash again yielding no income to the bank.

Bank Liabilities

The liabilities side of a bank balance sheet shows the different sources from which the banks collect their finances. They can be classified as (a) Own funds (b) Funds collected through deposits, borrowings and bills (c) Other liabilities.

Own funds comprise the share capital and reserve funds. Reserve funds are created by retaining a part of business earnings.

Total deposits are collected by a bank from the public and from other banks. The deposit accounts are of three types viz., fixed, savings and current. Current deposits are withdrawable without notice and no interest is paid on these deposits. The other two types of deposits are subjected to certain restrictions on withdrawals and varying rates of interest. Deposits are the main source of funds and the interest paid on these deposits accounts for the maximum cost incurred by the banks. Borrowings are primarily from RBI and other banks to meet the commercial banks'

short-term excess fund requirements.

Bills payable include the bank drafts and telegraphic transfers issued by a commercial bank to those who have to remit money from one place to another but remaining unpaid on the date of the balance-sheet and therefore, appear as a liability of the issuing bank.

Other liabilities include the current year's profit carried forward to the next years account.

Bank Earnings and Expenses

Profit and Loss (P&L) account of a bank shows the total earnings and expenses. Each of them is further classified as (a) Current operating earnings and other earnings (b) Current operating expenses and other expenses.

The charts (page no. 88 & 89) indicate the various sources of earnings (Chart-I) and items of expenses (Chart-II).

4.3 Data Sources

Our time-series analysis for both, cost function and profit function, focuses on the banking system as a whole (all commercial banks) and on various bank groups. These groups are:

1. All Commercial Banks [ACB]
2. State Bank of India and Subsidiaries [SBIS]
3. Twenty Nationalised Bank Group [NB]
4. Indian Private Sector Bank Group [IPS]

All the data for time-series analysis was collected from the Reserve Bank of India publication 'The Statistical Tables Relating to Banks in India'. We collected annual data for the post-nationalisation period, i.e. 1970-86.

For providing a proper perspective to our analysis, we have worked out the growth trends and changes in the composition patterns of items /variables during the study period, bank group wise, presented in Appendix-I, Table No.1 & 2.

For cross-sectional analysis, data was drawn for twenty eight public sector banks for three years viz. 1985, 1986 and 1987. For the analysis, the average of these years was used for both cost function as well as profit function. The data was collected from Indian Banks' Association (IBA) publication "The Financial Analysis of Banks", Vol. I and Vol.II for the relevant years. In the analysis, the abbreviations of the Public Sector Banks have been used. The list of name of all these banks has been given in the Appendix II.

CHART - I

			:-- Bills discounted/purchased
		:	:
	--- Interest earnings --		:-- Loans, cash credit, advances.
	:		:
	:		:-- Investment
	:		:
			:-- Deposits with RBI and other banks
	:-- Current operating earnings		
	:	:	
	:		:-- Inland bill collection
	:	:	:
	:		:-- Inland remittances
	:	:-- Commission, broker-	:
	:	age and serv.charge	:-- Foreign business
Total---			: transactions
Earnings:			:
			:-- Miscellenous services
	:-- Income from other business		
	:		
	:		
	:		:-- Sale/purchase of investment/property
:-- Net profit on ----:			:-- Revaluation of invested property

CHART - II

		:-- Interest, commission	:-- Deposits
		: and brokerage	:
		: paid on	:-- Borrowings
		:	:
		:	:-- Rediscounting
		:	:
		:	:-- Other business
		:	
:-- Current	----	:-- Establishment expenses	
: expenses		:	
:		:	
:		:-- Directors'/local committee	
:		: members'/auditors' fees,	
:		: allowances	
:		:	
:		:	:-- Rent, tax,
:		:	: insurance
:		:	:
:		:-- Other current	-----:-- Stationery and
:		: expenses	: printing
Total --	:	:	:
Expences :	:	:	:-- Publicity and
:	:	:	: public
:	:	:	: relations
:	:	:	:
:	:	:	:-- Other expenses
:	:	:	
:	:	:	
:	:	:	
:	:	:	:-- Taxes and dues in the
:	:	:	: nature of operating
:	:	:	: expenses
:	:	:	:
:	:	:-- Taxes and	-----:
:	:	: dues	:
:	:	:	:
:	:	:	:-- Interest tax
:	:	:	
:	:	:	
:-- Depreciations,			
loss on sale/purchase and devaluation			

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