

CHAPTER III

RESEARCH METHODOLOGY

This chapter discusses the research methodology followed in the study. It elaborates the sources of the data obtained, period of study covered, justification for the samples selected and the appropriate tools and techniques that were applied in carrying the research objectives. The methodology followed in the research study has been explained under the following heads.

- 3.1 Sources of Data
- 3.2 Period of the Study
- 3.3 Sample Design
- 3.4 Statistical tools and techniques

3.1 SOURCES OF DATA

The present research work is based on the secondary data. Most of the data were collected from authorised web portal such as www.nseindia.com, www.cmie.com and moneycontrol.com, Annual reports of the selected banks and IT companies. Further, the data were also obtained from reputed research journals, books, magazines, published and first-hand reports to support the analysis of the research study.

3.2 PERIOD OF THE STUDY

The period of the study is covered for ten years, (2006-2007 to 2015-2016). During this period the banking sector has been observed the remarkable changes in the area of data centralization, large scale implementation of core banking systems and introduction of Payment and Settlement Systems Act, 2007. This particular period has been noticed a predominant role in the development of banking sector and it showed the necessity to undertake the research in this area, as it is witnessed the consolidation of IT based efforts with the financial sector in general and with the commercial banks in particular. Hence, the post e – banking revolution period was considered for carrying out the study.

3.3 SAMPLE DESIGN

Globalisation has brought major revolutionary changes in the Information Technology sector. The information and communication technology has changed the functioning of the banks tremendously at the global level. To prove the present research statement and the core objectives of the study suitable sampling techniques are selected such as Non-probability based purposive sampling and judgmental sampling. The study focuses on banking and IT sector.

Banking and Information Technology (IT) sectors registered under NSE have been considered and the samples from the sectorial indices have been selected which is one among the key indices in NSE. Generally the investors prefer to invest in Index stocks than Non-Index stocks. But practically, sometime Non-Index stocks also performing well. Hence, both the Index and Non-Index stocks of banking and IT sectors have been considered for the purpose of the study. The Nifty Bank Index had twelve banks from the banking sector which trade on the National Stock Exchange of India Limited. Out of twelve banks, ten banks have been taken as sample for the evaluation based upon the top ranking stocks. All the companies indexed in Nifty IT were selected as per the indexed list as on 25th December 2015. Another 20 non-index companies ten from each sector based on their top ranking were selected for the purpose of performance evaluation

3.3.1 Sample Selection Criteria

- Index companies have been selected by purposive sampling method - Top trading companies listed in Nifty Bank and IT Index.
- Non-Index companies have been selected based on Judgmental sampling method - Listed companies in NSE which are not Indexed.

The select sample stocks have been presented in the following table.

Table 1
List of Sample Stocks Selected for the Study

S.No	BANKING SECTOR		IT SECTOR	
	Index Stocks	Non-Index Stocks	Index Stocks	Non-Index Stocks
1	Axis Bank	City Union Bank	KPIT (Kirtane and Pandit Information Technology)	ABB (ASEA Brown Boveri) Limited
2	Bank of Baroda	Corporation Bank	Infosys Technologies Limited	3i-Infotech Limited
3	Bank of India	DENA Bank	HCL Technology Limited	Ramco System
4	Canara Bank	IDBI Bank (Industrial Development Bank of India)	WIPRO (Western India Products)	Mphasis Limited
5	Federal Bank	Indian Overseas Bank	OFSS (Oracle Financial Services Software)	NIIT (National Institute of Information Technology)
6	HDFC Bank (Housing Development Financial Corporation)	IndusInd Bank	Mind Tree Limited	Aptech Limited
7	ICICI Bank (Industrial Credit Investment and Corporation of India)	Karur Vysya Bank	TCS (Tata Consultancy Services)	Tata- Elxsi Limited
8	YES Bank	Oriental Bank	Tech Mahindra Limited	SakSoft Limited
9	Punjab National Bank	South Indian Bank	Info Edge Limited	Rolta India Ltd
10	State Bank of India	Union Bank of India	Cyient Limited	Polaris Technology

Source: NSE website dated on 25th December 2015.

3.4 STATISTICAL DESIGN

The statistical tools and techniques applied in the study to process the data are discussed in the following headings.

3.4.1 The Tools that were Applied to Analyse the Pattern of Index and Non-Index Stock Performance of Banking and IT Sectors are:

Mean: Mean of a group of data is a representative which expresses the average value. The value of mean is obtained for each variable for different years.

$$\text{Mean} = \frac{\sum x_i}{n}$$

Where $i = 1, 2, 3, \dots, n$,

n = number of samples

Standard Deviation: The standard deviation is one of the measures of dispersion which explains the amount of deviation between the mean value and the group it represents. The standard deviation is obtained for each variable for each year considered in the study.

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \mu)^2}$$

Co-efficient of Variation: The co-efficient of variation is one of the measures of dispersion which is expressed in percentage. Lesser the co-efficient of variation indicates more consistency or uniformity. The technique is used in this study to identify which variable is more consistent or uniform when compared with other variables.

$$\text{CV} = \frac{\text{SD}}{\text{Mean}} \times 100$$

Linear Growth Rate (LGR): Linear growth rate is calculated to identify the overall growth rate of individual stocks.

Linear relationship between a study variable (Y) and time variable (X) is

$$Y = a + b X$$

The Linear Growth Rate (\hat{b}) is given by

$$\hat{b} = \left(\frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}} \right)$$

Beta value: To measure the risk-return relationship of share price to the market index, beta has been used. Beta is a statistical measure of the volatility of a stock versus the overall market. It is generally used to measure systematic risk and a performance of the stocks.

Capital Assets Pricing Model

It is a model that describes the relationship between expected return and risk of investing in a security. It shows that the expected return on a security is equal to the risk-free returns plus risk-premium, based on the beta of that security. CAPM allows investors to assess the risk of a stock to decide if the expected gain is worth than the risk of the investment. This formula takes into account the volatility, or beta value of a potential investment and compares it with the overall market return and an alternative safe bet investment. The resulting CAPM gives the expected rate of return, which the potential investment must exceed to be worth the risk. It provides a linear relationship between the required rate of return (R_i) of a security and its systematic (or) undiversifiable risk as measured by the security's beta. The Capital Asset Pricing Model can be calculated by using the following formula,

$$\text{CAPM} = R_f + \beta (R_m - R_f)$$

R_f = Treasury Bill, R_m = Bank Index

3.4.2 Stock Delivery Position of Banking and IT Sectors

In addition to the tools like mean, standard deviation and co-efficient of variation, the following tools were applied to examine the stock delivery position of Index and Non-Index stocks of the banking and IT sectors.

Fifty-Two Weeks Stock Performance

It is an indicator of highest and lowest price of stocks during the previous year and used to analyse Fifty-Two Weeks Stock Performance. Investors are widely using this factor to determine the current stock price and predict the future stock movement. This indicator is very much useful for spontaneous decision making.

Compounded Annual Growth rate (CAGR)

Compounded Annual Growth rate (CAGR) is the average annual growth rate of an investment during a given time period. CAGR is not an accounting term, but remains widely used to compare the growth rates of two investments because CAGR dampens the effect of volatility of periodic returns that can render arithmetic means irrelevant. CAGR is often used to describe the growth over a period of time of some element of the business, for example revenue, units delivered, registered users, etc.

The formula for CAGR is:

$$\text{CAGR} = (\text{FV} / \text{SV})^{1/N} - 1$$

Where:

FV = final value of an investment, SV = starting value of an investment, N = total number of investment periods (months, years, etc.)

3.4.3 Financial Indicators that Impact the Selection of Index and Non-Index Stocks for making Investment Decisions

With a view to identify the financial indicators that impact the selection of index and non-index stocks for making investment decisions, the following tools were applied along with mean, standard deviation and co-efficient of variation;

Skewness

Skewness is asymmetry in a statistical distribution, in which the curve emerges distorted or skewed either to the left or to the right; it can be quantified to define the extent to which a distribution differs from a normal distribution. In a normal distribution, the graph appears as a classical, symmetrical “bell shaped curve”. It explains the extreme values in one versus the other tail.

Normal distribution: The tails on either side of the curve are exact images of each other.

Negative Skewness: The tail on the curve’s left-hand side is longer than the tail on the right-hand side.

Positive Skewness: The tail on the curve’s right-hand side is longer than the tail on the left-hand side

Kurtosis

Kurtosis is a statistical measure that is used to describe the distribution. It measures the extreme values in either tail. It explains the tall and sharp of central peak. For the investors, high kurtosis of the return distribution implies that the investor will experience occasional extreme returns (either positive or negative), more extreme than the usual + or – the standard deviations from the mean that is predicted by the normal distribution of returns. This phenomenon is known as *kurtosis risk*.

Terms used for Explanations of Values in kurtosis

1. Leptokurtic : Sharply peaked with fat tails, and less variable.
2. Mesokurtic : Medium peaked
3. Platykurtic : Flattest peak and highly dispersed.

Correlation: It measures the interrelationship between the variables. If there are only two variables in the study of correlation it is simple correlation. Otherwise the study is either partial or multiple correlations. In this study, the simple correlation is used to determine the interrelationship between the selected

variables: financial variables (EPS, DPS, ROPS, and NPPS) of Index and Non-Index stocks in banking and IT sectors.

Pooled Regression: It is a statistical process for estimating the relationships among variables. It contains various techniques for modelling and analysing a number of variables, when the focus is on the relationship between a dependent variable and one or more independent variables.

EPS is very essential yardstick to the investors, because it breaks down a company's profit on a per share basis. Hence, the researcher had taken EPS as a dependent variable and Dividend Per share (DPS), Revenue Per Share (ROPS) and Net Profit Per Share (NPPS) as Independent financial variables. The following regression model was applied for individual Index and Non-Index stocks in banking and IT sectors.

The following regression equation is constructed for analysis

$$\text{EPS (Y)} = a + bx_1 + bx_2 + bx_3$$

3.4.4 Inter-relationship between Economic Value Added (EVA) and Market Value Added (MVA) of Select Index and Non-Index Stocks of Banking and IT Sectors, were analysed as follows

- a) Calculation of EVA
- b) Calculation of MVA
- c) Application of Correlation and

Other tools like mean, standard and correlation were used

Economic Value Added (EVA): is the profit earned by the firm, less the cost of financing its capital (Stewart, 1991). It is also known as 'economic profit'. EVA captures the idea that value is created when the return on the company's capital employed is greater than the cost of that capital.

Economic Value Added (EVA) = Net Operating Profit after Tax (NOPAT) – (Capital Invested x WACC)

NOPAT = Operating Income x (1 – Tax Rate).

Weighted Average Cost of Capital = (Cost of Debt) x (1 – Tax Rate) x (Proportion of debt) + (Cost of Equity) x (Proportion of equity) compute

Market Value Added (MVA) is a performances measurement indicator tool that used to calculate the company's capacity to increase shareholder value over time. The higher value of MVA is indicating the shareholders wealth maximization as well as good indication of the effective management of company.

Market Value Added = Market capitalization – Net worth

Market Capitalization = Closing Share Price x Number of Outstanding shares

Net Worth = (Equity share Capital + Reserve and Surplus) – (Accumulated Losses +Miscellaneous Expenditure)

3.4.5 The Impact of Financial and Valuation Ratios on MVA and Share Prices of Select Stocks in Banking and IT Sectors was Analysed by Applying Following Techniques

a) Factor analysis and

b) Path analysis

Factor Analysis

Factor analysis helps to study the effect of two or more predictor variables on certain equation criterion. It is intended to group the original input variables into factors which underlie the input variables. It provides the tools for analysing the structure of the interrelationship (Correlation) among a large number of variables by defining sets of variables that are highly interrelated, known as factors. These groups of variables (Factors), by definition highly inter-correlated are assumed to represent dimensions within the data.

This study made an attempt to find out the influence of the financial indicators on the share price of selected Index and Non-Index stocks in banking and IT sectors. For this purpose, Market Value Added (MVA), Financial Ratios and Valuation Ratios have been considered. In order to find out the dimensions of the ratios, factor analysis has been applied. The following table depicts the dependent and independent variables selected for this study.

Table 2
Variables Selected for Factor Analysis

Variables		Banking Sector	IT Sector
Dependent		Market Value Added	Market Value Added
Independent	1.	Credit- Deposit ratio	Debt-Equity Ratio
Financial Ratios	2.	Investment / Deposit ratio	Long Term Debt-Equity Ratio
	3.	Cash / Deposit ratio	Current Ratio
	4.	Interest Expended / Interest Earned ratio	Fixed Assets ratio
	5.	Other Income / Total Income ratio	Debtors ratio
	6.	Operating Expenses / Total Income ratio	Inventory ratio
	7.	Interest Income / Total Funds ratio	Total Asset Turnover Ratio
	8.	Interest Expended / Total Funds ratio	Interest Cover Ratio
	9.	Net Interest Income / Total Funds ratio	PBIDTM ratio
	10.	Non-Interest Income / Total Funds ratio	PBITM ratio
	11.	Operating Expenses / Total Funds ratio	PBDTM ratio
	12.	Profit before Provisions / Total Funds ratio	ROCE ratio
	13.	Net Profit / Total funds ratio	RONW ratio
	14.	RONW ratio	Pay-out ratio
	Valuation Ratios	1.	Price Earning (P/E) ratio
2		Price to Book Value (P/BV) ratio	Price to Book Value (P/BV) ratio
3		Price / Cash EPS (P/CEPS) ratio	Price / Cash EPS (P / CEPS) ratio
4		EV / EBIDTA ratio	EV / EBIDTA ratio
5		Market Cap / Sales ratio	Market Cap / Sales ratio

Confirmatory Factor Analysis

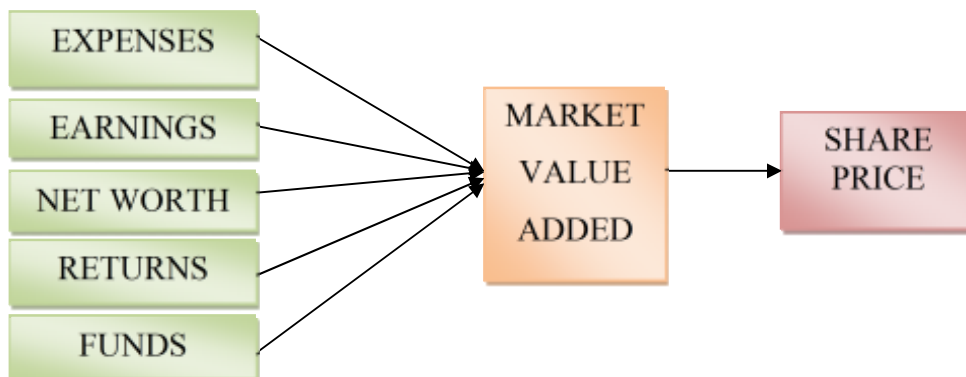
The Intention of Confirmatory factor analysis is to estimate the magnitude and significance of hypothesized causal connections among set of variables displayed through the use of Amos

It is applied to find out the accurate relationship between the financial factors which influence the Market Valued Added and to understand how the Market Value Added influences the values of Share price of selected Index and Non-Index stocks strongly affect among the banking and IT sectors.

This analytical technique allows for the evaluation of the overall fit of the present model and the estimation of all the corresponding coefficients simultaneously. The present model for confirmatory factor SEM is applied to examine the accuracy of the variables applied in the research study. The model depicts the direct and indirect relationship between the selected variables and shows the exact correlation value of the research analysis.

Figure 4

Proposed Model - Confirmatory Factors used for the Model Goodness - Fit



Summary

To sum up the research methodology chapter highlighted the sources of data, period of study, sampling design and statistical techniques used in this research which played a major role in the architecture and construction of the report.