CHAPTER 3
RESEARCH METHODOLOGY

This chapter discusses in detail the objectives, period and sample of the study. It also discusses the statistical techniques used to analyse the data along with the limitation of the study.

3.1 OBJECTIVES OF THE STUDY

The specific objectives of the study are as follow:

1. To study regulatory framework governing IPOs in India.
2. To carry out the analysis of listing performance in terms of return on IPOs for short period, i.e., from the date of offer to the public, to the date of their first listing on the stock exchange.
3. To measure the price performance of IPOs for Medium (1 year) and long term (3 years period)
4. To study the relationship between market return and return on various IPOs.
5. To examine the factors affecting the short and long run performance of IPOs.
6. To make suggestions on the basis of the finding of the study.

3.2 SCOPE OF THE STUDY AND SAMPLE SELECTION

The sample of the study consists of 251 IPOs for measuring listing performance and 225 IPOs for measuring medium and long term performance, which raised capital for the first time since their inception & have been listed on NSE between November, 1994 and April 2006. The sample selection is based on following criteria:-

(a) The firm is listed on the NSE
(b) The instrument of issue is equity share.
(c) The firm has at least three years trading history from date of its listing.
Data regarding offer price, listing date, issue size, date of incorporation, lead managers, Listing Delay, oversubscription, and industry are available.

Companies having conflicting data with regard to various variable in various databases like Ace equity, Capitaline, Prowess have been excluded for measuring medium and long term performance.

For comparing IPOs return with market return Nifty has been selected as a representative of the market. Daily four values of Nifty are available viz. opening, high, low and closing value. The study is based on the closing values on different dates in order to calculate market-adjusted return. In case of non-availability of data concerning the exact date the nearest date (not varying more than a week) has been considered. For measuring the performance of various companies, the time period is divided into short term, medium term and long term. Returns on listing day assumed under short term, returns upto one week, one month, three months, six months, one year are considered for medium term performance. Returns at the end of second year and third year are considered for measuring returns in long run on the basis of studies conducted in other parts of the world. Four measures have been used to evaluate listing and short run, medium and long run performance of IPOs. These are raw returns, market adjusted excess returns, annualised raw returns and annualised market adjusted excess returns.

3.3 TIME PERIOD OF THE STUDY

The study analyses the pricing performance of Indian IPOs during the period from November 1994 to April 2006 that got listed on National Stock Exchange.

3.4 SOURCES OF DATA

For the present study secondary data has been used. The information regarding sectors such as offer price, date, size, listing date, age, industry, lead manager and oversubscription of IPOs has
been taken from capitaline database and closing values of NIFTY have been taken from capita chart Database. Capita Chart and capitaline Databases are maintained by Capital Market Publishers India Private Limited. Besides this data has also been collected from Prime Database, Ace Equity, Prime Directory of Praxis Consulting and Information Services Pvt. Ltd., New Delhi, Economic Times, Financial Express, Economic Intelligence Service of CMIE Monthly Bulletin, The Stock Exchange Review and Official Directory of National Stock Exchange.

3.5 TECHNIQUES OF DATA ANALYSIS

Various Statistical techniques have been applied to analyse the secondary data.

3.5.1 Measurement of Pricing Performance of IPOs

3.5.1.1 Initial Price Performance

The initial return on IPOs is computed as the difference between the closing price on the first day of trading and the offer price, divided by the offer price.

\[
R_i = \frac{P_1 - P_0}{P_0} \times 100
\]  

...(1)

Where

\(R_i\) = Initial return or raw return for stock i  
\(P_i\) = Closing price on the first day of trading  
\(P_0\) = Offer price

Equation (1) assumes that there is no time lag between the offer and trading of the stock which means a legitimate market. If the first condition is not fulfilled, returns should be adjusted for changes in market conditions during this period. In India, there is substantial time gap between the offering and listing of the stock. During this period, a major change could occur in market conditions and the observed premium (discount) measured by equation (1) could be caused by a change in market conditions rather than initial mispricing (Singh and Mittal (2003)). Therefore, the initial or raw...
return estimated by equation (1) is adjusted for market return as follows:

\[ MAER_i = \frac{P_1 - P_0}{P_0} - \frac{M_1 - M_0}{M_0} \times 100 \quad \ldots (2) \]

Where

\( MAER \) = Market Adjusted Excess Return

\( M_1 \) = Closing value of NIFTY on the first day of trading

\( M_0 \) = Closing value of NIFTY on the offer closing date

Since for different companies, the time taken to list varies, so as to normalize, annualized returns are calculated by multiplying Raw Return and MAER by the following factor.

\[ \text{Annualizing Factor} = \frac{365}{\text{After Market Trading Lead Time}} \]

### 3.5.1.2 Aftermarket Price Performance

To evaluate medium and long-term performance of Indian IPOs, medium and long-term returns on the IPO price and the closing price on the first day of trading are calculated. These returns are measured by the difference in quotations at the end of one week, one month, two month, three months, one year, two year and three years and the initial price or the closing price on the first day of trading. These figures are compared with NIFTY. The medium and long run performance of IPOs is analysed using two dimensional approaches, where in returns at the end of above mentioned time intervals are measured from offer price as well as listing price. So, one approach includes initial return and the other approach excludes initial returns of IPO. In other words, returns are measured by difference in closing share prices at the end of one week, one month, three month six month, one year, two year, three year and the offer price or the closing share price on the first trading day, as the case may be. The return for each IPO firm is calculated, following the methodology of Madhusoodhan and Thiripalraju (1997). The
following standard formula is used to calculate returns at different time intervals.

\[ R_{it} = \left( \frac{P_t}{P_{io}} \right) - 1 \times 100 \]  

... (3)

Where

\( R_{it} \) = Raw return of firm i at time t  
\( P_t \) = Price of the share of firm i at time t  
\( P_{io} \) = Offer price of share of the ith firm

\[ R_{mt} = \left( \frac{I_{mt}}{I_{mo}} \right) - 1 \times 100 \]  

... (4)

Where

\( R_{mt} \) = Return on Nifty during period t  
\( I_{mt} \) = Nifty at time t  
\( I_{mo} \) = Nifty on the offer day

\[ MAER_{it} = R_{it} - R_{mt} \]

Where

MAER = Market adjusted excess return for stock (i)

The average market adjusted returns on a portfolio of n stocks for event month t is the equally weighted arithmetic average of the market adjusted returns given by:

\[ \text{Average } MAER_t = \frac{1}{n} \sum_{i=1}^{n} MAER_{it} \]

To analyse the medium and long term performance, another measure Wealth Relative (Index) using the procedure employed by Ritter and Levis is calculated. The magnitude of this measure is an indication of the performance of IPOs vis-a-vis the market. A wealth relative greater than unity implies that IPOs outperformed the market in that period, while a wealth relative below 1, indicates under-performance. \( WR_{it} \) for a sample of n stocks from offer date, to date ‘t’ is calculated using the formula:
Wealth Relative \( (WR_{it}) \) = \[
\frac{1 + \frac{1}{N} \sum_{i=1}^{n} r_{it}}{1 + \frac{1}{N} \sum_{i=1}^{n} r_{mt}}
\]

Where \( r_{it} = \frac{R_{it}}{100} \)
\( r_{mt} = \frac{R_{mt}}{100} \)
\( N = \) total number of IPOs in the sample

3.6 ONE-SAMPLE T TEST

The statistical significance of the average return \((AR)\) is determined by using the usual t-statistic, with \(n-1\) degrees of freedom which is computed for each period as:

\[
t(AR) = \frac{AR_{t}}{SE(AR_{t})}
\]

Where \( SE(AR_{t}) \) is the standard error of the average return in period \(t\) and \( t(AR_{t}) \) is the t-statistic for the null hypothesis that the average return in any given period is zero.

3.7 CORRELATION ANALYSIS

This analysis usually precedes regression analysis. The correlation matrix provides information of the direction and extent of linear relationship between different variables. The probability of the problem of collinearity also becomes clear by examining the correlation matrix.

3.8 REGRESSION ANALYSIS

Multiple regression models of Ordinary Least Squares (OLS) are used to decompose performance variation into various factors. This technique reveals the extent and direction of relationship between the dependent variable and several independent variables. The adjusted \( R^{2} \) generated by it indicates the proportion of variation in the dependent variable explained by the independent variables.

There are several approaches to assist the researchers in finding the best regression model. The Step-wise regression approach is employed to identify variables, which explain the greatest variation in the dependent variable. It does this by selecting and adding to the
model the variables contributing the greatest explained variance, followed by the second, third and so on, until additional variables do not contribute further to adjusted $R^2$.

Regression models have to be used very carefully; otherwise they may produce very biased and misleading estimations. The violation of such assumptions has been checked by examining outliers and residuals. Another problem, multicollinearity among independent variables may affect the overall estimations of the model as well as coefficients of individual variables. VIFs have been computed using SPSS/PC+ Version 14 on computer to determine the extent of collinearity among independent variables.

Regression models test only linear relationships. The scatter diagram of data may reveal the presence of non-linear relationships. These non-linear variables have been transformed to logarithms to improve the linearity of variables. Transformation of variables has been done on the basis of their correlation with dependant variable.

3.9 LIMITATIONS OF THE STUDY

Since present study is based on the secondary data collected from various sources, as discussed in earlier section, the conclusions drawn are subject to the correctness of data. Some other limitations of present study are as follows:

(a) The present study is restricted to IPOs, which have equity share as their instrument of issue. Other instruments like Preference shares or Debt have been excluded from purview of this study.

(b) The period of present study is Nov 1993 – Apr 2006. The affect of mechanism of IPO Grading which was introduced in 2006, on pricing performance of IPOs was hence precluded.

(c) The non-availability of trading data reduced the sample size for present study. The result would have been more comprehensive, had the trading data relating to all IPOs been available.