Chapter- III

Research Methodology

Based on the review of previous studies reported earlier, investors rationality and IPO price performance was conceptualized to study in the present study. This chapter describes the objectives of study, hypothesis formulated for empirical verification, data collection, research methodology applied and the chapterisation scheme of the study. Primarily, this study has been aimed to analyze the price performance of Indian IPOs and the impact of investors’ rationality on the IPO price performance.

3.1 Objectives of the study

The main objective of this study is to analyze the performance of the IPOs and understand investors rationality for IPO investment. In this context, it attempts to proceed along the three objectives:

i) To study the IPO pricing performance as to the underpricing and the overpricing.

ii) To study the investors disposition as to their exuberance and underreaction to the IPO investment.

iii) To understand the contours of investors rationality as regards to their investment decisions for IPO investment.

3.2 Hypotheses of the study

On the basis of above objectives of the study, the following null hypotheses were formed for empirical verification:

H₀₁: IPOs are fairly priced so as it is neither underpriced nor overpriced.

H₀₂: As investors are rational, there is no impact of investor’ predisposition on the IPO pricing and performance (based on the performance outcomes obtained (i) above for observed rationality).

H₀₃: Investors are wholesome rational in making investment decisions for IPO investment (both for observed rationality as obtaining from (i) and (ii) above and as revealed in the primary survey).
The results of verification of these hypotheses are reported in the chapters (IV) and (V), respectively for the aforesaid hypotheses.

3.3 Data and Methodology

The data and the methodological inputs used in this study presented in the form of sample design, sample sources and methods of data collection, quantitative and statistical tools to analyze the data. The secondary data used in this study are of two kinds, as (i) IPO fund raising in the Indian Capital market (as available on the NSE) (ii) observed investors rationality outcomes based on the previous studies.

The Indian IPO fund raising data has been collected from the NSE. The IPO data which has been required for this study is listed on the National Stock Exchange. In India, during the period 1999 to 2014, there are total 455 IPOs issued at NSE. But out of these 455 IPOs, this study has collected only 151 IPOs which are issued at NSE during the period January 2009 to August 2014. This study has considered the prices of those IPOs which satisfied the following criteria:

(i) IPOs are listed on NSE.

(ii) IPOs on which the data are available on the issue price, issue size, date of listing, date of issue, price range and last traded price.

The IPOs due to missing listing date and offer price has excluded from the sample. The total 43 IPOs has been dropped out from the total sample of 151 IPOs. And out of 43, the 32 IPO companies have been excluded from sample due to the unavailability of the listing date and issue price. Another 11 IPOs have been excluded from the sample due to non availability of the company specific details online. After the exclusion, this study is left with a sample of 108 IPOs. These 108 IPOs detailed information as name of IPO, issue price, date of listing, date of issue, price range, rating agency and grade assign has been reported in the annexure -I.

The number of times 108 IPO subscription data has been compiled from http://www.chittorgarh.com. The rating agencies are assign the grades to the IPOs based on their company fundamentals. This rating grades IPO data has been collected from the NSE. There are five grading agencies assigned the grades for the NSE listed IPOs which are observed in this study as CARE, CRISIL, FITCH, ICRA and BWR. The rating agencies have been assigned the
grades at five point scale based on stronger to poor fundamentals. The higher grade of the IPO has been referred as the strong fundamental issuer and if IPO has been recorded lower grade then it is considered as a poor fundamental of the issuer. The IPO rating grades are divided into five points.

- Grade 1: Poor fundamentals
- Grade 2: Below-average fundamentals
- Grade 3: Average fundamentals
- Grade 4: Above-average fundamentals
- Grade 5: Strong fundamentals

For this sample study, out of 108 IPOs, ninety six IPOs are considered for the grading performance. The left twelve IPOs are rejected. Out of twelve IPOs, two are rejected due to the missing of grades, and remaining ten is rejected due to the grades assigned by more than one rating agency. So, the 96 IPOs are taken for the grading analysis in relation to the IPOs performance.

To evaluate the observed investors rationality outcomes reported in previous studies, this study was identified by representative sample of 20 web hosted previous studies selected on random basis. These 20 previous studies were selected from January 2000 to December 2012. And all these 20 studies were related to the investors’ behavior in making IPO investment decisions. This study was considered for understanding the observed rationality in case of IPO performance.

In addition, this study has also used the primary data to reveal the investors performance through primary survey. The data has been collected on random basis. It has been obtained from total 500 investors having exposure to the IPO investment. This study is only confined to those investors who invested in the IPOs. The total 347 respondents from the target population filled up the questionnaire and remaining investors’ had not responded. Out of 347, forty questionnaires were rejected from sample due to the inadequate information. Out of these, only 307 questionnaires were used for the analysis.
The structured questionnaire was designed to collect the responses and it has been collected from the investors directly. The primary data have been compiled from sample investors for revealed rationality through a structured questionnaire as reported in the annexure – II.

This questionnaire was based on the different aspects of the investors rationality in making IPO investment decision. It has been designed on the basis of review of past studies and keeping in mind the investors behavior and IPO prices. While designing the questionnaire there are many aspects which have been taken into consideration related to the investors’ rationality and the IPO price performance as diversification of investment, investors’ behavior on IPO price movements as overreaction and underreaction, investors stock picking behavior, IPO buying-selling decision, short run investing and long run investing, interpretation of valid information, disposition effect, conservative behavior, overconfident behavior, rational behavior, emotional exuberance behavior, investors disposition, regret behavior, herding reactions, panic selling of stock, investment with analysis of risk and return, leveraged investing, aggressive investing, loss aversion, self control on investing, cognitive dissonance behavior, panicky behavior at low prices than the listing price, experts advice and emotions in investing.

In this study, the questionnaire was designed with 45 questions were identified and shortlisted for being related to the investor’s rationality and the IPO pricing performance. Of these eleven questions were subsequently removed from the questionnaire for response inconsistency. As this change is needed in the questionnaire for consistent results. The thirty four questions were finalized based on the five point scale (Likert scale) as

i) Never

ii) Rarely

iii) Sometimes

iv) Often

v) Always

During the course of survey, encircle the expected answer according to their choice, knowledge and experience. The collected information has been treated confidential and was communicated to this effect to the sample respondents.
3.4 Analytical tools

The 108 IPOs has been analyzed on the basis of different time spans in short run as well as in long run for the IPO price performance. For the short run analysis, the time intervals considered are as on the listing day, a week after, a month after, a quarter after and six month after the listing day. For the long run analysis, the time span considered are as one year after, two year after and five year after listing day. If the IPOs price was not available on a particular date, then the nearest working day price had been considered for the IPO return calculations. The IPO return has been obtained in percentage by comparing with the issue price of the IPO companies.

In this study, the Microsoft excel spreadsheet has extensively been used to measure the IPO return, market return, market adjusted excess returns, standard deviation, variance of the market return, covariance of the IPO, beta, Sharpe’ measure, Treynor’s measure and Jensen Alpha measure. Various formulas listed below have been used to calculate the short and long run IPO returns and after due adjustment for dividend and bonus. Kumar (2008) described the case of short run analysis; the listing day return of IPO is calculated as the difference between the closing price of IPO on listing day for every stock and the issue price divided by the issue price. The IPO listing day return has calculated by the formula as shown below:

\[ R_i = \left( \frac{P_1 - P_0}{P_0} \right) \times 100 \]

Wherein,
- \( R_i \) = the listing day return of IPO,
- \( P_1 \) = closing price of the IPO on the first listing day, and
- \( P_0 \) = the issue price of the IPO.

If the initial return of the IPO has been recorded in positive, then it is referred as the IPO issue has been underpriced and if the IPO return has recorded a negative return then, it is considered as the IPO issue price has been overpriced.

Kumar (2008) described in study that the return on market index is calculated from the difference between the closing value of market index on the IPO listing day and the closing value of market index on the offer closing day, divided by the closing value of market index on the offer closing day. This return has been calculated by using the returns on CNX Nifty index for the corresponding period. The CNX Nifty index has used as the benchmark index. After the computation, if the market return is positive then the market on whole has moved up, if the market return has recorded negative returns then it indicates decline in overall market and if
market return has shown zero value then it concluded as the market has remained unchanged between IPO issue day to IPO listing day interval. The market return has been calculated as shown below:

\[
R_m = \left( \frac{M_1 - M_0}{M_0} \right) \times 100
\]

Wherein,
- \( R_m \) = market return on listing day of IPO,
- \( M_1 \) = closing value of benchmark index on the listing day of IPO’s, and
- \( M_0 \) = closing value of benchmark index on the IPO issue closing day.

Bansal and Khanna (2012) described the calculation of **market adjusted excess return** as difference between the IPO first listing day return and the return on market benchmark. If the outcome of excess return has been noticed positive then the underlying IPO is considered as underpriced. After adjusting it for the market movements, if the excess return has been noticed in the negative zone then it is considered as overpriced and if the excess return appeared to be zero then it indicate that the IPOs was fairly priced, neither overpriced nor underpriced. The market adjusted excess return has been computed as given below:

\[
\text{MAER}_i = R_i - R_m
\]

\[
R_i = \left( \frac{P_1 - P_0}{P_0} \right) \times 100
\]

\[
R_m = \left( \frac{M_1 - M_0}{M_0} \right) \times 100
\]

\[
\text{MAER}_i = \left( \frac{(P_1 - P_0)}{P_0} - \frac{(M_1 - M_0)}{M_0} \right) \times 100
\]

Wherein,
- \( P_1 \) = closing price of the IPO on the listing day,
- \( P_0 \) = the issue price of the IPO,
- \( M_1 \) = the closing value of market index on the listing day of IPO’s,
- \( M_0 \) = the closing value of market index on the closure day of IPO issue,
R_i = the listing day return of IPO,

R_m = market benchmark return on listing day of IPO, and

MAER_i = market adjusted excess return of the IPO.

The analyses of IPOs performance for a week after, a month after, a quarter after, six month after, a yearafter, two yearafter and three year after listing day has been calculated by the formula as given below:

\[
R_{it} = \left( \frac{P_{t1} - P_0}{P_0} \right) \times 100
\]

\[
R_{mt} = \left( \frac{M_{t1} - M_0}{M_0} \right) \times 100
\]

\[
MAER_{it} = \left( \frac{(P_{t1} - P_0)/P_0 - (M_{t1} - M_0)/M_0)}{} \right) \times 100
\]

Wherein,

R_{it} = IPO return on the day ‘t’,

P_{t1} = closing price of IPO on day ‘t’,

P_0 = issue price of the IPO,

R_{mt} = market benchmark return on day ‘t’,

M_{t1} = closing value of market index on day ‘t’,

M_0 = closing value of market index on the closing day of IPO offer, and

MAER_{it} = market adjusted excess return on the day ‘t’.

**Risk Free Rate**

The average annual yield on 91- days Treasury bill Government of India compiled from the website as http://www.treasury.gov for the period from January 2009 to August 2014. These treasury bill rates are taken as per the risk free rate. This risk free rate is used in application of tools as in Sharpe’s measure, Treynor’s measure and Jensen’s Alpha measure.

**Return Variability**
The return variability is also referred as the total investment risk and the root mean squared deviation. It is represented by sigma (σ). It is referred to as the square root of the averaged mean squared deviation of the IPOs returns. It measures the degree of variability in returns with all elements of risk as systematic risk and unsystematic risk. It is calculated by the formula given as:

$$\sigma_i = \sqrt{\frac{\sum(R_i - \bar{R})^2}{n}}$$

Wherein,

- $\sigma_i$ = the standard deviation,
- $R_i$ = return of IPO,
- $\bar{R}_i$ = averaged mean of IPO, and
- $n$ = number of observations.

It is crystal clear that if the standard deviation value has been recorded positive, then it is considered as the total risk on the IPO is more. The more positive value of standard deviation recorded, the more the total investment risk involved in it.

In this study, the computation of variance of the market return and covariance of the IPO has been used to evaluate the beta value of the IPOs.

**Variance of the Market Return**

The variance is the averaged mean squared deviation of the market returns. It is derived as given below:

$$\text{Var}_m = \frac{\sum [(R_m - \bar{R}_m)]^2}{n - 1}$$

Wherein,

- $\text{Var}_m$ = variance of the market return,
- $R_m$ = return of the market index,
- $\bar{R}_m$ = average return of the market index, and
- $n$ = number of observations/ terms.
Covariance

The covariance measures the relationship between the IPO returns and the benchmark returns whether it moves in the same direction or in the opposite direction. The calculation of the covariance is shown as given below:

$$\text{Cov}_{im} = \frac{\sum (R_i - \bar{R}_i)(R_m - \bar{R}_m)}{n}$$

Wherein,

- $\text{Cov}_{im}$ = covariance of the IPO
- $R_i$ = return of the IPO
- $\bar{R}_i$ = average return of the IPO
- $R_m$ = market return of index
- $\bar{R}_m$ = average market return of benchmark index, and
- $n$ = number of observations.

This covariance helps to analyze the relation between IPO returns and benchmark return during the study period. If the return of stock and the market return moves in the same direction then the covariance is recorded a positive value. And if the IPOs return and benchmark return moves in the opposite direction then the calculated value of covariance is noticed as negative.

Beta

Chander (2002) described in study the beta as the measure of volatility. It is also called the systematic risk of the IPO with comparison to the market. It measures the degree of risk from which the stock price fluctuates in comparison to market fluctuations. This beta has statistically computed as shown below:

$$\beta_i = \frac{\text{Cov}(R_i, R_m)}{\text{var} R_m}$$

Wherein,

- $\beta_i$ = systematic risk or risk premium of the IPO,
- $\text{Cov}(R_i, R_m)$ = the covariance of the IPO returns and the market returns, and
VarR_m = variance of the market return.

Therefore, the beta is the measure the IPO return volatility in relation to the market return. The beta calculated outcome can be one, zero, more than one, less than one respectively.

Table 3.1

<table>
<thead>
<tr>
<th>Beta Value (s)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>the IPO price will move with the market.</td>
</tr>
<tr>
<td>Greater than one</td>
<td>the IPO price is more fluctuating than the market prices. The IPO returns are more risky than the benchmark returns.</td>
</tr>
<tr>
<td>Less than one</td>
<td>the IPO price is less volatile than the market values. The IPO returns are less risky than the market returns.</td>
</tr>
<tr>
<td>Zero</td>
<td>it defines as the returns when IPO returns are independent of the market returns.</td>
</tr>
<tr>
<td>Less than zero or negative</td>
<td>it describes as the IPO returns are rising when the benchmark return is falling and vice versa.</td>
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The risk- return (mean- variance) performance outcomes obtained in above said framework have been evaluated in terms of theoretical performance models developed by Sharpe’s (1960s), Treynor’s (1965) and Jensen (1968) as explained below:

**Sharpe’s Measure**

Sharpe’s model (1960s) that it is used to measure the stock return earned in the excess of risk free rate to the return variability. The return variability is measured by the standard deviation. This standard deviation has also referred to as the total investment risk of the IPO issue. The computation used for Sharpe’s measure is given below:

\[
S_i = \frac{R_i - R_f}{\sigma_i}
\]

Wherein,

\[
S_i = \text{Sharpe’s measure},
\]

\[
R_i = \text{return of the IPOs},
\]
\[ R_f = \text{risk free rate of return, and} \]
\[ \sigma_i = \text{return variability (total risk)} \]

It measures the risk premium from IPO returns in the excess of risk free rate to the standard deviation. If the Sharpe’s measure value is higher than that on the market index then it is considered as the superior performance. It means the IPOs performance has beaten the market performance. If the Sharpe’s computed value has shown negative performance than the market index then the performance measured in this regard has been referred as the inferior performance.

**Treynor’s Measure**

The Treynor measure is similar to the Sharpe’s measure except the standard deviation. The Treynor’s measure (1965) refers to the difference between IPO return earned and risk free rate divided by systematic risk of the stock. The formula is shown as below:

\[ T_i = \frac{R_i - R_f}{\beta_i} \]

Wherein,

\[ T_i = \text{Treynor’s measure,} \]
\[ R_i = \text{return of the IPO,} \]
\[ R_f = \text{risk free rate of return, and} \]
\[ \beta_i = \text{beta of the IPO’s.} \]

It measures the risk premium from stock returns in excess of risk free rate relative to the systematic risk of the IPO. If the Treynor’s performance is recorded positive return then it is referred as the superior performance of the IPO. Simultaneously, if the Treynor’s measure has been recorded a negative return then it is considered as the inferior performance of the IPO.

**Jensen’s Alpha Measure**

Jensen Alpha (1968) measures the absolute performance on risk adjusted basis. It is denoted by the \( \alpha_i \). It compares the excess return of the IPO with the expected return of the IPO. The expected return has been measured by its beta, risk free rate and risk premium of the market.
Its outcome values can be zero, positive and negative. The Jensen's Alpha measure computation is shown as given below:

\[ R_i = R_f + \beta_i \star (R_m - R_f) \]

\[ \alpha_j = R_i - \alpha_j \]

\[ \alpha_j = R_i - (R_f + \beta_i \star (R_m - R_f)) \]

Wherein,

- \( \alpha_j \) = alpha that measure the forecasting ability,
- \( R_i \) = expected returns of the IPO
- \( R_f \) = return of the IPO,
- \( R_f \) = risk free rate of return,
- \( \beta_i \) = measure of systematic risk, and
- \( R_m \) = market index return.

Jensen (1968) described in study that if the Jensen alpha value is higher than the measured performance then it is referred as the superior performance. It indicates that the IPO estimated return has been greater than the expected return of the IPO. If the Jensen alpha has been recorded a negative value and below to the security market line, then it is considered as inferior performance or underperforming the market. The negative value of Jensen alpha has been considered as the lower IPO return is recorded than the expected return. The higher value of Jensen alpha is more desirable.

**Meta Analyses and Forest Plots**

Neyeloff et al. (2012) described the model meta analysis and forest plots. The meta analysis is a set of statistical combination of results from two or more different studies. The forest plots refer as to the graphic presentation of the results of each study in one diagram. It has been used in this study to analyze the 20 web previous studies. To test the null hypothesis of the study as investors are rational. The Q statistics (chi square) was measured to accept and reject the null hypothesis. And it was compared against the critical values. To apply the formula of Q, various formulas as standard error (SE), variance (Var), individual study weights (w), weighted effect size (w*es), and other necessary calculations like w*es^2 and w^2 were calculated.
**Standard Error**

The standard error is the inversely proportion to the square root of sample mean and total sample size of the studies. The computation of standard error is given below:

\[
SE = \frac{es}{\sqrt{es \cdot n_{total}}}
\]

\[
es = \frac{n_{events}}{n_{total}}
\]

Wherein,

- \( es \) = outcome/mean of the study,
- \( n_{events} \) = sample size used for the study,
- \( n_{total} \) = total sample size taken in the study, and
- \( SE \) = standard error.

**Variance**

It is computed by squared the standard error of the study. It has calculated by formula as given below:

\[
Var = SE^2
\]

Wherein,

- \( Var \) = variance of the study, and
- \( SE \) = standard error of the study.

**Individual Study Weights (w)**

It measures as each study is inversely of the variance. It has computed as given below:

\[
w = \frac{1}{SE^2}
\]

Wherein,

- \( w \) = weights of the studies, and
- \( SE \) = standard error.
Weighted Effect Size

It is measured by multiplying the study weights by the mean of the each study. Its calculation formula has given below:

\[ \text{Weighted effect size} = w \times es \]

Squared weights of the study \((w^2)\)

It has computed by squaring the weights of the each study. It is calculated as given below:

\[ \text{Weights of the study} = w^2 \]

Squared weighted Effect Size \((w^e_{s^2})\)

It has measured by multiply the individual weights of the each study by squaring the effect size of each study. This has been calculated as given below:

\[ \text{Weighted effect size} = w^2 \times (es)^2 \]

Calculation of Q statistics / Value:

Jindal and Chander (2015) described in study the Q statistics. This Q statistics has been computed for the heterogeneity analysis among the studies. It works like a chi square test. It has measured as the summation of the squared weighted effect size difference from the sum of square of individual weighted effect size divided by individual study weights. The Q statistics computed in this study has been illustrated below:

\[ Q = \sum \left( \frac{[\Sigma (w \times es)]^2}{\Sigma w} \right) \]

Wherein,

- \(Q\) statistics = chi square of the study,
- \(w^e_{s^2}\) = squared weighted effect size,
- \(w^*es\) = individual weighted effect size, and
- \(w\) = individual study weights.
If the computed value of the Q statistics has found less than the table of critical values then it is accepted as a null hypothesis. On the contrary, if the calculated Q value has recorded more than the critical table value then it is rejected the null hypothesis in the study.

**Calculation of I²**

Neyeloff et al. (2012) described in study the I² is treated as to test the heterogeneity of the study. It measures by differentiate the Q value from degree of freedom and divided by the Q value. This I² value is expressed in percentage.

\[
I^2 = \frac{Q - df}{Q}
\]

Wherein,

\(Q\) = Chi Square value of the study
\(df\) = degree of freedom of the study

If the outcome is more than the 26% then it is considered as high heterogeneity between the studies. On the contrary, if the calculated value is less than 26% then it is considered as low heterogeneity between the studies.

**One sample t-test**

One sample t-test is used in this study through SPSS. This test compares the mean of sample to a population mean with the adjustment of number of cases in sample and standard deviation of the sample. It is used only to test sample mean against the population mean. This t-test has statistically computed as shown below:

\[
t = \frac{\overline{x} - \mu_0}{\frac{s}{\sqrt{n}}}
\]

Wherein,

\(t\) = t-test
\(\overline{x}\) = observed mean of sample
\(\mu_0\) = expected mean of population
\(s\) = standard deviation of the sample
\[ n \] = number of observations in sample

Therefore, the results are measured against the p-value and 5 percent significance level whether t-test reaches the threshold of statistical significance level or not. The p-value is the measure of strength of the sample against the null hypothesis. If the p-value is recorded less than the 0.05 value then rejects the null hypothesis at 5 percent significance level and found significant difference among the study’s results. If the p-value is recorded more than the 0.05 percent value then accepts the null hypothesis at 5 percent significance level and found no significant difference among the study’s results. It can say that there is 5% chances of difference between sample mean and population mean if accepts the null hypothesis.

The revealed investors rationality for IPO investment has been analyzed with the help of data reduction tool, factor analysis tool in SPSS 20 version using the primary data collected from a sample of investors. The data was collected from investors’ and put their answers in the coded form. Then this coded data was entered into the statistical software SPSS sheet. The data has been subjected to SPSS tool as factor analysis as described below:

**Factor Analysis**

The factor analysis is used for coding the respondents’ answers from questionnaire. Field (2009) described about the factor analysis it is a technique to identify the factors through data reduction in SPSS. The data is analyzed by using the tool factor analysis through SPSS. The factor analysis is a set of statistical procedure which can be used to identify the latent, distinct and coherent factors which represent the linear relationship among sets of interrelated variables. In SPSS, the factor analysis is conducted to check out the interrelated variables which generate the correlation matrix and reduce large number of observed variables in the less number of factors. It measures the correlation matrix of all the variables which is used in the analysis to extract the factors, rotation of the factors which helps to retain the factors in the analysis and interpretation of the results.

The factor analysis is usually started from the correlation matrix in which all the variables are shown co-relation between all the variables. This matrix contains the useful information as shown the relationship among the pairs of the variables. It expresses the linear relationship between all variables rows and columns. If the values of this matrix are closer to one then it is considered as greater relationship among the variables, if this value has shown closer to zero then
it is considered as the less relationship among the variables and if correlation matrix values has recorded negative then it indicates inverse relationship among the variables.

The factor extraction phase is used mainly to extract the factors. And the factors are extracted after the correlation matrix. The principal component analysis is the way to extract the factors. The high variables are loaded on one factor and low variables are loaded on the remaining factors. The factor extraction is reduced the large number of variables in few factors. After deciding the factors through factor extraction, select the rotational varimax method which maximizes the high loading variables and minimizes the low loading variables. At last interpretation of the factor results in which giving the name to the factors. It is the search of factors and taken variables together which explain the majority of responses.

Field (2009) described the KMO and Bartlett’s test. The Kaiser- Mayer- Olkin (KMO) is used to measure the sampling adequacy and Bartlett’s test of sphericity has examined the appropriateness of the tool. The KMO value is desirable if it is recorded more than 0.5. The Bartlett’s test of sphericity is used to test the null hypothesis that the correlation matrix is an identity matrix. In this study, the factor analysis is described through the principal component analysis, eigen value, varimax method and rotation component matrix. The principal components matrix is the summation of numerous observed variables which extracts the maximum variance factors before rotation. It is the technique of combining the two or more correlated variables into one factor. However, by the use of rule of thumb, consider all those loadings which have value more than the ± 0.30. This factor loading represent the relationship of each variable to the underlying factor extracted by principal component matrix.

After the factor extraction, the Eigen value is considered to show the proportion of variance explained by each new factor. The addition of squared value of factor loadings is defined as the eigen value. It describes the major role of the principal component matrix in the factor analysis. Rightly so, this method is retained only those factors which have more than one eigen values. The first eigen value will always be largest because the first factor always explains the greatest amount of total variance. Then, percentage of the variance is extracted in the principal component matrix (eigen value divided by the number of variables) and this is followed by cumulative percent. In this study, ten factors are extracted having eigen values more than 1. In this study, all variables are found less relationship among each other.
The communalities show that proportion of variance that every variable is associated with the underlying factors. The proportion of common variance when present in the variable, then it is known as communality. The high value of communality is better. The rotation varimax method and orthogonal (unrelated) method is used for extracting the factors on thirty four questions which was related to the investors rationality on IPO pricing performance. All the statements with the factor loadings ± 0.30 values are considered in the corresponding factor.

**Reliability and Validity of the Data**

Tavakol and Dennick (2011) described the validity and reliability test which is used to measure the internal consistency in the questionnaire. To check the reliability and validity of the data then the Cronbach’s alpha (1951) value is calculated. It is used to check the scale reliability. The Cronbach’s Alpha values are symbolized as ‘α’ and it is the common measure to check the scale reliability and internal consistency of the data. The Cronbach’s Alpha measures as:

\[
\alpha = \frac{N^2 \text{Covar}}{\sum \text{Var}_{\text{item}} + \sum \text{Covar}_{\text{item}}}
\]

The Cronbach’s alpha value of the questionnaire was calculated. And this value has been recorded as 0.7514 from the reliability test of the questionnaire which is acceptable from the minimum threshold perspective for internal consistency or the scale reliability.

**Time Frame used in this study**

The sample period 108 IPOs has been analyzed during January 2009 to August 2014. The IPOs performance in this sample period is analyzed in different time frames at short run as well as long run. Kumar (2008), Peng (2008), Kiran and Chopra (2009) and Sahoo and Rajib (2010) studied on the IPOs price performance in different time frames as for the short run analysis, the time intervals considered are as listing day, a week after, a month after, a quarter after and six month after listing day. For the long run analysis, the time span considered are as one year after, two year after and three year after listing day. The four and five year data has been taken for this study. But IPOs price performance in four and five year after listing day has been ignored because the sample size of IPOs is found abnormal in these years. Only four IPOs have recorded in five year after listing day.
3.5 Chapterisation Scheme

The study comprises of seven chapters. The chapter 1 introduces the topic of investors rationality, behavioral biases of investors, disposition effect on the investors, representative behavior, Initial Public Offerings, IPO pricing methods, IPO pricing anomalies and long run underperformance. The chapter two described the literature review of the existing studies related to this study, their problem area from which this study is making up for the further study. The chapter three describes the methodological frame of the study. In this chapter, the explanation of the primary and secondary data is given that how to collect the data, the sample size of the population, the sample area to collect the data, which tool is used to analyze and the reliability and validity of the data is also studied.

The chapter four is analysis of IPO price performance and implications for rationality. It analyze the IPO price performance whether the IPOs prices are more than the issue price or less than the issue price. The IPO performance is analyzed at short run and long run performance at different time spans with different times and the summary statistics of IPO price performance during the study period is also explained with the help of different aspects. It analyzes the observed implications of the investors rationality on the IPOs pricing performance. This chapter describes the investors’ exuberant and pessimistic behavior regarding IPO pricing performance. The chapter five attempted to analyze the investors rationality based on the primary data. That actually how investors behave on the IPO prices movements. At the last, the chapter six describes in brief, the study findings and dwells on the application implication of study findings.

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References:

Books:

Articles:

Websites:
- http://www.nseindia.com
- http://www.moneycontrol.com
http://www.chittorgarh.com