CHAPTER III
RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers the research methodologies adopted for the study of Buyback of Shares in India listed in Bombay Stock Exchange.

3.2 Research Problem

Most of the researches related to Buyback of shares were carried out in United States of America, Canada, United Kingdom, Australia, and Malaysia. There were very few research work undertaken by the researchers in buyback of shares in India. Research was done in India focuses mainly on measuring the impact of buyback announcement on share price. No study was made so far on factors that lead or influence the company to buyback of shares.

This research was attempted to identify the factors that led the Indian company to buyback of shares, in which be the probability for participating in the stock market.

3.3 The Research Questions

RQ1. Are there any significant variables that indicate a company’s likelihood of going for buyback of shares?

RQ2. Does buyback of shares announcement result in abnormal returns?

RQ3. Does buyback of shares impact on the Leverage Ratio, Cash flows, Earnings per Share, Book value to Market Value and Capital Structure of the firm?

3.4 The Research Objectives

RO1. To identify significant variables that indicate a company’s likelihood of involving in share repurchase.

RO2. To measure the impact of share price during Pre and post buyback announcements.
RO3. To assess the impact of buyback on Leverage Ratio, Cash Flows, Earnings Per Share, Book value to Market Value and Capital Structure of the firm.

3.5 Research Hypothesis

Research Hypothesis is a formal question that intends to resolve. Thus a hypothesis may be defined as a proposition or a set of proposition set forth as an explanation for the occurrence of some specified group of phenomena either asserted merely as a provisional conjecture to guide some investigation or accepted as highly probable in the light of established facts.

The following hypotheses were constructed to know the significant relationship of the variables that influence the buyback of shares, and impact created on the pre and post buyback announcement.

Table 3.1

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Statements</th>
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<tbody>
<tr>
<td>Hypothesis 1</td>
<td>H0: There is no significant relationship between Undervaluation and Buyback announcement</td>
</tr>
<tr>
<td></td>
<td>H1: There is significant relationship between Undervaluation and Buyback announcement</td>
</tr>
<tr>
<td>Hypothesis 2</td>
<td>H0: There is no significant relationship between Earnings Management and Buyback announcement</td>
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<tr>
<td></td>
<td>H1: There is significant relationship between Earnings Management and Buyback announcement</td>
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<tr>
<td>Hypothesis 3</td>
<td>H0: There is no significant relationship between Free cash flow and Buyback announcement</td>
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<tr>
<td></td>
<td>H1: There is significant relationship between Free cash flow and Buyback announcement</td>
</tr>
<tr>
<td>Hypothesis 4</td>
<td>H0: There is no significant relationship between Capital Structure and Buyback announcement</td>
</tr>
<tr>
<td></td>
<td>H1: There is significant relationship between Capital Structure and Buyback announcement</td>
</tr>
<tr>
<td>Hypothesis 5</td>
<td>H0: There is no significant relationship between Leverage and Buyback announcement</td>
</tr>
<tr>
<td></td>
<td>H1: There is significant relationship between Leverage and Buyback announcement</td>
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</table>
3.6 Research Design

This research covered the buyback of shares announced in last from 1998 - 2015. Hence, the research design for the study can be classified as descriptive research design mainly using secondary data. The statistical tools used in this research were Multiple Regression, GARCH Model, Autocorrelation and Stationarity Test.

3.7 Data Collection

As per this research, the secondary data from difference sources and websites was used.

3.7.1 Secondary Data

Secondary data means data that are already available i.e. in this research utilized the secondary data from various sources of websites

- Centre for Monitory Indian Economy (CMIE) Prowess Database,
- Securities Exchange Board of India (SEBI),
- Bombay Stock Exchange (BSE) and Journals.

3.7.2 About Bombay Stock Exchange

Bombay Stock Exchange popularly called as BSE, it was recognized in the year 1875. In India BSE is the first stock exchange to obtain permanent recognition, which was granted by
the Government of India in the year 1956 under the Security Contract Regulation Act (SCRA).

3.7.3 CMIE PROWESS

Prowess is a database of the financial performance of Indian companies. It has been created by the Centre for Monitoring Indian Economy Pvt. Ltd. (CMIE) from essentially publicly available documents. It covers listed companies, large and medium public limited companies, government owned companies, some privately held companies, some cooperatives and even some business entities that are not companies. Prowess is not a directory but a database of the financials of companies.

Prowess provides time-series data beginning 1989-90. The database has been updated every day. Prowess is designed to help users access information for individual companies. There were tools to search companies in the database that match search criteria provided by users. Prowess presents several tabulations (such as financial statements) and charts (including those of share prices) in a faster time presentations help the user in analysing the companies in the database.

3.8 Sampling Design

A sample design is a definite plan for obtaining a sample from a given population. It refers to the technique or the procedure that would adopt in selecting items for the sample. As for this study judgment sampling was used viz., Samples were chosen based on the company particularly in the stock market.

3.8.1 Sampling Procedure

Sampling was selected for this research has Bombay Stock Exchange (BSE) listed companies. Sampling size mainly focused those companies participated in buyback of shares from 1998 to 2015 in BSE. Those companies were selected as a sampling for this research. 238 companies were participated in buyback of shares.
3.8.2 Dependent Variables

3.8.2.1 Outstanding Buyback of Shares

Shares outstanding means a firm’s stock presently held by all its shareholders, including share blocks held by institutional investors and controlled shares owned by the insiders of the company. A company's number of outstanding shares is not static, but may fluctuate widely over time.

Outstanding shares are shown on a company’s balance sheet under the heading “Capital Stock.” The number of outstanding shares is used in calculating key metrics such as a company’s market capitalization, as well as its earnings per share (EPS).

Source: http://www.investopedia.com/terms/o/outstandingshares.asp#ixzz3nl2Xp7ls

3.8.3. Independent Variables

Australia firms went for buyback of shares given that firms may repurchase shares for more than one reason, Reddy (2013) analyzed whether the influence of total assets, leverage, liquidity, growth, earnings to price and governance variables on the decision to buyback or not to buyback shares. Some of the variables used in this study were to analyze the factors influencing to go for buyback of shares in Bombay Stock Exchange listed companies in India.

3.8.3.1 Book Value to Market Value

The company book value to market Value was depends on the balance sheet value of the owner equity. Book value to market Value is determined dividing net worth by the number of equity shares outstanding. Book value to Market Value also determines the company value because depends on the asset historical value affects the company’s value. Yarram (2013) found that market value to Book value to Market Value as well as earnings to price have significant positive influenced on the decision to buyback shares and results were contradicts undervaluation or signaling hypothesis that firms buyback shares when the author were undervalued and examined the undervaluation hypothesis the influence of market to book ratio which was a proxy for information asymmetry – on the decision to buyback shares was examined.

3.8.3.2 Earnings per Share (EPS)
EPS measured the indicating whether or not the firm’s earnings power on share basis has changed over that period. EPS simply shows the profitability of the company on the basis of per share basis or share price basis. The shareholder’s investment profit also measure in different ways. One of the measuring is the Earning per Share is calculated by dividing the profit after taxes by the total number of shares outstanding.

\[
EPS = \frac{Profit_{after\,tax}}{Number_{of\,shares\,Outstanding}}
\]

Yarram (2013) mentioned that EP (earning price) was one of the variable to analyze the motivating factor the decision to buyback of shares in Australian firm. Mitchell et al found two major motivations for buyback of shares. Improving financial performance or increase in earnings per share was the major motive for firms to buyback shares. Firms with excess free cash flow may distribute it in the form of repurchases. Firms that were undervalued and have excess cash flow were more likely to repurchase stock. Management in this instance may be trying to signal to the market the better prospects that are available to the firm. Stonham found that improving the reported earnings per share (EPS) was the most cited reason for buybacks. Hribar et al. claimed that share buybacks is used to manage the reported EPS in analysts’ forecasted figures or expectations. This was important because if the market sets prices by capitalizing reported EPS at industry-wide multiples, stock prices will also increase.

### 3.8.3.3 Return on Capital Employed

The fund employed in net assets has known as capital employed. Net assets equal net fixed assets plus current assets minus current liabilities excluding bank loans. Alternatively, capital employed is equal to net worth plus total debts.

\[
Return_{on\,capital\,employed} = \frac{Profit_{Before\,Interest\,and\,Tax}}{Capital\,Employed}
\]

Return on Capital Employed as the measure of the firm’s operating performance. It indicates the firm’s earning power. It has product of the asset turnover, gross profit margin and operating leverage.
3.8.3.4 Free Cash

Cash was the money which includes coins, currency and cheques held by the firm and balances in its bank accounts. Cash was the important and basic input to run a business continuously and smoothly. Cash was the important current asset for the operations of the business. [Baker et al (1981), Stonham, and Otchere Ross] claimed that excess cash was best employed in share buybacks. Baker et al. found that majority of companies use available cash balances to fund the buyback of shares. Oswald and Young found that when a company was in a situation of having temporary excess cash with limited investment opportunities, it was influenced to make decision which favors share buyback. Thus, it was expected that companies with excess cash and limited investment opportunities would prefer to buy back shares.

3.8.3.5 Total Assets and Current Assets

Assets represents everything which a business owns and has money value. Assets are various forms like fixed assets, current assets, liquid assets, fictitious assets, Contingent assets and wasting assets. Yarram (2013) total assets had significantly positively influencing factor to decision of buyback of shares in Australian firms. Current assets include cash and those assets that can be converted into cash within a year such assets called Current assets. Current assets are Debtors, Inventories, Marketable Securities, prepaid expenses etc.,

3.8.3.6 Equity

The shareholder’s equity or net worth will include paid-up share capital, share premium and reserves and surplus less accumulated losses. Net worth can also be found by subtracting total liabilities and total assets. Leverage as measured by debt to equity shows that debt was roughly half of equity for the sample firms in their study. Leverage has showed fluctuation during the sample period with the highest level of 58% of equity in 2008 and a low level of 32.5% in 2010. Leverage was the one of the variable to take decision to go for a buyback of shares; study conducted in Australia in the year 2004 to 2010. (Yarram, 2013) Share repurchases by reducing the amount of equity, achieve increase in leverage. Dol and Wahid (2013) mentioned that share buyback was used for the restructuring process or capital structure adjustment the
leverage ratio. The debt to equity ratio (DEBTEQTY) measures the leverage of the company. Additionally, Brown and O’day used the leverage ratio to conduct capital restructuring assessments of a company. The debt to equity ratio represents the total liabilities to shareholders equity

3.8.3.7 Debts

An amount of money borrowed by one party or from another. Many companies/individuals used debt as a method for making large purchases that they could not afford under normal circumstances. A debt arrangement gives the borrowing party permission to borrow money under the condition that it is to be paid back at a later date, usually with interest. Guffey (2004) mentioned that the leverage hypotheses stated that management provided information that the firm was moved closer to its optimal capital structure through a buyback of its shares i.e. by replacing equity with tax-deductible debt. Share buyback had the effect of reducing the equity of a company and thereby changing its capital structure mix. A company may decide to increase its leverage by issuing debt and using the proceeds to buyback shares. In other words, in order to initiate a buyback, a company should have or be perceived to have excess debt capacity.

3.9 Statistical Tools used for Data Analysis

Statistical Tools have been used in this research to verify and identify variable to go for buyback of shares in BSE listed companies in India. Statistical tools are important method to analyze the data in the form of dependent and independent variables. The analysis was done through SPSS 16 (Statistical Package for Social Science) and EViews. The tools used in this research given below.
3.9.1 Multiple Regression

Multiple regression analysis is a method for explanation of phenomena and prediction of future events. A coefficient of correlation between variables X and Y is a quantitative index of association between these two variables. Its squared form, the coefficient of determination, indicates the amount of variance (information) in the criterion variable Y which is accounted for by the variation in the predictor variable X. A multivariate counterpart of the coefficient of determination is the coefficient of multiple determination, $R^2$. In multiple regression analysis, the set of predictor variables is used to explain variability of the criterion variable $X_1, X_2, \ldots, X_n$ is used to explain variability of the criterion variable Y. When there are two or more than two independent variables, the analysis concerning relationship is known as multiple correlation and the equation describing such relationship is the multiple regression equation

Multiple Regression equation assumes the form:

$$Y = a + b_1 X_1 + b_2 X_2 + \ldots + b_n X_n$$

Where $X_1$ and $X_2$ are two independent variables and Y is the dependent variable, and $a$, $b_1$ and $b_2$ are the constant.

Multiple Regression was used following authors [Vaughan and Williams, (1998), Rajandran (2011), Sathyapriya (2013)]

3.9.2 Autocorrelation

Autocorrelation refers to the correlation of a time series with its own past and future values. Autocorrelation is also sometimes called “lagged correlation” or “serial correlation”, which refers to the correlation between members of a series of numbers arranged in time. Positive autocorrelation might be considered a specific form of “persistence”, a tendency for a system to remain in the same state from one observation to the next. Autocorrelation can be expressed as follows;

$$\rho_1 = \frac{\sum_{t=1}^{T-1} [Y_t - \bar{Y}_t][Y_{t-1} - \bar{Y}_t]}{\sum_{t=1}^{T} [Y_t - \bar{Y}_t]^2} = \frac{\gamma_1}{\gamma_0}$$
If \( pj \) is plotted against \( j=0,1,\ldots \), we get a graph known as the Auto correlation function or Correlogram (ACF).

When the autocorrelation is used to detect non-randomness, it is usually only the first (lag 1) autocorrelation that is of interest. When the autocorrelation is used to identify an appropriate time series model, the autocorrelations are usually plotted for many lags.

### 3.9.3 Generalized Auto Regressive Conditional Heteroscedasticity (GARCH) Model

The Engle (1982) autoregressive conditional heteroskedasticity (ARCH) model is the most extensively used time series models in the finance and stock market literature. The ARCH model proposes that the variance of residuals at time \( t \) depends on the squared error terms from past periods. The residual term \( \epsilon_t \) is conditionally normally distributed and serially uncorrelated. The strength of the ARCH technique is that is used the established and well specified models for economic variables; the conditional mean and conditional variance are the only two main specifications.

Bollerslev (1986) extended Engle’s ARCH model to the GARCH model and it is based on the assumption that forecasts of time varying variance depend on the lagged variance of the asset. The GARCH model specification is found to be more appropriate than the standard statistical models, because it is consistent with return distribution, which is leptokurtic and it allows long-run memory in the variance of the conditional return distributions. As a result, the unexpected increase or decrease in returns at time \( t \) will generate an increase in the expected variability in the next period. The GARCH (1,1) model.

The basic model of GARCH (1,1) can be expressed as:

\[
R_t = \alpha + b R_{t-1} + \epsilon_t \\
\epsilon_t | I_{t-1} \sim N(0, h_t), h_t = \alpha_0 + \sum_{i=1}^{p} \beta_i h_{t-1} + \sum_{j=1}^{a} \lambda_j \epsilon_{t-j}^2
\]

Where,
R_t = denotes the realized return,

h_t = is the conditional variance,

\( \alpha, \beta \text{ and } \lambda \) = the coefficients to be estimated and measures the short run dynamics of the resulting volatility time series.

\( \lambda \) = scaling parameter

\( \beta \) = parameter refers to the last periods forecast variance

In GARCH model, the coefficients of variance equation \( \beta \) and \( \lambda \) should be less than 1.

### 3.9.4 Stationarity

Before stationarity test first, the unit root test to be calculate for the variables under consideration using Augmented Dickey – Fuller (ADF) test.

#### 3.9.4.1 Unit Root Test:

Engle and Granger (1982) have shown that many time series variables are non-stationary or different order of integration I(1) series. Since most of time series have unit roots and are non stationary as indicated, by Nelson and Plosser (1982), and as proved by Stock and Watson (1988), that conventional regression techniques on non-stationary time series may produced spurious regression. However, the Augmented Dickey Fuller (ADF) test is employed to infer the stationarity of the series.

#### 3.9.4.2 Augmented Dickey Fuller (ADF) test:

Augmented Dickey Fuller (ADF) (1979) implicitly assumes that the estimated errors are statistically independent and homescadastic. Heteroskedasticity does not affect a wide range of unit root test statistics. Hence, a problem will happen if the estimated residual is not free from autocorrelation. Since, this invalidates the test. The well known example of unit root non-stationary is the random walk model. There might be three possibilities for any time series. The time series might be a random walk, a random walk with drift, or random walk with drift and time trend. The three possible forms of the ADF test are expressed in the following form;
\[ \Delta Y_t = \gamma_1 y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta y_{t-i} + \varepsilon_t \]

\[ \Delta Y_t = \alpha_0 + \gamma_1 y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta y_{t-i} + \varepsilon_t \]

\[ \Delta Y_t = \alpha_0 + \gamma_1 y_{t-1} + \alpha_2 I + \sum_{i=1}^{p} \beta_i \Delta y_{t-i} + \varepsilon_t \]

The additional lagged difference terms are being determined by minimum number of residual free from autocorrelation. If the calculated ADF test statistics are less than their critical values from table, the null hypothesis \((H_0)\) is accepted and the series are non-stationary or integrated to zero order.

### 3.10 Scope and Period of the Study

This research has been confined to all the companies listed in Bombay Stock Exchange (BSE) and has gone for buyback of shares. The period of the study has been from 1998 to 2015. All the buyback announcements made during this period have been covered.

### 3.11 Summary

The research methodology for this study was designed to carry out the research work scientifically. Sampling of this study was selected Bombay Stock Exchange (BSE) listed company equally distributed. The factors influencing to go for buyback of shares independent variable is buyback outstanding in a company was identified. Other factors were Total assets, EPS, Debt, Equity, Cash etc value taken in BSE listed companies.

Statistical tool has been used in this study were selected through literature review related to stock market appropriately selected. Statistical tool are logistic regression, GARCH Model Autocorrelation.