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REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

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A STUDY ON CONSTRUCTION OF OPTIMAL PORTFOLIO USING SHARPE'S SINGLE INDEX MODEL**ARUN KUMAR .S.S****LECTURER****DR. C. V. RAMAN COLLEGE OF ADMINISTRATION & NETWORK SCIENCES****DAVANGERE****MANJUNATHA.K****ASST. PROFESSOR****DEPARTMENT OF COMMERCE****RANI CHANNAMMA UNIVERSITY PG CENTRE****BIJAPUR****ABSTRACT**

Capital market comprising the new issues market and secondary markets or stock market, is one of the most sensitive market in the whole economy. The secondary market enables investors to continuously rearrange their assets if they so desire by divesting themselves of such assets while others can use their surplus funds to acquire them. This rearrangement is not a product of instant decisions but a thorough research. In order to have a model of the portfolio return, we have to model the individual assets as well as their dependencies. Based on these models, we compute the portfolio return and its characteristics. 'A portfolio optimization is only possible once we have a model of the portfolio return. The investment decisions are derived from the portfolio optimization'. We therefore aim to control the financial risk that an investor takes. This raises the question of how to define financial risk, which is still an open issue in theory and in practice. Risk is the exposure to some uncertain future event. The probabilities of the different outcomes of this future event are assumed to be known or estimable measures have been proposed so far, but no risk measure is well suited for all problems arising in the area of financial engineering. Obviously, the asset allocation process refers to the process of investing money in different financial assets. There is no generally accepted methodology for this problem. The first step of the elaboration of an asset allocation strategy is the definition of the risk measure. However, not all risk measures are well suited for the derivation of optimal asset allocation strategies. There are many keywords describing different stages of the asset allocation process, e.g., strategic and tactical asset allocation. We consider the asset allocation process as an iterative process since a continuous monitoring of the portfolio characteristics is essential. Hence, an attempt is made to "study construction of optimal portfolio using Sharpe's Single index model".

KEYWORDS

Sharpe's single index model, Sharpe ratio, optimal portfolio.

INTRODUCTION

A Portfolio is a combination of different investment assets mixed and matched for the purpose of achieving an investor's goal. A portfolio is a professional and stylish way to display projects and prevents them from getting lost, dirty or damaged. The key to creating an efficient portfolio is reaching desired goal by using as little resources as possible.

The ideal investment is to pick a low risk stock in hopes of big returns. That is nearly impossible. In the game of investing, high risk equals high return and vice versa. Harry Markowitz's Modern Portfolio Theory explains that by diversification the potential risk can be dispersed throughout portfolio. This means balance a high risk stock with a low risk stock, as well as investing in different sectors.

Here is a right way and a wrong way to build a securities portfolio. Like horse racing, where you may do well short term by picking horses by the color of their silks.

Building a portfolio is not as simple as putting random pieces of work into a folder, and requires time, thought and organization. Building a stock portfolio is very difficult to do because it takes a lot of study. But, in the end, the ability of the stock market to grow over time will most likely lead to reaching goals. This ensures people who view portfolio can see talents instantly, and are more likely to be impressed by what they see.

Investment managers of leading mutual funds are in the business of amassing stock for many companies based on the fund's unique characteristics. In essence, mutual funds can provide with more diversification than if you were to buy individual stocks on own.

STATEMENT OF THE PROBLEM

One aspect of financial engineering is the development of portfolio management strategies. By definition, a portfolio is a collection of investments held by an institution or an individual. Holding a portfolio with different investments instead of a single one is reducing the investor's risk and is called diversification.

In order to have a model of the portfolio return, we have to model the individual assets as well as their dependencies. Based on these models, we compute the portfolio return and its characteristics. 'A portfolio optimization is only possible once we have a model of the portfolio return. The investment decisions are derived from the portfolio optimization'.

We therefore aim to control the financial risk that an investor takes. This raises the question of how to define financial risk, which is still an open issue in theory and in practice. Risk is the exposure to some uncertain future event. The probabilities of the different outcomes of this future event are assumed to be known or estimable measures have been proposed so far, but no risk measure is well suited for all problems arising in the area of financial engineering. Obviously, the asset allocation process refers to the process of investing money in different financial assets. There is no generally accepted methodology for this problem.

The first step of the elaboration of an asset allocation strategy is the definition of the risk measure. However, not all risk measures are well suited for the derivation of optimal asset allocation strategies.

There are many keywords describing different stages of the asset allocation process, e.g., strategic and tactical asset allocation. We consider the asset allocation process as an iterative process since a continuous monitoring of the portfolio characteristics is essential.

Hence, an attempt is made to "study construction of optimal portfolio using Sharpe's Single index model".

REVIEW OF LITERATURE

In paper titled "An extension of Sharpe's single-index model: portfolio selection with expert betas" A Bilbao, M Arenas, M Jiménez, B Perez Gladish and M V Rodríguez presented an approach to the portfolio selection problem based on Sharpe's single-index model and on Fuzzy Sets Theory. In this sense, expert estimations about future Betas of each financial asset have been included in the portfolio selection model denoted as 'Expert Betas' and modelled as trapezoidal fuzzy numbers. Value, ambiguity and fuzziness are three basic concepts involved in the model which provide enough information about fuzzy numbers representing 'Expert Betas' and that are simple to handle. In order to select an optimal portfolio, a Goal Programming model has been proposed including

imprecise investor's aspirations concerning asset's proportions of both, high-and low-risk assets. Semantics of these goals are based on the fuzzy membership of a goal satisfaction set. To illustrate the proposed model a real portfolio selection problem is presented.

In paper titled as CONSTRUCTION OF OPTIMAL PORTFOLIO OF EQUITY, USING SHARPE'S SINGLE INDEX MODEL: A CASE STUDY OF IT SECTOR it is found that Portfolio is the collection of financial or real assets such as equity shares, debentures, bonds, treasury bills and property etc. portfolio is a combination of assets or it consists of collection of securities. These holdings are the result of individual preferences, decisions of the holders regarding risk, return and a host of other considerations. Portfolio management concerns the construction & maintenance of a collection of investment. It is investment of funds in different securities in which the total risk of the Portfolio is minimized while expecting maximum return from it. It primarily involves reducing risk rather than increasing return. Return is obviously important though, and the ultimate objective of portfolio manager is to achieve a chosen level of return by incurring the least possible risk. This paper presents an approach to the portfolio selection problem based on Sharpe's single-index model. To illustrate the model, a real portfolio selection problem is presented. The study is carried out to fulfill the objectives like (i) to construct an optimal portfolio by implementing Sharpe's single index model. (ii) To know the proportion of each security in the optimal portfolio. This paper aims at developing an optimal portfolio of equity of IT sector, through Sharpe's Single Index Model. For the study, six top performing IT companies traded in BSE were taken and the optimal portfolio was constructed with 5 companies

In paper titled as 'Construction of an optimal portfolio: an application to sharpe's single index model' it is found that an approach to the portfolio selection problem based on Sharpe's single-index model. To illustrate the model, a real portfolio selection problem is presented. The study is carried out to fulfill the objectives like (i) to construct an optimal portfolio by implementing Sharpe's single index model, (ii) to verify and investigate the optimal portfolio framed out of the selected stocks on the basis of risk and return (beta and expected returns, respectively). This attempt has been made by selecting the most representative stocks of the Indian economy, that is, the securities listed in BSE Sensex. All the thirty securities have been taken for the study. Through implementing financial techniques suggested by Sharpe individually on these stocks, results have been found in terms of optimal portfolio. The research will be helpful for researchers to understand the practical aspect of the model as well as for investors who want to diversify the unsystematic risk by diversification of the investments.

In a paper titled as An extension of Sharpe's single-index model: portfolio selection with expert betas the Bilbao A, Arenas M, Jiménez M, Perez Gladish B, Rodríguez found that application using quarterly data for 1996-2000 concerning 26 Spanish mutual funds. Sets DM goals of: 3.5% return minimum; Beta less than/equal to '1'; residual variance < 15; satisfaction degree for high-risk/low-risk assets proportion (~20%/~50% of budget) to be '0.5'; and, maximum investment in each fund to be no more than 35% of budget. Uses PROMO software (Luque, 2000) for solution calculation.

Research limitations/implications - Seeks an extended model.

Originality/value - Presents a fuzzy-based goal programming portfolio selection model that enables both analyst and decision-maker to work together

SCOPE OF THE STUDY

1. Selections of companies are restricted to S&P CNX Nifty of 50 companies.
2. The companies chosen and analyzed are based on their performance of certain parameters for the recent past five years.

OBJECTIVES OF THE STUDY

1. To analyze the performance of securities based on aggregate weighted Average of EPS, RONW, SALES and NET PROFIT.
2. To construct the optimal portfolio using Sharpe model.
3. To provide findings based on analysis.

METHODOLOGY

I) DATA COLLECTION

A) SECONDARY DATA

Stocks covered in S&P CNX Nifty are taken out for analysis based on EPS, RONW, Sales, and Net Profit of the recent past five years of yearly data. The securities which tops on Aggregate Weighted Average will be selected for constructing portfolio. Data has been collected from secondary data only. This data is obtained from WWW.nseindia.com, www.nseindia.com, www.economics.com, www.capitaline.com. While calculating Weighted Averages, recent years are given more weightages and distant year are given the least weightages. But all of these (i.e. top fifty) securities are chosen, based on Weighted Averages, for Optimum Portfolio Construction. Only one security from each sector is chosen with intention to maintain portfolio diversification. These securities are further given ranks on the basis of excess of return over risk free return (Risk Premium) to beta. The criterion for awarding marks/points depends on the higher the rank, the higher the marks/points, for example, I rank- 50 marks, II-49, III-48.....XXX-1. The optimum portfolio is built using Sharpe model.

II) STATISTICAL TOOLS USED

For analyzing the securities, various statistical tools used like,

1. weighted and simple averages,
2. standard deviation,
3. regression analysis,
4. systematic and unsystematic risk etc.;

LIMITATIONS OF THE STUDY

1. The study is limited to construct the optimal portfolio.
2. Out of 50 stocks of Nifty index, the constitution of portfolio is arrived by considering few stocks.
3. The portfolio is constructed purely on the basis Sharpe's model which basically considers the "stock price movements and does not take into consideration company, industry and economic specific factors".

THEORETICAL BACKGROUND OF PORTFOLIO CONSTRUCTION

CONSTRUCTION OPTIMAL PORTFOLIO

➤ Sharpe's single index model

SINGLE INDEX MODEL

Casual observations of the stock prices over a period of time reveals that most of the stock prices move with the market index.

Selection of securities based on the management efficiency and security analysis to be done on parameters like Weighted average of Sales, net profit, EPS, return on net worth, etc.

➤ Computing the rate of return of the stocks included in portfolio, using daily closing prices of each company

$$R_i = \frac{P_t - P_o}{P_o} \times 100$$

Pt= current year price

Po = previous year price.

- Computing the rate of return of the Nifty index, using daily closing points.

$$R_m = \frac{P_t - P_o}{P_o} \times 100$$

P_t = current year price. P_o = previous year price.

- Beta, to evaluate the risk.

$$\beta = \frac{N \sum xy - (\sum x)(\sum y)}{N \sum x^2 - (\sum x)^2}$$

- Computing the excess return to Beta to rank the securities using following formula:

$$\left[\frac{R_i - R_f}{B} \right]$$

Rank the securities highest to the lowest.

- Computing variance of the NIFTY movement
X-mean

$$\sigma_m^2 = \frac{\sum (X - \text{mean})^2}{N - 1}$$

- Computing variance of the Stocks movement
X-mean

$$\sigma_{ei}^2 = \frac{\sum (X - \text{mean})^2}{N - 1}$$

- Computing the systematic and unsystematic risks

$$\text{Systematic risk} = \beta^2 \sigma_m^2$$

$$\text{Unsystematic risk} = \sigma_{ei}^2 - \text{Systematic risk}$$

- Computing C_i values for all the stocks according to the ranked order using the following formula:

$$C_i = \frac{\sigma_m^2 \sum (R_i - R_f) \beta / \sigma_{ei}^2}{1 + \sigma_m^2 \sum \beta^2 / \sigma_{ei}^2}$$

- Computing X_i and Z_i to determine how much funds needs to be invested in each security can estimated as follows:

$$X_i = \frac{Z_i}{\sum Z_i}$$

$$Z_i = \beta^2 / \sigma_{ei}^2 \left[\frac{R_i - R_f}{B} - C^* \right]$$

ANALYSIS FOR PORTFOLIO CONSTRUCTION

The following table shows ranking of securities based on weighted averages of EPS, Sales, Net profit and return on network:

TABLE - 1

| Rank | WAEPS | Companies | WAS | Companies | WANP | Companies | WARONW | Companies |
|------|---------|------------------|------------|-------------------|-----------|------------------|--------|------------------|
| 1 | 124.835 | SBI | 151754.667 | RIL | 16206.389 | ONGC | 91.899 | HUL |
| 2 | 91.125 | Infosys | 128849.427 | BPCL | 15532.467 | RIL | 44.797 | Hero Honda |
| 3 | 89.979 | Punjab Bank | 60653.438 | ONGC | 15374.256 | L & T | 39.514 | TCS |
| 4 | 84.578 | RIL | 58116.748 | SBI | 7882.680 | NTPC | 32.165 | Unitech |
| 5 | 78.035 | ONGC | 44999.936 | SAIL | 7732.791 | SBI | 30.973 | INFOSYS |
| 6 | 75.859 | BHEL | 41344.501 | NTPC | 7127.818 | Bharti Airtel | 30.476 | Siemens LTD |
| 7 | 73.033 | Hero Honda | 29914.711 | L & T | 6494.823 | SAIL | 28.831 | Bharti Airtel |
| 8 | 70.163 | ACC | 29650.219 | Tata Motors | 5045.867 | INFOSYS | 27.301 | Jindal Steel |
| 9 | 66.453 | L & T | 29202.195 | Bharti Airtel | 4803.515 | Tata Steel | 27.029 | Wipro |
| 10 | 64.683 | Tata Steel | 27037.639 | ICICI Bank | 4709.008 | TCS | 26.341 | ITC |
| 11 | 62.058 | Maruti Suzuki | 26631.818 | BHEL | 3759.408 | ICICI Bank | 26.163 | SAIL |
| 12 | 56.429 | Jindal Steel | 22541.479 | Tata Steel | 3551.987 | Wipro | 25.995 | BHEL |
| 13 | 51.141 | HDFC Bank | 22284.722 | Maruti Suzuki | 3356.997 | ITC | 24.743 | L & T |
| 14 | 44.441 | AXIS Bank | 20498.561 | GAIL | 3279.508 | BHEL | 24.319 | M & M |
| 15 | 43.641 | R Infra | 20103.323 | TCS | 2837.068 | Punjab Bank | 22.129 | Sun Pharma |
| 16 | 40.402 | TCS | 19321.860 | Wipro | 2741.463 | GAIL | 21.935 | ONGC |
| 17 | 39.050 | Tata Power | 18412.367 | Hindalco | 2331.295 | HDFC Fin – Hou | 21.173 | Punjab Bank |
| 18 | 38.127 | BPCL | 17935.067 | Infosys | 2109.831 | HDFC Bank | 20.969 | Tata Steel |
| 19 | 35.815 | Tata Motors | 17370.195 | HUL | 2109.374 | Hindalco | 20.525 | DLF |
| 20 | 35.024 | ICICI Bank | 15374.256 | ITC | 2076.529 | HUL | 19.894 | GAIL |
| 21 | 28.518 | Reliance Capital | 14131.292 | M & M | 1793.017 | Maruti Suzuki | 19.429 | Cipla |
| 22 | 26.103 | Siemens LTD | 12986.134 | HDFC Bank | 1740.368 | R Com | 19.113 | Maruti Suzuki |
| 23 | 25.343 | GAIL | 12859.714 | Hero Honda | 1682.702 | Tata Motors | 19.029 | HDFC Fin – HoU |
| 24 | 25.222 | M & M | 12545.295 | R Com | 1656.688 | AXIS Bank | 18.091 | JP Associate |
| 25 | 24.271 | Wipro | 12243.248 | Punjab Bank | 1529.360 | PGCI | 17.991 | Tata Motors |
| 26 | 21.635 | IDFC LTD | 12210.373 | Sterlite India | 1458.463 | Hero Honda | 17.357 | BPCL |
| 27 | 18.776 | Bharti Airtel | 9407.682 | HDFC FIN – HOU | 1389.586 | Ambuja Cement | 16.645 | RIL |
| 28 | 16.600 | HDFC Fin – Hou | 8970.503 | AXIS BANK | 1376.728 | BPCL | 14.879 | HDFC Bank |
| 29 | 15.724 | SAIL | 8391.432 | Siemens Ltd | 1339.324 | M & M | 14.567 | SBI |
| 30 | 15.031 | HCL | 8326.341 | IDEA | 1318.289 | ACC | 14.149 | IDFC Ltd |
| 31 | 14.787 | ABB | 8262.291 | R Infra | 1282.278 | JINDAL STEEL | 13.747 | NTPC |
| 32 | 14.780 | Hindalco | 7814.311 | ACC | 1238.711 | DLF | 12.663 | PGCI |
| 33 | 11.411 | Cipla | 7007.242 | Ambuja Cement | 1027.789 | JP Associate | 12.570 | IDEA |
| 34 | 10.710 | Ranbaxy | 6498.536 | JP Associate | 1022.159 | R Infra | 11.999 | Hindalco |
| 35 | 10.083 | HUL | 6411.829 | Tata Power | 963.741 | HCL | 11.443 | Reliance Capital |
| 36 | 9.563 | NTPC | 6293.366 | Jindal Steel | 954.379 | Sun Pharma | 10.307 | Tata Power |
| 37 | 9.308 | Sun | 6262.410 | ABB | 935.819 | Sterlite India | 9.678 | Kotak Bank |
| 38 | 9.116 | Ambuja Cement | 5458.643 | Suzlon Energy Ltd | 869.393 | Tata Power | 9.575 | R Infra |
| 39 | 9.057 | RPL | 5288.697 | PGCI | 865.983 | IDEA | 8.873 | ICICI Bank |
| 40 | 8.863 | ITC | 4872.749 | Ranbaxy | 833.966 | Cipla | 8.211 | Sterlite |
| 41 | 8.451 | R Com | 4822.363 | Cipla | 776.575 | Siemens Ltd | 6.439 | R Com |
| 42 | 8.324 | DLF | 3213.029 | HCL | 754.453 | IDFC LTD | 4.568 | Ranbaxy |
| 43 | 6.868 | Sterlite India | 2845.919 | IDFC LTD | 720.597 | Unitech Ltd | 1.275 | RPL |
| 44 | 6.373 | JP ASSOCIATE | 2837.652 | DLF | 698.367 | Reliance Capital | 0.000 | ABB |
| 45 | 5.589 | Unitech Ltd | 2691.805 | Sun Pharma | 435.098 | Ranbaxy | 0.000 | ACC |
| 46 | 5.019 | Kotak Bank | 2636.466 | Kotak Bank | 346.181 | Kotak Bank | 0.000 | AMBUJA CEMENT |
| 47 | 3.662 | PGCI | 2156.833 | Reliance Capital | 313.373 | ABB | 0.000 | AXIS BANK |
| 48 | 2.865 | IDEA | 2077.625 | Unitech Ltd | 176.498 | RPL | 0.000 | HCL |
| 49 | -0.037 | Cairne India | 2.911 | Cairne India Ltd | -6.747 | Cairne India Ltd | -0.091 | Cairne India Ltd |
| 50 | -0.805 | Suzlon | 2.850 | RPL | -147.129 | Suzlon | -0.536 | Suzlon |

Source: Data of company collected from www.Capitalline.com

INTERPRETATION

From the above table no.1 rank is based on weighted average of EPS, the SBI bank stands first is 124.835 which is followed by the Infosys, Punjab bank, RIL, ONGC, BHEL, Hero Honda, ACC, L&T, Tata steel, etc. On the basis of Weighted average of Sales RIL has highest rank is 151754.667 which is followed by BPCL, ONGC, SBI, SAIL, NTPC, L&T, Tata motors, Airtel, ICICI, etc. In respect of weighted average of Net profit ONGC becomes the first in its position 16206.389 which is followed by RIL, L&T, NTPC, SBI, Airtel, SAIL, Infosys, Tata steels, TCS, etc. According to return on net worth, HUL stands in rank one is 91.899 and HEROHONDA on next rank then followed by TCS, Unitech, Infosys, simens, Airtel, Jindal, Wipro, ITC, etc.

TABLE – 2: THE RANKING ARRIVED BASED ON AGGREGATE WEIGHTED AVERAGES

| COMPANY | Ranks in EPS, Sales, Net Profit, | | | Return on Network | |
|--|----------------------------------|-------|------------|-------------------|-------|
| | EPS | Sales | Net Profit | RONW | TOTAL |
| ONGC | 5 | 3 | 1 | 16 | 25 |
| Larsen & Toubro | 9 | 7 | 3 | 13 | 32 |
| Infosys Tech | 2 | 18 | 8 | 5 | 33 |
| RIL | 4 | 1 | 2 | 27 | 34 |
| SBI | 1 | 4 | 5 | 29 | 39 |
| BHEL | 6 | 11 | 14 | 12 | 43 |
| TCS | 16 | 15 | 10 | 3 | 44 |
| Bharti Airtel | 27 | 9 | 6 | 7 | 49 |
| Tata Steel | 10 | 12 | 9 | 18 | 49 |
| SAIL | 29 | 5 | 7 | 11 | 52 |
| Hero Honda | 7 | 23 | 26 | 2 | 58 |
| Punjab National Bank | 3 | 25 | 15 | 17 | 60 |
| Wipro | 25 | 16 | 12 | 9 | 62 |
| Maruti Suzuki India Ltd | 11 | 13 | 21 | 22 | 67 |
| GAIL (India) Ltd | 23 | 14 | 16 | 20 | 73 |
| Bharat Petroleum Corporation Ltd. | 18 | 2 | 28 | 26 | 74 |
| HUL | 35 | 19 | 20 | 1 | 75 |
| Tata Motors | 19 | 8 | 23 | 25 | 75 |
| NTPC | 36 | 6 | 4 | 31 | 77 |
| ICICI Bank | 20 | 10 | 11 | 39 | 80 |
| HDFC Bank | 13 | 22 | 18 | 28 | 81 |
| ITC | 40 | 20 | 13 | 10 | 83 |
| Jindal Steel | 12 | 36 | 31 | 8 | 87 |
| M & M | 24 | 21 | 29 | 14 | 88 |
| HDFC Fin – Hou | 28 | 27 | 17 | 24 | 96 |
| Siemens Ltd | 22 | 29 | 41 | 6 | 98 |
| Hindalco | 32 | 17 | 19 | 34 | 102 |
| ABB | 31 | 37 | 1 | 44 | 113 |
| AXIS Bank | 14 | 28 | 24 | 47 | 113 |
| ACC | 8 | 32 | 30 | 45 | 115 |
| R Infra | 15 | 31 | 34 | 38 | 118 |
| Tata Power | 17 | 35 | 38 | 36 | 126 |
| R Communications | 42 | 24 | 22 | 41 | 129 |
| Sun Pharmaceutical | 37 | 45 | 36 | 15 | 133 |
| Cipla | 33 | 41 | 40 | 21 | 135 |
| JP Associate | 44 | 34 | 33 | 25 | 136 |
| DLF | 42 | 44 | 32 | 19 | 137 |
| Unitech Ltd | 45 | 48 | 43 | 4 | 140 |
| IDFC Ltd | 26 | 43 | 42 | 30 | 141 |
| PGCI (Power Grid Corporation of India Ltd) | 47 | 39 | 25 | 32 | 143 |
| Ambuja Cement | 38 | 33 | 27 | 46 | 144 |
| Sterlite India | 43 | 26 | 37 | 40 | 146 |
| Reliance Capital | 21 | 47 | 44 | 35 | 147 |
| IDEA Cellular | 48 | 30 | 39 | 33 | 150 |
| HCL technology ltd | 30 | 42 | 35 | 48 | 155 |
| Ranbaxy Laboratories Ltd | 34 | 40 | 45 | 42 | 161 |
| Kotak Bank | 46 | 47 | 46 | 37 | 176 |
| Reliance Power Ltd | 39 | 50 | 48 | 43 | 180 |
| Suzlon Energy Ltd | 50 | 38 | 50 | 50 | 188 |
| Cairne India Ltd | 49 | 49 | 49 | 49 | 196 |

INTERPRETATION

On the grand total of the parameters from the above table no.2, ranks are disclosed that ONGC stands first, which is followed by LNT, Infosys, RIL, SBI, BHEL, TCS, Airtel, Tata steels, Sail, Hero Honda, Punjab National Bank, Wipro, Maruti, Gail, etc.,

*The above mentioned are top ranked securities.

TABLE - 3

| STOCKS | RETURN |
|---|-------------|
| Unitech Ltd | 128.1899396 |
| Reliance Capital | 69.21870372 |
| Tata Motors | 67.62084015 |
| IDFC Ltd | 59.853581 |
| Larsen & Toubro | 52.47982261 |
| SAIL | 48.98766952 |
| AXIS Bank | 47.70164887 |
| Tata Power | 44.84174059 |
| ICICI Bank | 42.8910775 |
| Sterlite India | 42.4331431 |
| Tata Steel | 41.7257453 |
| HDFC Fin – Hou | 41.07967426 |
| HCL technology Ltd | 39.7143373 |
| Cairne India Ltd | 39.25158276 |
| Kotak Bank | 38.9398116 |
| R Infra | 36.86669074 |
| Maruti Suzuki India Ltd | 35.65753712 |
| HDFC Bank | 35.32274241 |
| Hero Honda | 35.28564015 |
| Sun Pharmaceutical | 35.03378976 |
| SBI | 34.58814347 |
| ACC | 31.67543768 |
| Punjab National Bank | 30.95537808 |
| Cipla | 28.26783959 |
| ABB | 27.34668021 |
| Siemens Ltd | 25.59270603 |
| RIL | 24.20860552 |
| GAIL (India) Ltd | 23.77705178 |
| Bharti Airtel | 23.58622914 |
| JP Associate | 22.02018845 |
| NTPC | 21.36335307 |
| Wipro | 21.0023895 |
| HUL | 19.54928909 |
| Hindalco | 18.37560586 |
| Ranbaxy Laboratories Ltd | 14.70831256 |
| Infosys Tech | 12.13201698 |
| Bharat Petroleum Corporation Ltd. | 11.24970371 |
| Ambuja Cement | 11.20563009 |
| BHEL | 9.68444462 |
| ONGC | 9.40154794 |
| M & M | 7.22240497 |
| DLF | 5.34215616 |
| Jindal Steel | 2.20874897 |
| R Communications | -2.76144497 |
| IDEA Cellular | -6.87599119 |
| ITC | -7.92458089 |
| PGCI(Power Grid Corporation of India Ltd) | -8.34809202 |
| Reliance Power Ltd | -10.8979508 |
| TCS | -17.4228325 |
| Suzlon Energy Ltd | -27.7599395 |

INTERPRETATION

From the above table no.3, it is depicted that the security **Unitech** more than the half of the investment is earned annually is **128.18993960** which considers that it has the highest return among the selected securities.

TABLE-4

| STOCKS | σ_i^2 | BETA | B^2 | σ_m^2 | Systematic | Unsystematic |
|---|--------------|----------|-----------|--------------|------------|--------------|
| ABB | 10.060077 | 0.823569 | 0.678265 | 3.284849 | 2.227999 | 7.832078 |
| ACC | 5.718074 | 0.783355 | 0.613645 | 3.284849 | 2.015732 | 3.702342 |
| Ambuja Cement | 11.078562 | 0.745617 | 0.555944 | 3.284849 | 1.826193 | 9.252369 |
| Axis Bank | 9.705511 | 0.054936 | 0.003018 | 3.284849 | 0.009913 | 9.695597 |
| BHEL | 7.894703 | 1.608975 | 2.5888 | 3.284849 | 8.503817 | -0.609114 |
| Bharat Petroleum Corporation Ltd. | 6.866431 | 0.588148 | 0.345918 | 3.284849 | 1.136289 | 5.730142 |
| Bharti Airtel | 9.047526 | 0.155233 | 0.024097 | 3.284849 | 0.079156 | 8.96837 |
| Cairne India Ltd | 9.052882 | 0.950044 | 0.902584 | 3.284849 | 2.964853 | 6.088029 |
| Cipla | 6.913212 | 0.58832 | 0.346121 | 3.284849 | 1.136954 | 5.776258 |
| DLF | 8.293085 | 1.586738 | 2.517739 | 3.284849 | 8.270393 | 0.022692 |
| GAIL (India) Ltd | 6.799178 | 0.842969 | 0.710597 | 3.284849 | 2.334206 | 4.464973 |
| HCL technology Ltd | 10.333973 | 1.000139 | 1.000279 | 3.284849 | 3.285764 | 7.048209 |
| HDFC Bank | 5.721813 | 0.920333 | 0.847012 | 3.284849 | 2.782308 | 2.939506 |
| Hero Honda | 4.976923 | 0.547974 | 0.300275 | 3.284849 | 0.986359 | 3.990564 |
| Hindalco | 15.217519 | 1.215765 | 1.478085 | 3.284849 | 4.855288 | 10.362231 |
| HUL | 4.273614 | 0.568146 | 0.32279 | 3.284849 | 1.060318 | 3.213296 |
| HDFC Fin – Hou | 109.916128 | 0.996506 | 0.993024 | 3.284849 | 3.261934 | 106.654194 |
| IDFC Ltd | 15.187348 | 0.033589 | 0.001128 | 3.284849 | 0.003706 | 15.183641 |
| ITC | 11.544674 | 0.66762 | 0.445717 | 3.284849 | 1.464113 | 10.080561 |
| ICICI Bank | 9.679391 | 1.333076 | 1.777091 | 3.284849 | 5.837477 | 3.841914 |
| IDEA Cellular | 10.761334 | 1.034825 | 1.070862 | 3.284849 | 3.51762 | 7.243714 |
| Infosys Tech | 6.123996 | 0.74506 | 0.555114 | 3.284849 | 1.823465 | 4.300531 |
| Jindal Steel | 20.842149 | 5.029839 | 25.299279 | 3.284849 | 83.104318 | -62.262169 |
| JP Associate | 21.152833 | 1.648036 | 2.716022 | 3.284849 | 8.921723 | 12.23111 |
| Kotak Bank | 14.905484 | 1.195643 | 1.429561 | 3.284849 | 4.695893 | 10.209591 |
| Larsen & Toubro | 10.441743 | 1.117558 | 1.248935 | 3.284849 | 4.102564 | 6.339179 |
| M & M | 14.359888 | 0.136981 | 0.018764 | 3.284849 | 0.061636 | 14.298252 |
| Maruti Suzuki India Ltd | 5.7593 | 0.811118 | 0.657912 | 3.284849 | 2.161142 | 3.598159 |
| NTPC | 4.75351 | 0.803712 | 0.645953 | 3.284849 | 2.121857 | 2.631652 |
| ONGC | 9.718491 | 0.92327 | 0.852427 | 3.284849 | 2.800094 | 6.918396 |
| PGCI(Power Grid Corporation of India Ltd) | 5.427796 | 0.758664 | 0.575571 | 3.284849 | 1.890664 | 3.537131 |
| Punjab National Bank | 6.824818 | 0.056386 | 0.003179 | 3.284849 | 0.010444 | 6.814374 |
| Ranbaxy Laboratories Ltd | 9.397955 | 0.727323 | 0.528999 | 3.284849 | 1.737683 | 7.660272 |
| R Communications | 16.070169 | 1.416149 | 2.005477 | 3.284849 | 6.587691 | 9.482478 |
| RIL | 8.233647 | 1.157005 | 1.338661 | 3.284849 | 4.3973 | 3.836347 |
| R Infra | 13.004998 | 0.096277 | 0.009269 | 3.284849 | 0.030448 | 12.97455 |
| Reliance Capital | 15.268508 | 1.587295 | 2.519505 | 3.284849 | 8.276193 | 6.992315 |
| Reliance Power Ltd | 11.714845 | 1.070624 | 1.146236 | 3.284849 | 3.765211 | 7.949634 |
| Siemens LTD | 14.199269 | 1.058892 | 1.121251 | 3.284849 | 3.683141 | 10.516127 |
| SBI | 6.61241 | 1.057847 | 1.11904 | 3.284849 | 3.675879 | 2.936531 |
| SAIL | 11.309794 | 1.352698 | 1.829793 | 3.284849 | 6.010594 | 5.2992 |
| Sterlite India | 20.034977 | 1.354059 | 1.833477 | 3.284849 | 6.022694 | 14.012283 |
| Sun Pharmaceutical | 8.887598 | 0.489663 | 0.23977 | 3.284849 | 0.787609 | 8.099989 |
| Suzlon Energy Ltd | 21.298866 | 1.52667 | 2.330721 | 3.284849 | 7.656067 | 13.642798 |
| TCS | 9.006015 | 0.863378 | 0.745422 | 3.284849 | 2.448598 | 6.557417 |
| Tata Motors | 9.046375 | 1.109531 | 1.23106 | 3.284849 | 4.043847 | 5.002528 |
| Tata Power | 7.325653 | 0.959894 | 0.921397 | 3.284849 | 3.02665 | 4.299003 |
| Tata Steel | 10.615811 | 1.333962 | 1.779455 | 3.284849 | 5.845241 | 4.77057 |
| Unitech Ltd | 28.353737 | 1.390386 | 1.933174 | 3.284849 | 6.350185 | 22.003552 |
| Wipro | 8.858219 | 0.942564 | 0.888428 | 3.284849 | 2.918351 | 5.939869 |

INTERPRETATION

Tata steels has got highest risk among the securities, wherein total risk of HDFC Fin – Hou is 109.91612847617, in which systematic risk is 3.261934413997 and unsystematic risk is 106.65419406218. Second highest risk is Unitech, it has total risk of 28.353737290643 where 6.3501849619094 as systematic risk and 22.003552328734 as unsystematic risk. Third highest risk is Suzlon Energy, It has Total risk of 21.298865505544 where 7.6560674608552 as systematic risk and 13.64279804468 as unsystematic risk.

TABLE- 5

| COMPANY | Ri | Rf | BETA | Ri-Rf | Ri-Rf/ β | Rank |
|--|---------------|----|------------|---------------|----------------|------|
| IDFC Ltd | 264.46873946 | 6 | 0.03358943 | 258.46873946 | 7694.94273145 | 1 |
| NTPC | 1990.72215667 | 6 | 0.80371182 | 1984.72215667 | 2469.44504107 | 2 |
| Punjab National Bank | 133.72483952 | 6 | 0.05638617 | 127.72483952 | 2265.18024210 | 3 |
| AXIS Bank | 110.99902177 | 6 | 0.05493584 | 104.99902177 | 1911.30279467 | 4 |
| HUL | 738.72136113 | 6 | 0.56814650 | 732.72136113 | 1289.66976667 | 5 |
| ITC | 849.49501116 | 6 | 0.66762036 | 843.49501116 | 1263.43511883 | 6 |
| SAIL | 1284.13645871 | 6 | 1.35269841 | 1278.13645871 | 944.87910277 | 7 |
| ONGC | 731.43863151 | 6 | 0.92326974 | 725.43863151 | 785.72772441 | 8 |
| PGCI (Power Grid Corporation of India Ltd) | 495.44587513 | 6 | 0.75866406 | 489.44587513 | 645.14177357 | 9 |
| R Infra | 60.01998980 | 6 | 0.09627679 | 54.01998980 | 561.09046868 | 10 |
| Ambuja Cement | 368.88311832 | 6 | 0.74561659 | 362.88311832 | 486.68863269 | 11 |
| M & M | 69.93384779 | 6 | 0.13698067 | 63.93384779 | 466.73627453 | 12 |
| GAIL (India) Ltd | 339.72646460 | 6 | 0.84296945 | 333.72646460 | 395.89390069 | 13 |
| Bharti Airtel | 44.91465524 | 6 | 0.15523287 | 38.91465524 | 250.68565751 | 14 |
| Hero Honda | 121.01709966 | 6 | 0.54797382 | 115.01709966 | 209.89524592 | 15 |
| Wipro | 203.58006467 | 6 | 0.94256434 | 197.58006467 | 209.61971051 | 16 |
| HCL technology ltd | 214.61673399 | 6 | 1.00013926 | 208.61673399 | 208.58768683 | 17 |
| Tata Motors | 225.28639063 | 6 | 1.10953147 | 219.28639063 | 197.63873079 | 18 |
| Tata Steel | 267.40115372 | 6 | 1.33396210 | 261.40115372 | 195.95845663 | 19 |
| TCS | 168.64391483 | 6 | 0.86337811 | 162.64391483 | 188.38086538 | 20 |
| ICICI Bank | 253.16228647 | 6 | 1.33307592 | 247.16228647 | 185.40750962 | 21 |
| Bharat Petroleum Corporation Ltd. | 105.64686154 | 6 | 0.58814802 | 99.64686154 | 169.42480240 | 22 |
| Hindalco | 203.03152587 | 6 | 1.21576533 | 197.03152587 | 162.06378109 | 23 |
| RIL | 179.36779680 | 6 | 1.15700523 | 173.36779680 | 149.84184387 | 24 |
| SBI | 158.32223646 | 6 | 1.05784710 | 152.32223646 | 143.99267811 | 25 |
| Cipla | 86.97521142 | 6 | 0.58832019 | 80.97521142 | 137.63799547 | 26 |
| Siemens Ltd | 126.26840022 | 6 | 1.05889152 | 120.26840022 | 113.57952919 | 27 |
| Unitech Ltd | 160.97783012 | 6 | 1.39038625 | 154.97783012 | 111.46386876 | 28 |
| Infosys Tech | 86.64441652 | 6 | 0.74505956 | 80.64441652 | 108.23888511 | 29 |
| Sun Pharmaceutical | 56.31954583 | 6 | 0.48966338 | 50.31954583 | 102.76354726 | 30 |
| ACC | 80.49045237 | 6 | 0.78335507 | 74.49045237 | 95.09155634 | 31 |
| HDFC Fin – Hou | 94.25524361 | 6 | 0.99650593 | 88.25524361 | 88.56469476 | 32 |
| Larsen & Toubro | 94.14457831 | 6 | 1.11755770 | 88.14457831 | 78.87250796 | 33 |
| DLF | 127.63289567 | 6 | 1.58673844 | 121.63289567 | 76.65592053 | 34 |
| HDFC Bank | 71.41161990 | 6 | 0.92033270 | 65.41161990 | 71.07388466 | 35 |
| Maruti Suzuki India Ltd | 53.84373223 | 6 | 0.81111772 | 47.84373223 | 58.98494253 | 36 |
| Tata Power | 61.81545157 | 6 | 0.95989417 | 55.81545157 | 58.14750584 | 37 |
| Sterlite India | 83.58914282 | 6 | 1.35405932 | 77.58914282 | 57.30113998 | 38 |
| Reliance Capital | 96.19811405 | 6 | 1.58729476 | 90.19811405 | 56.82505644 | 39 |
| JP Associate | 92.03347141 | 6 | 1.64803585 | 86.03347141 | 52.20364065 | 40 |
| Ranbaxy Laboratories Ltd | 35.66181060 | 6 | 0.72732337 | 29.66181060 | 40.78214998 | 41 |
| Cairne India Ltd | 39.25158276 | 6 | 0.95004434 | 33.25158276 | 35.00003246 | 42 |
| Kotak Bank | 45.73446134 | 6 | 1.19564254 | 39.73446134 | 33.23272630 | 43 |
| R Communications | 47.89465692 | 6 | 1.41614876 | 41.89465692 | 29.58351408 | 44 |
| BHEL | 41.44958856 | 6 | 1.60897476 | 35.44958856 | 22.03240807 | 45 |
| ABB | 13.08898107 | 6 | 0.82356851 | 7.08898107 | 8.60763981 | 46 |
| Jindal Steel | 6.95965958 | 6 | 5.02983884 | 0.95965958 | 0.19079330 | 47 |
| IDEA Cellular | -6.87599119 | 6 | 1.03482457 | -12.87599119 | -12.44268026 | 48 |
| Reliance Power Ltd | -10.89795083 | 6 | 1.07062393 | -16.89795083 | -15.78327400 | 49 |
| Suzlon Energy Ltd | -21.26104595 | 6 | 1.52666993 | -27.26104595 | -17.85654216 | 50 |

INTERPRETATION

Based on risk return analysis as per Sharpe model optimal portfolio construction IDFC has the highest ratio, followed by NTPC, PNB, AXIS Bank, HUL, ITC, SAIL, ONGS, PGCI, R Infra, Ambuja Cement, M&M, GAIL, Bharati Airtel, and Hero Honda etc.

The above table 4 discloses that the higher the risk premium to beta, the higher the efficiency. IDFC stands first in the ranking of (i.e. excess of return over risk free return to beta) risk premium to beta because of the highest. This is followed by NTPC, PNB, AXIS BANK, HUL, ITC, SAIL, ONGC, PGCI, R INFRA, etc.

CONTINUE...

| COMPANY | (Ri- Rf) β/σ_{ei2} | $\sum(Ri-Rf) \beta/\sigma_{ei2}$ | β^2/σ_{ei2} | $\sum \beta^2/\sigma_{ei2}$ | σ_{m2} | $\sigma_{m2}\sum(Ri-Rf)\beta/\sigma_{ei2}$ | $\sigma_{m2}\sum(\beta^2/\sigma_{ei2})$ | Ci |
|--|-------------------------------|----------------------------------|------------------------|-----------------------------|---------------|--|---|-------------|
| IDFC Ltd | 0.57178758 | 0.572 | 0.00007431 | 0.00007431 | 3.28484929 | 1.878236028 | 0.000244087 | 1.877777687 |
| NTPC | 606.13804460 | 607 | 0.24545517 | 0.24552947 | 3.28484929 | 1992.950362 | 0.806527318 | 1103.194146 |
| Punjab National Bank | 1.05687101 | 608 | 0.00046657 | 0.24599605 | 3.28484929 | 1996.422024 | 0.808059938 | 1104.179116 |
| AXIS Bank | 0.59493079 | 608 | 0.00031127 | 0.24630732 | 3.28484929 | 1998.376282 | 0.809082413 | 1104.635293 |
| HUL | 129.55328837 | 738 | 0.10045462 | 0.34676194 | 3.28484929 | 2423.939309 | 1.139060705 | 1133.179298 |
| ITC | 55.86340057 | 794 | 0.04421549 | 0.39097743 | 3.28484929 | 2607.442161 | 1.28430192 | 1141.461266 |
| SAIL | 326.26305336 | 1120 | 0.34529608 | 0.73627351 | 3.28484929 | 3679.16712 | 2.418547514 | 1076.236941 |
| ONGC | 96.81080851 | 1217 | 0.12321165 | 0.85948516 | 3.28484929 | 3997.176036 | 2.823279212 | 1045.483684 |
| PGCIL(Power Grid Corporation of India Ltd) | 104.97914057 | 1322 | 0.16272259 | 1.02220775 | 3.28484929 | 4342.016691 | 3.357798398 | 996.378514 |
| R Infra | 0.40085177 | 1322 | 0.00071442 | 1.02292216 | 3.28484929 | 4343.333429 | 3.360145145 | 996.1442302 |
| Ambuja Cement | 29.24350236 | 1351 | 0.06008668 | 1.08300884 | 3.28484929 | 4439.393927 | 3.557520821 | 974.0808877 |
| M & M | 0.61250153 | 1352 | 0.00131231 | 1.08432115 | 3.28484929 | 4441.405902 | 3.561831554 | 973.6014691 |
| GAIL (India) Ltd | 63.00625617 | 1415 | 0.15914935 | 1.24347050 | 3.28484929 | 4648.371958 | 4.084613177 | 914.2036565 |
| Bharti Airtel | 0.67357096 | 1416 | 0.00268691 | 1.24615741 | 3.28484929 | 4650.584537 | 4.093439286 | 913.0538868 |
| Hero Honda | 15.79384887 | 1432 | 0.07524634 | 1.32140375 | 3.28484929 | 4702.464951 | 4.34061217 | 880.5104735 |
| Wipro | 31.35286772 | 1463 | 0.14957023 | 1.47097398 | 3.28484929 | 4805.454396 | 4.831927825 | 823.990718 |
| HCL technology Ltd | 29.60266796 | 1493 | 0.14191954 | 1.61289351 | 3.28484929 | 4902.694699 | 5.298112116 | 778.4387779 |
| Tata Motors | 48.63644147 | 1541 | 0.24608760 | 1.85898112 | 3.28484929 | 5062.458079 | 6.106472803 | 712.3728211 |
| Tata Steel | 73.09383518 | 1614 | 0.37300679 | 2.23198791 | 3.28484929 | 5302.560312 | 7.331743898 | 636.4286249 |
| TCS | 21.41440601 | 1636 | 0.11367612 | 2.34566403 | 3.28484929 | 5372.903408 | 7.705152822 | 617.2095445 |
| ICICI Bank | 85.76092565 | 1721 | 0.46255368 | 2.80821771 | 3.28484929 | 5654.615124 | 9.224571946 | 553.0417463 |
| Bharat Petroleum Corporation Ltd. | 10.22786259 | 1732 | 0.06036815 | 2.86858586 | 3.28484929 | 5688.212111 | 9.422872234 | 545.7432446 |
| Hindalco | 23.11703895 | 1755 | 0.14264161 | 3.01122747 | 3.28484929 | 5764.1481 | 9.891428432 | 529.2371094 |
| RIL | 52.28604796 | 1807 | 0.34894157 | 3.36016904 | 3.28484929 | 5935.899887 | 11.03764889 | 493.1112329 |
| SBI | 54.87210983 | 1862 | 0.38107569 | 3.74124474 | 3.28484929 | 6116.146499 | 12.28942512 | 460.2265669 |
| Cipla | 8.24744231 | 1870 | 0.05992126 | 3.80116600 | 3.28484929 | 6143.238104 | 12.48625743 | 455.5183775 |
| Siemens LTD | 12.11008426 | 1882 | 0.10662207 | 3.90778807 | 3.28484929 | 6183.017905 | 12.83649486 | 446.863022 |
| Unitech Ltd | 9.79292072 | 1892 | 0.08785736 | 3.99564542 | 3.28484929 | 6215.186174 | 13.12509303 | 440.0102826 |
| Infosys Tech | 13.97150586 | 1906 | 0.12908028 | 4.12472570 | 3.28484929 | 6261.080465 | 13.5491023 | 430.3413596 |
| Sun Pharmaceutical | 3.04193498 | 1909 | 0.02960130 | 4.15432701 | 3.28484929 | 6271.072763 | 13.64633812 | 428.1665977 |
| ACC | 15.76096141 | 1925 | 0.16574512 | 4.32007213 | 3.28484929 | 6322.845146 | 14.19078586 | 416.2289695 |
| HDFC Fin – Hou | 0.82459836 | 1926 | 0.00931069 | 4.32938282 | 3.28484929 | 6325.553827 | 14.22137007 | 415.5705956 |
| Larsen & Toubro | 15.53933869 | 1941 | 0.19701844 | 4.52640126 | 3.28484929 | 6376.598213 | 14.86854597 | 401.8388469 |
| DLF | 8505.10238449 | 10446 | 110.95166982 | 115.47807108 | 3.28484929 | 34314.57775 | 379.3280599 | 90.22362893 |
| HDFC Bank | 20.47978686 | 10467 | 0.28814785 | 115.76621893 | 3.28484929 | 34381.85076 | 380.2745821 | 90.17608928 |
| Maruti Suzuki India Ltd | 10.78521087 | 10478 | 0.18284685 | 115.94906578 | 3.28484929 | 34417.27855 | 380.8752065 | 90.12703095 |
| Tata Power | 12.46263903 | 10490 | 0.21432801 | 116.16339379 | 3.28484929 | 34458.21644 | 381.5792417 | 90.06818115 |
| Sterlite India | 7.49772925 | 10498 | 0.13084782 | 116.29424161 | 3.28484929 | 34482.84535 | 382.009057 | 90.03140975 |
| Reliance Capital | 20.47547815 | 10518 | 0.36032482 | 116.65456643 | 3.28484929 | 34550.10421 | 383.1926698 | 89.92910832 |
| JP Associate | 11.59226350 | 10530 | 0.22205853 | 116.87662495 | 3.28484929 | 34588.18305 | 383.9220986 | 89.85761842 |
| Ranbaxy Laboratories Ltd | 2.81631356 | 10532 | 0.06905751 | 116.94568246 | 3.28484929 | 34597.43422 | 384.1489421 | 89.82871414 |
| Cairne India Ltd | 5.18895032 | 10538 | 0.14825559 | 117.09393804 | 3.28484929 | 34614.47914 | 384.6359393 | 89.75947418 |
| Kotak Bank | 4.65329226 | 10542 | 0.14002138 | 117.23395943 | 3.28484929 | 34629.7645 | 385.0958885 | 89.69213488 |
| R Communications | 6.25670469 | 10549 | 0.21149295 | 117.44545238 | 3.28484929 | 34650.31683 | 385.7906109 | 89.58417256 |
| BHEL | -93.64009092 | 10455 | -4.25010696 | 113.19534541 | 3.28484929 | 34342.72325 | 371.8296501 | 92.11371263 |
| ABB | 0.74542940 | 10456 | 0.08660091 | 113.28194632 | 3.28484929 | 34345.17187 | 372.114121 | 92.05004565 |
| Jindal Steel | -0.07752594 | 10456 | -0.40633469 | 112.87561163 | 3.28484929 | 34344.91721 | 370.7793728 | 92.37983525 |
| IDEA Cellular | -1.83944192 | 10454 | 0.14783325 | 113.02344489 | 3.28484929 | 34338.87492 | 371.2649828 | 92.24309702 |
| Reliance Power Ltd | -2.27574644 | 10451 | 0.14418722 | 113.16763211 | 3.28484929 | 34331.39944 | 371.7386161 | 92.10582955 |
| Suzlon Energy Ltd | -3.05059262 | 10448 | 0.17083893 | 113.33847104 | 3.28484929 | 34321.3787 | 372.2997962 | 91.94052354 |

INTERPRETATION

Based on Sharpe's model optimal portfolio construction the first six securities have been chosen as they are in ascending order, there after it has been declining. The first six securities namely IDFC, NTPC, PNB, AXIS BANK, HUL, ITC have been consider for portfolio construction.

Table No6 speaks that C* helps in determining cut-off point at which securities listed from above will be selected for portfolio construction. While calculating C* as per Sharpe model, only first six securities namely IDFC, NTPC, PNB, AXIS BANK, HUL, and ITC are selected for building Optimum Portfolio Construction. The C* increases from 1.877777687 to 1141.461266 and thereafter it decreases. Hence, IDFC TO ITC securities are chosen.

TABLE- 6

| COMPANY | β/σ_{ei}^2 | $[(R_i - R_f)/\beta - C_i]$ | Zi | Xi |
|--------------------------|-----------------------|-----------------------------|-------------|-------------|
| IDFC Ltd | 0.002212212 | 7693.064954 | 17.01868863 | 0.035148111 |
| NTPC | 0.305401964 | 1366.250895 | 417.2557066 | 0.86174384 |
| Punjab National Bank | 0.008274593 | 1161.001126 | 9.606811326 | 0.019840617 |
| Axis Bank | 0.00566606 | 806.6675012 | 4.570626681 | 0.009439558 |
| HUL | 0.176811125 | 156.4904682 | 27.66925578 | 0.057144361 |
| ITC | 0.06622849 | 121.9738532 | 8.078144065 | 0.016683513 |
| SAIL | 0.255264648 | -131.3578385 | | |
| ONGC | 0.13345141 | -259.7559598 | | |
| PGCI | 0.214485699 | -351.2367404 | | |
| R Infra | 0.007420434 | -435.0537615 | | |
| Ambuja Cement | 0.08058656 | -487.392255 | | |
| M & M | 0.009580239 | -506.8651945 | | |
| GAIL (India) Ltd | 0.188796104 | -518.3097559 | | |
| Bharti Airtel | 0.017308928 | -662.3682293 | | |
| Hero Honda | 0.137317398 | -670.6152275 | | |
| Wipro | 0.158684368 | -614.3710075 | | |
| HCL technology ltd | 0.141899777 | -569.8510911 | | |
| Tata Motors | 0.221794163 | -514.7340903 | | |
| Tata Steel | 0.279623231 | -440.4701683 | | |
| TCS | 0.131664354 | -428.8286791 | | |
| ICICI Bank | 0.346982247 | -367.6342366 | | |
| BPCL | 0.102641091 | -376.3184422 | | |
| Hindalco | 0.1173266 | -367.1733283 | | |
| RIL | 0.301590312 | -343.269389 | | |
| SBI | 0.360237028 | -316.2338888 | | |
| Cipla | 0.101851445 | -317.880382 | | |
| Siemens Ltd | 0.100692154 | -333.2834928 | | |
| Unitech Ltd | 0.063189172 | -328.5464138 | | |
| Infosys Tech | 0.173248273 | -322.1024745 | | |
| Sun Pharmaceutical | 0.060452354 | -325.4030504 | | |
| ACC | 0.211583645 | -321.1374132 | | |
| HDFC Fin – Hou | 0.009343336 | -327.0059008 | | |
| Larsen & Toubro | 0.176293755 | -322.9663389 | | |
| DLF | 69.92436 | -13.5677084 | | |
| HDFC Bank | 0.31309096 | -19.10220462 | | |
| Maruti Suzuki India Ltd | 0.225425784 | -31.14208842 | | |
| Tata Power | 0.223282956 | -31.92067531 | | |
| Sterlite India | 0.096633743 | -32.73026977 | | |
| Reliance Capital | 0.227005613 | -33.10405187 | | |
| JP Associate | 0.13474132 | -37.65397776 | | |
| Ranbaxy Laboratories Ltd | 0.094947459 | -49.04656416 | | |
| Cairne India Ltd | 0.156051228 | -54.75944172 | | |
| Kotak Bank | 0.117109736 | -56.45940857 | | |
| R Communications | 0.149343739 | -60.00065848 | | |
| BHEL | -2.641500077 | -70.08130456 | | |
| ABB | 0.10515325 | -83.44240584 | | |
| Jindal Steel | -0.080784832 | -92.18904195 | | |
| IDEA Cellular | 0.142858277 | -104.6857773 | | |
| Reliance Power Ltd | 0.134675883 | -107.8891035 | | |
| Suzlon Energy Ltd | 0.111902993 | -109.7970657 | | |

INTERPRETATION

As per Sharpe model, out of total investment 86.174% of total funds will be invested in NTPC. The second highest amount of investment made in HUL (5.714%) followed by IDFC (3.515%), PNB (1.984%), ITC (1.668%), AXIS BANK (0.944%).

The table No. speaks that Xi indicates percentage of funds to be distributed to six chosen securities. Out of the total investment, nearly 86.174% of funds is to be invested in NTPC, 5.714% in HUL, 3.515% in IDFC, 1.984% in PNB, 1.668% in ITC and 0.944% in AXIS BANK.

FINDINGS AND CONCLUSION**FINDINGS**

1. ONGC Stand First Rank on the basis of the aggregate weighted average of EPS, Sales, Net profit, and RONW and Cairne India has the least rank.
2. On total return of securities, The Unitech Ltd company in Cement industry top in getting the highest returns followed by R-Capital, Tata motors, IDFC.
3. Based on Risk premium to beta ratio, IDFC Ltd.stands top in this ratio, which has been the for building Sharpe model. This has been followed by NTPC,PNB, AXIS BANK, HUL, and ITC.
4. On division of total risk between Systematic and Unsystematic risk, The HDFC Fin-Hou company has the highest amount of systematic risk and its unsystematic risk, is only 109.91612847617.The HUL company has the least systematic risk of 1.060317957227 and unsystematic risk of 3.21329609127.
5. IDFC, NTPC, PNB, AXIS Bank, HUL, & ITC are selected for building Optimum Portfolio Construction. The C* increases from 1.877777687 to 1141.461266 and thereafter it decreases. Hence, IDFC to ITC securities are chosen.
6. Lion's share of total investment is to be made in NTPC.This is followed by HUL hardly about 5% and the rest are negligible.

CONCLUSION

The returns obtained by each of the companies and β_i , the sensitiveness of the stock return of the changes in the market returns is observed as shown in the above table. Also the portion in which the securities be invested to optimum return is also calculated and represented.

It is being assumed that casual observation of the stock prices over a period of time reveals that most the stock prices move the market index. When the S&P CNX Nifty increases, stock prices also tend to increase and vice-versa. This indicates that some underlying factors affect the market index as well as the stock prices. Stock prices are related to the market index and this relationship could be used to estimate the return on stock

Keeping all these assumptions in mind this portfolio has been constructed giving due consideration to the past five years performance of all the S&P CNX Nifty companies.

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