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A Study on Practical Evaluation of Portfolio Creation Using Nifty

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ABSTRACT

The main purpose of this paper is to construct an optimal portfolio by using Sharpe's single-index model. For this purpose the monthly closing prices of 164 companies listed in Dhaka Stock Exchange (S&P CNX NIFTY) and S&P CNX NIFTY all share price index for the period of July 2007 to June 2012 have been considered. The proposed method formulates a unique cut off point (Cut off rate of return), selects stocks having excess return to beta ratio surpassing this cut off point, and determines the percentage of investment in each of selected stocks. The optimum portfolio consists of ten stocks selected out of 50 stocks, giving the moderate return. The findings of this paper will be useful for policy makers, all kinds of investors, corporations and other financial market- participants.

KEYWORDS :

1. Introduction

It's a complicated task of selecting good investments by considering the trade-off between risk and return along with the combination of various types of investments for the investors. A rational investor always seeks to minimize risks and maximize returns on his investment in an optimal portfolio. For this purpose investors ought to maximize the level of return at a given level of risk and alternatively to minimize the level of risk at a given level of return. This is done through the construction of portfolio of assets which is subject to the investor's portfolio. The study's significance arises from the fact that the application of the fundamental models develops an offer to investors for making decision in the choice of optimal portfolios in the NSE Stock Exchange (S&P CNX NIFTY). The rational of the study is to apply theoretical framework of portfolio management on a real world scenario and to form a well-balanced optimized and diversified portfolio of stocks. Implementation of Markowitz model is much more time-consuming and more complex by the number of estimates required. The sheer number of inputs is staggering. Recognition of this has motivated the search for the development of models. Although the majority of the studies were carried out in developed countries, only a limited number of studied were conducted in developing countries. The study attempts to find out the optimal portfolio using single index model.

1.1 Problem Statement

Statement of the problem of this research is to help investors to make the investment decision using the analysis to evade problems like difficulty in data input, enlightening portfolio managers, and time-cost contemplation.

1.2 Objectives of the Study

- To analyse the market specific risk of the selected stock
- To evaluate the optimal portfolio to minimize the risk to the maximum level

1.3 Hypothesis of the Study

- There is no significant difference between the risk and the return of the selected stock
- There is no significant difference between the risk and the portfolio of the selected stock

2. Literature Review

According to Terol et al. (2006) Markowitz model is a conventional model proposed to solve the portfolio selection problems by assuming that the situation of stock markets in the future can be characterized by the past asset data. However, it is difficult to ensure the accuracy of this traditional assuming because of the large number of extensions to problems of the traditional portfolio selection. As for SIM model, it includes fuzzy betas obtained not only from statistical data but also from expert knowledge. In addition, Briec & Kerstens (2009) stated that Markowitz model contributes in geometric mean optimization advocated for long term investments. On the other hand, the SIM models are no longer good approximations to multi period.

Chitnis (2010) optimized two portfolios using single index model, compared them, and he found out that portfolios tend to spread risk over many securities and thus help to reduce the overall risk involved. "The greater the portfolio's Sharpe's ratio, the better is its performance."

Nanda, Mahanty, and Tiwari (2012) selected stocks from the clusters to build a portfolio, minimizing portfolio risk and compare the returns with that of the benchmark index i.e. Sensex. Saravanan and Natarajan (2012) used Sharpe single index model in order to construct an optimal portfolio of 4 companies from NSE (National Stock Exchange of India) and used NSE NIFTY as market index.

Meenakshi and Sarita (2012) stated that Sharpe's single index model is of great importance and the framework of Sharpe's single index model for optimal portfolio construction is very simple and useful. Most of the studies were carried out in developed countries, only a few numbers of studies were conducted in developing countries especially in Bangladesh. Kamal (2012), during and after the bubble burst no stock took part on an optimal portfolio. This is because of that the most stocks were as risky as market and market return was negative after bubble burst. Hence stocks were selected randomly listed in NSE Stock Exchange to construct a well rationalized and diversified portfolio using single index model. The study covers only 16 securities to conclude a decision. It covers only 6.80% data that is quite unsatisfactory to make an investment decision.

3. Methodology and Data

3.1 Data Source

This paper aims at creation of optimal portfolio by using Sharpe's single-index model. For this purpose daily closing price of the shares and daily closing index value of the stock market index (S&P CNX Nifty) have been used for the period from July 2007 to June 2012. They were collected from NSE Stock Exchange. This study takes 15 companies listed in S&P CNX Nifty. The study has used secondary data because it pertains to historical analysis of reported financial data. Auction of 91 days Treasury bill has been used as proxy for risk-free rate sourced from "State Bank of India". The collected data were consolidated as per study requirements. Various statistical tools have been used to analyze data through Microsoft Excel software.

The companies that are listed and traded but stopped operations during the time frame are excluded.

3.2 Limitations of the Research

This paper attempts to construct an optimal portfolio by using Sharpe's single-index model and thereby helps to make investment decisions. The current study however has some limitations. This study did not take into consideration the companies that are not listed on the S&P CNX NIFTY and the companies that are listed and traded but stopped operations. This study used daily data rather than monthly/yearly data. This study has successfully constructed an optimal portfolio consisting of 10 securities among various sectors; future research may concentrate

on portfolio selection models and the development of new portfolio selection models and policies.

3.3 Tools Used

3.3.1 Sharpe's Single Index Model

William Sharpe (1963) studied Markowitz's research and worked on simplifying the calculations in order to develop a practical use of the model. The single index model assumes that co-movement between stocks is due.

4. Data Analysis and Findings

Firstly the securities are ranked according to their excess return to beta ratio from highest to lowest. Among 15 companies 3 companies offer less return then risk free rate. And then Ci is calculated in order to find out the optimum Ci. The highest Ci value is considered as the optimum Ci. And this is known as the cut-off point C*

Table 1: Optimal Portfolio from Selected Companies (July 2007 to June 2012)

Security Name	Ri -Rf)/ βi	[(Ri -Rf)*βi] 2/Ϭ ei	Σ[[(Ri -Rf)*βi] 2/Ϭ ei]	βi 2 /Ϭ 2 ei	22Σ(βi /Ϭ ei)	Ci
NIFTY	0.0509	0.2338	5.0283	6.0123	56.6641	0.0360
ACC	0.0675	0.6594	5.6117	7.4942	65.1714	0.0334
AMBUJACEM	0.0588	0.8938	6.2666	3.8686	74.7535	0.0352
AXISBANK	0.0668	0.5653	6.8198	12.0493	83.0360	0.0367
BAJAJ-AUTO	0.0587	0.2508	7.1125	10.1821	88.0239	0.0372
BHEL	0.0577	0.1896	7.5449	16.0001	95.5181	0.0380
BPCL	0.0576	0.3603	7.7677	4.8050	99.3866	0.0384
BHARTIARTL	0.0572	0.0631	8.4566	7.4860	111.4360	0.0394
CAIRN	0.0557	0.3160	9.0241	5.5805	121.6181	0.0422
CIPLA	0.0542	0.6488	9.8918	7.3533	137.6182	0.0422
DLF	0.0534	0.2002	10.1483	15.4111	142.4232	0.0413
DRREDDY	0.0530	0.7619	10.5447	4.2169	149.9092	0.0417
GAIL	0.0527	0.2395	10.8391	13.2681	155.4897	0.0422
GRASIM	0.0523	0.1979	11.2239	4.1604	162.8430	0.0422

From the table 1 it can be seen that among 235 companies the optimum portfolio consists of investing in 33 companies for which (Ri - Rf) /βi is greater than a particular cut off point C*. Here, the cut-off rate is 0.0422.

Table 2: Portfolio Risk and Return from Selected Companies (July 2007 to June 2012)

No.	Name of Company	Securities (%)	Return(%)	Beta
1	NIFTY	16.43	7.12	0.4828
2	ACC	11.10	5.24	0.4916
3	AMBUJACEM	9.34	7.51	0.5959
4	AXISBANK	8.51	5.73	0.2918
5	BAJAJ-AUTO	6.05	8.53	0.9293
6	BHEL	6.00	5.98	0.5228
7	BPCL	4.40	4.18	0.5675
8	BHARTIARTL	4.20	6.32	0.5501
9	CAIRN	3.13	5.36	0.8162
10	CIPLA	2.90	9.23	1.2134
11	DLF	2.71	8.91	1.1629
12	DRREDDY	2.46	4.65	0.6428
13	GAIL	2.41	8.82	1.1802
14	GRASIM	2.33	5.28	0.8362

Table 1 and 2 clearly explain the results of empirical analysis. Only those securities are desirable in the portfolio, which have positive excess return over risk free return. Portfolio return and portfolio risk have found out respectively 6.17% and 8.76%. The result shows that portfolio beta is significantly lower than the market beta and portfolio return is much higher than the portfolio variance. The results are almost similar to the earlier results. All the securities which have excess return to beta ratio more than the cut-off point are included in the portfolio. Such portfolio is the optimum portfolio and the securities included in the portfolio are the efficient securities.

5. Conclusion

Risk and return play an important role in making any investment decisions. This study aims at analyzing the opportunity that are available for investors as per as returns are concerned and the investment of risk thereof while investing in equity of firms listed in the stock exchange. Sharpe's single-index model was applied by using the daily closing prices of 15 companies listed in S&P CNX Nifty. From the empirical analysis, it can be said that data coverage of this paper is moreover satisfactory to make an investment decision because it covers almost 90% of data. Out of 15 companies taken for the study, 7 companies are showing negative returns and the other 8 companies are showing positive returns. Out of 15 companies, 10 companies where market beta is above 1, show that the investments in these stocks are outperforming than the market. The study shows that portfolio beta is significantly lower than the market beta and portfolio return is much higher than the portfolio variance. And the framework of Sharpe's single index model for optimal portfolio creation is very simple and useful. The results are almost similar to the earlier results (Mokta Rani Sarker 2013). From this empirical analysis, to some extent one can able to forecast individual security's return through the market movement and can make use of it.

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