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A study on optimal portfolio construction using sharpes single index model with special preference to selected sectors listed in NSE

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Abstract
The study focus on optimal portfolio construction using Sharpe's single index model with special reference to selected sectors such as banking, automobile and financial sectors. For this purpose a sample of fifteen companies have been taken. Five companies from each sector listed in NSE been selected .Calculating the cut-off values using all the collected data. On the basis of the cut-off values to know which securities are performing highly well and which are performing low in the market .The study findings are useful to policy makers, investors and participants of financial markets.

Keywords: Portfolio, Sharpe index, Risk & Return

Introduction
Investment in more than one security has been discussed always in portfolio management, which includes the security evaluation and the optimal portfolio. Finally it deals with how many securities have to be included in constructing an optimal portfolio**.**
Harry Markowitz's Modern portfolio theory provides the information which an investor needs, but calculations procedure is difficult to get the portfolio which will give maximum return with a given rate of risk. This model has some practical difficulties. So in order to avoid those difficulties Sharpe's model is using. According to Sharpe index model Stock values are related to the market index and this relationship could be used to calculate the return on stock.

Statement of the problem
The present study is prepared on the basis of studying the sectors in which an investor can invest their savings in any securities or portfolio. By constructing a portfolio an investor gets maximum returns with a minimum rate of risk. Portfolio management is about the analysis of individual securities as well as with the theory and practice of optimally combining securities into good portfolios. Therefore, the present study is entitled as "Construction of Optimal Portfolio using Sharpe's single Index model- A study with special reference to selected sectors listed in NSE".

Significance of the study
It serves as a guide to select optimal portfolio out of the top performing sectors. In the present situation due to increased competition in industry there is a need to improve its efficiency and performance. For this purpose, a thorough analysis of the financial statement of the company inevitable. Mean return of the company's stock and cut – off values are calculated, which is considered to be the effective tool for analyzing the financial statements.

Objectives of the study
- To build an optimal portfolio using Sharpe's Single Index Model
- To calculate the proportion of investment to be made in each of the stock that is included in the optimal portfolio.
- To get a practical knowledge as to the idea embedded in Sharpe's index model.
- To know which securities are performing highly well and which are performing low in the market.

Limitations of the study
The following are the limitations of the study,
- The study is purely based on secondary data.
- This study is based on monthly data, not on yearly data.
- The study shows the market prices but the causes of performance are not analyzed.
- The results of the study may not be universally applicable.
- Due to time limit only three years data have been taken.
- Only Fifteen companies have been selected for conducting this study.

Research Methodology
Research means search of knowledge. Sometimes it may refer to scientific and systematic research for pertinent information of a topic. Research methodology is a way to systematically solve the research problem.

Sources of Data
This study is purely based on secondary data obtained from the website www.moneycontrol.com. Only fifteen companies listed in the NSE nifty index were selected for the study.

Period of Study
For the purpose of analysis the study period has been chosen for three years of the period from 2013-2015.

Tools used for data analysis

i) The equation to be used for calculating the stock return is

$$Ri = \frac{(Pt-Po) \times 100}{Po}$$

Where Pt=current year price, Po=previous year price

ii) Equation used for calculating excess return to beta ratio is

$$\frac{(Ri-Rf)}{\beta i}$$

Where Ri=the expected return of stock I, Rf=risk free rate of return, βi=systematic risk of stock i

iii) Cut-off rate (Ci) is calculated using the following equation

$$C_i = \frac{\sigma_m^2 \sum_{i=1}^{N} \frac{(R_i - R_f)}{\sigma_{ei}^2} \times \beta_i}{1 + \sigma_m^2 \sum_{i=1}^{N} \frac{\beta_i^2}{\sigma_{ei}^2}}$$

Where σ2m = market index variance, σ2ei= unsystematic risk of stocks

Data Analysis and Interpretation

Table 1: Companies with Mean Return and Beta Values

No.	Name of companies	Mean return	Beta values
1.	Axis bank	2.78	1.89
2.	HDFC bank	6.24	0.98
3.	ICICI bank	0.78	1.76
4.	Kotak Mahindra bank	2.86	1.03
5.	SBI bank	1.36	1.55
6.	Ashok Leyland	5.63	1.58
7.	Bajaj autos	1.62	0.99
8.	Mahindra & Mahindra	4.96	0.87
9.	Maruti Suzuki	5.59	1.23
10.	Tata motors	-0.62	1.27
11.	IFCI limited	0.12	1.99
12.	DSP gilts limited	4.80	0.99
13.	Housing development finance corporation	2.30	1.12
14.	LIC finance limited	2.08	1.75
15.	Reliance limited	1.73	1.06

Source: Mean return values calculated by the author and beta values obtained from company's website.

Interpretation

The above table 1.1 shows the list of sample companies selected for this study, their mean return and beta values. A beta value below **1** indicates either an investment in stocks with lower volatility than the market, or a volatile investment whose price movements are not highly correlated with the highest beta value of 1.99 which means it is highly volatile than the market. Axis Bank (1.89), ICICI Bank (1.76), SBI Bank (1.55), Ashok Leyland (1.58), Maruti Suzuki (1.23), Tata Motors (1.27), HDFC Bank (1.12), LIC Finance Limited (1.75), Reliance Limited (1.06) have the beta values greater than 1, which means they are also volatile than the market. Mahindra &Mahindra having lowest beta value of 0.87.

Table 2: Ranking of the stocks based on excess return to Beta ratio

No.	Name of companies	Ri	Ri-Rf	β	Ri-Rf B	Rank
1.	Axis bank	2.78	-4.97	1.89	-3.38	10
2.	HDFC bank	6.24	-1.51	0.98	-1.54	14
3.	ICICI bank	0.78	-6.97	1.76	-3.96	8
4.	Kotak Mahindra bank	2.86	-4.89	1.03	-4.74	6
5.	SBI bank	1.36	-6.39	1.55	-4.12	7
6.	Ashok Leyland	5.63	-2.12	1.58	-1.34	15
7.	Bajaj autos	1.62	-6.13	0.99	-6.19	3
8.	Mahindra & Mahindra	4.96	-2.79	0.87	-3.20	12
9.	Maruti Suzuki	5.59	-2.16	1.23	-1.75	13
10.	Tata motors	-0.62	-8.37	1.27	-6.59	2
11.	IFCI limited	0.12	-7.63	1.99	-3.83	9
12.	DSP gilts limited	4.80	-12.55	0.99	-12.67	1
13.	Housing development finance corporation	2.30	-5.45	1.12	-4.86	5
14.	LIC finance limited	2.08	-5.67	1.75	-3.24	11
15.	Reliance limited	1.73	-6.02	1.06	-5.67	4

Interpretation

The above table 1.2 shows the excess return to beta ratio of the sample company's .After computing those ratios ranks are assigned to sample companies on the basis of those ratios.

Table 3: Cut-off values (Ci) of sample companies stock

No.	Name of companies	$\frac{\beta_i^2}{\sigma_{ei}^2}$	$\sum_{i=1}^{N} \frac{\beta_i^2}{\sigma_{ei}^2}$	C_i
1.	Axis bank	0.002123693	0.002123693	1.12
2.	HDFC bank	0.000544748	0.002668441	0.05
3.	ICICI bank	0.001984133	0.004652574	0.06
4.	Kotak Mahindra bank	0.001080916	0.00573349	1.80
5.	SBI bank	0.002242906	0.007976396	0.09
6.	Ashok Leyland	0.001497255	0.009473651	0.03
7.	Bajaj autos	0.001726487	0.011200139	0.15
8.	Mahindra & Mahindra	0.000245817	0.011445955	1.16
9.	Maruti Suzuki	0.000871316	0.012317271	0.18
10.	Tata motors	0.001472139	0.01378941	0.18
11.	IFCI limited	0.005998234	0.019787643	0.17
12.	DSP Gilts Limited	0.000360379	0.020148023	0.16
13.	Housing Development Finance Corporation	0.001517022	0.021665044	1.18
14.	LIC Finance Limited	0.001076791	0.022741836	2.19
15.	Reliance Limited	0.000551147	0.023292982	2.03

Interpretation

The above table 1.3 shows the cut-off values (Ci) of sample companies. The Ci values goes on increasing from 0.16 to 2.19. Therefore, the value of 2.19 is considered as the "Cut-off point". The securities which come after the cut-off point will not be considered for the optimal portfolio construction.

Those securities which have value of Ci more or equal to cut off point will be selected in optimal portfolio.

Table 1.5 Proportion of investment proposed

Name of company	Ci	Zi (Relative investment in each security)	Xi (Proportion of Investment)	Mean Return in %
DSP Gilts limited	0.16	0.001823018	30.00	4.80
Housing Development Finance Corporation	1.18	0.002522311	34.00	2.30
LIC Finance limited	2.19	0.000613583	36.00	2.08

$\sum Xi=100.00$

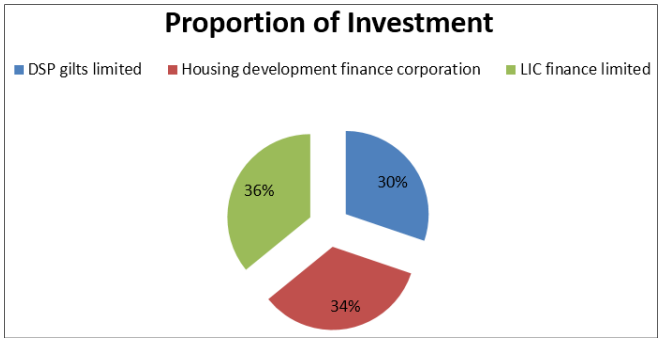

Fig 1

Interpretation

In a sample of fifteen companies three companies have been selected for the Optimal Portfolio Construction applying Sharpe's Single Index Model. Once the companies on which investment is to be made are known it is essential to know the Proportion of Investment to be made in each company's security. Fig: 1.1 represents the Proportion of Investment to be made by the investor to earn maximum returns. The figure shows that 36% of investment is made in LIC Finance Limited (which means majority of the funds is to be invested on this company's stock), 34% of investment is made in Housing Development Finance Corporation and balance 30% of investment is made in DSP Gilts Limited.

Findings

The findings of the present study are listed below

1. HDFC bank having the highest return i.e. 6.24 and the IFCI limited having the lowest return i.e. 0.12.
2. The return from IFCI limited has the highest beta value of 1.99 which means it is highly volatile.
3. Axis bank, ICICI bank, Kotak Mahindra bank, SBI bank, Ashok Leyland, Maruti Suzuki, Tata motors, IFCI limited, Housing Development Finance Corporation, LIC finance limited, Reliance limited have beta values greater than 1.i.e they are also volatile.
4. Mahindra & Mahindra having the lowest beta value of 0.87.
5. Cut-off values goes on increasing from 0.16 to 0.19. Based on the Cut-off values three companies were selected.
6. LIC finance limited and Reliance limited having the highest cut off value i.e. 0.19. Axis bank having the lowest cut off value i.e. 0.02.

Conclusion

Risk and return assumes a significant part in settling on any financing choices. An investor should continuously monitor the market and constantly update his portfolio by selecting right stocks for investment at that time. Sharpe Index model

aids investor as a tool to make his portfolio choices and take informed decisions. This method of constructing a portfolio is more convenient and easy. Use of cut off rate played a vital role in constructing the optimal portfolio. Through portfolio evaluation the investor tries to find out how well the portfolio has performed. He/she should evaluate the portfolio from time to time to earn more returns, because of its volatile nature of market and economy.

References

1. Suresh AS, International. Journal of Advance Research. in Computer Science and Management Studies; 3(0):ISSN:2327782 (Online).
2. Dr. Ramanathan KV. Construction of optimal equity portfolio using the sharpe index model with reference to banking and information technology sectors in India from 2009-2013; 2347(856):2348-0653
3. Ms Apurva, Chauhan A. A Study on Usage of Sharpe's Single Index Model in Portfolio Construction With Reference To Cnx Nifty, 2014; 3(10):2277-8160.
4. Saugat Dasi V, Ankit Agarwal. International. Journal of Accounting and Financial Management Research. ISSN (P): 2249-6882; ISSN(E): 2249-7994, 2014; 4(3):1-4.
5. Ch. Naveen. An International. Journal of Management Studies, 2014, 4-2. www.mgmt2day.griet.ac.in.
6. Mokta Rani Sarker. World. Journal of Social Sciences, 2013; 3(6):75-87.
7. Vikrant Panwar. Masters International. Journal of Management Research and Development (MIJMRD), 2014; 2(3):2347-9043.
8. Thangjam Ravichandra. International. Journal of Interdisciplinary and Multidisciplinary Studies. (IJIMS), 2014; 1(4):75-81.
   www.moneycontrol.com
   www.finance.yahoo.com
9. Dr. Nalini R. A Study on Optimal Portfolio Construction Using Sharpe's Single Index Model - A Study of Selected Stocks from BSE ISSN: 2278-6236, International. Journal of Advanced Research in Management and Social Sciences. 2014, 3(12)
10. Ward DJ, Griepentrog GL. Risk and Return in Defaulted Bonds. Financial Analysts. Journal 1993; 49(3):44-61.