"CONSTRUCTION OF OPTIMAL PORTFOLIO OF BANKING STOCKS" - A DIVERSIFICATION STRATEGY

SAUGAT DAS[1] & ANKIT AGARWAL[2]

[1]Assistant Professor, Royal School of Business, Guwahati, Assam, India

[2]MBA Student, Royal School of Business, Guwahati, Assam, India

ABSTRACT

Indian stock market is experiencing a continuous growth year over year. It acts as a performance indicator of the economy. The Indian stock market is serving as an attractive investment avenue for the investors. Majority of the Indian middle-class citizens are still not investing in the stock market due to high level of risk associated with it. Indian risk-averse investors want to earn maximum returns with the minimum possible risk. As the banking sector contributes significantly to the growth and development of Indian economy, the Bank Nifty as an index has gained more importance among the investing community. Thus, this research paper focuses on the 12 banking stocks of the Bank Nifty index and concentrates on the construction of an optimal portfolio of banking stocks using Sharpe Index model.

The twelve companies were ranked on the basis of excess return to beta ratio. The cut off point was calculated for each stock and the highest value of cut off point was taken into calculations in determining the percentage of money to be invested in each banking stock. The outcome of this study will guide the investors in their decision of selecting best banking stocks from the Bank Nifty Index.

KEYWORDS: Optimal Portfolio, Sharpe Index Model, Beta, Cut-Off Rate, Bank Nifty

INTRODUCTION

Investment in the equity market is a risky and quick way of maximizing returns rather than investing in the financial instruments at a risk-free rate. The aim of the risk-averse investors is always to maximize return at a given level of risk or to minimize risk at a given level of return. Risks in the stock market can be classified into two types: Systematic risk or Non-Diversifiable risk and Unsystematic risk or Firm-Specific risk. Investors usually invest in a portfolio of stocks to eliminate non-systematic risk, but systematic risk cannot be avoided as it arises out of the market factors like GDP, inflation, exchange rate fluctuations. Portfolio theory was originally proposed by Harry Markowitz who attempted to quantify the risk of a portfolio and developed a procedure for determining the optimal portfolio. However, the Markowitz theory was to complex and cumbersome to determine the optimal portfolio.

Hence, William Sharpe developed the single index model to determine the optimal portfolio, which made the calculations based on the statistical concept of regression between stock returns and market returns. Sharpe's model expresses the returns on each security as a function of a return on the market index. Thus this study is fully based on Sharpe index model aiming at constructing an optimal portfolio of banking stocks by choosing the best performing banking stocks in the Indian economy in the period March 2009 to February 2014.

OBJECTIVES

- To perform a risk-return analysis of the 12 banking stocks and construct an optimal portfolio of banking stocks from the Bank Nifty Index.

- To validate and analyze the Sharpe model of constructing optimal portfolios using regression as the focus point of the study.

- To identify the banking stocks to be included in the portfolio and percentage of investment to be made in each stock.

LIMITATIONS

- Portfolio is constructed based only on risk and return assuming that stock returns are normally distributed.

- Study is restricted to only twelve stocks of the Bank Nifty.

- Stock prices considered are restricted to only the previous 5 year's closing prices.

- All the calculations could not be brought into the report.

RESEARCH METHODOLOGY

The research design is fully descriptive in nature as it is based on quantitative analysis of secondary data. The study is based on the constructions of portfolio of banking stocks. Descriptive research is a type of conclusive research that has its major objective in describing something, usually the market characteristics or functions. The data has been collected from the website of National Stock Exchange and Reserve Bank of India. The study is conducted with the financial data for last five years from March 2009 to February 2014. The sample size under this study is limited to twelve stocks. However, the total number of days of data included in our study is 1247.The sampling technique adopted is cluster sampling. All the data helped in formulating a comprehensive case study.

TOOLS USED FOR DATA ANALYSIS

Sharpe Index Model

The William Sharpe's single index model is based on the assumption that when the market moves up most of the stock prices also tends to increase and vice versa. Therefore, securities returns are correlated and there might be co-movement between securities because of common response to market changes. This co-movement of stocks with the market index is studied with the help a simple regression analysis:

$$R_i = \alpha_i + \beta_i R_m + e_i$$

Where, R_i = Return on individual security

α_i =   Independent of the market performance

β_i =   Measure of the expected change in individual stock return to the change in market return

R_m =   Return of the market index

e_i =   Error term representing the residual return

BETA

Beta coefficient is the relative measure of systematic risk. Beta of an investment is a measure of the risk arising from exposure to general market movements as opposed to idiosyncratic factors. The market portfolio has a beta of exactly one.

$$\beta_i = \frac{\sigma_{i,m}}{\sigma_m^2}$$

Return

The total gain or loss experienced on an investment over a given period of time, calculated by dividing the difference in ending price and beginning Price during the period with the total period of investment value is termed as return.

Risk-Free Rate of Return (R_f)

Risk-free rate of return is the return on a security that is free from default risk and is uncorrelated with returns from anything else in the economy.

Excess return-to-beta ratio $= \frac{R_i - R_f}{\beta_i}$

Where, R_i = the stock's expected return

R_f = the risk-free rate, β_i = beta, a measure of systematic risk

Cut off Point

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

Where, σ_m^2 = market variance

σ_{ei}^2 = **unsystematic risk**

Investment to Be Made in Each Security

$$X_i = \frac{Z_i}{\sum_{i=1}^{N} Z_i}$$

Where, X_i = proportion of investment in each stock

$$Z_i = \frac{\beta_i}{\sigma_{ei}^2}\left(\frac{R_i - R_f}{\beta_i} - C^*\right)$$

Where, C^* = cut off point

ANALYSIS AND INTERPRETATION

Table 1: Returns of Individual Stocks and Beta

Name of the Banks	R_i	β_i
INDUSLND BANK	254.160	0.499
YES BANK	104.040	0.6295
AXIS BANK	53.860	0.5958
ICICI BANK	47.360	0.6704
BANK OF BARODA	27.740	0.4459
KOTAK MAHINDRA BANK	35.630	0.9344
PUNJAB NATIONAL BANK	12.900	0.4355
STATE BANK OF INDIA	10.370	0.5615
CANARA BANK	7.336	0.4469
UNION BANK OF INDIA	-3.752	0.4486
BANK OF INDIA	-4.711	0.4826
HDFC BANK	-4.280	0.375

The return of the 12 banking companies was calculated by taking the compounded average of the five years return from 2009-14. The best performing banks are Induslnd & Yes bank and the banks giving negative returns are Union Bank, Bank of India and HDFC bank. The beta values of all the companies were less than 1; with only Kotak Mahindra bank having a beta value close to 1

Table 2: Cut-Off Calculation of 12 Companies

Name of the Banks	$\dfrac{R_i - R_f}{\beta_i}$	$\dfrac{(R_i - R_f)\beta_i}{\sigma_{ei}^2}$	$\dfrac{\beta_i^2}{\sigma_{ei}^2}$	C_i
INDUSLND BANK	494.17	1967.705	3.982	58.92
YES BANK	153.25	804.057	5.247	71.73
AXIS BANK	77.69	531.084	6.836	72.63
ICICI BANK	59.35	583.458	9.830	70.27
BANK OF BARODA	45.23	198.803	4.395	68.43
KOTAK MAHINDRA BANK	30.03	591.664	19.702	58.90
PUNJAB NATIONAL BANK	12.24	54.551	4.457	56.42
STATE BANK OF INDIA	4.99	41.071	8.236	51.82
CANARA BANK	-0.52	-1.797	3.431	49.94
UNION BANK OF INDIA	-25.24	-83.048	3.291	47.44
BANK OF INDIA	-25.45	-88.353	3.472	44.96
HDFC BANK	-31.60	-59.078	1.870	43.59

The Sharpe Model has been implemented in constructing the best banking stocks in Bank Nifty during the given period. Firstly, the excess return-to-beta ratio is calculated and the stocks have been ranked in a descending order. From Table 2, we can see that Induslnd bank has the highest rank and HDFC bank has the lowest rank. The risk-free rate used is the average MIBOR rates calculated for the years 2009-14 which is equal to 7.57%. Secondly, the cut-off rate is calculated which comes to be C* = 72.63. According to the method, all the stocks having excess return-to-beta ratio greater than the cut-off rate should be selected in the optimal portfolio.

Table 3: Selected Stocks for Optimal Portfolio

Name of the Banks	$\dfrac{R_i - R_f}{\beta_i}$
INDUSIND BANK	494.17
YES BANK	153.25
AXIS BANK	77.69

Hence, the bank stocks selected are: Induslnd, Yes and Axis bank respectively (Table 3). Finally, the model goes on to find out the proportion of investment in each of the stocks.

Table 4: Percentage Investment in the 3 Selected Banks

Selected Stocks	β_i	σ_{ei}^2	Z_i	$X_i(\%)$
INDUSIND BANK	0.499	0.06253	3363.75	82.17
YES BANK	0.6295	0.07553	671.95	16.41
AXIS BANK	0.5958	0.05193	58.12	1.42

The analysis finally points out that 82.17% of the money should be invested in Induslnd bank, followed by 16.41% in Yes bank and a meagre 1.42% in Axis bank.
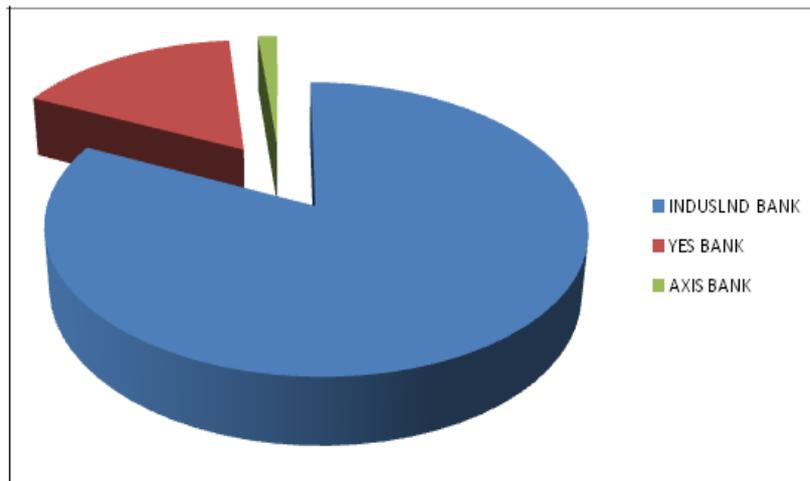

Figure 1: Proportion of Investment Using Pie-Chart

CONCLUSIONS

Stock markets are more volatile and investment in the stock market depends on the investor's knowledge and reaction to various market factors like GDP, inflation, exchange rate fluctuations, monetary policies, government policies, etc. Investors always expect higher return on their investment made in the stock market as compared to riskless securities. Portfolio construction is beneficial in diversifying risk rather than holding a single stock. An optimal portfolio is efficient when all the risk is diversified. Investors should hold a portfolio of stocks to minimize their risk and maximize their return. The above study conducted on the construction of optimal portfolio of banking stocks by using Sharpe index model would guide the investors in their investment decisions. Investors can make use of this study in deciding the banking stocks to be included in their portfolio as well as they can also determine the required proportion to be invested in each stock. The study is further left to the coming generation of the financial world to undertake researches and develop new theories and models to the portfolio management, especially focusing on the banking sector.

REFERENCES

1. Bekhet, H. A & Matar, A. (2012). Risk-Adjusted Performance: A two-model Approach Application in Amman Stock Exchange. International Journal of Business and Social Science, 3 (7), 34-45.

2. Chandra, P. (2010). Investment Analysis and Portfolio Management (Third ed.). Tata McGraw Hill Education Private Limited.

3. Gopalakrishnan, M. M. (2014). Optimal Portfolio Selection Using Sharpe's Single Index Model. Indian Journal of Applied research, 4 (1), 286-288.

4. Malhotra, N. K., & Dash, S. (2010). Marketing Research: An Applied Orientation (Sixth ed.). Pearson Education.

5. Nageswari, D. P., Selvam, D. M., & Bhuvaneswari, D. P. (2013). An Empirical Analysis of Optimal Portfolio Selection using Sharpe's Optimization. Asian Journal of Research in Business Economics and Management, 3 (11), 209-221.

6. P, V. (2011). Portfolio construction using the Sharpe index model with reference to banking and information technology sectors. Prime Journal of Business Administration and Management, 1 (12), 392-398.

7. Sarker, M. R. (2013). Optimal Portfolio Construction: Evidence from Dhaka Stock Exchange in Bangladesh. World Journal of Social Sciences, 3 (6), 75-87.