Security Analysis & Portfolio Management

M.Com. IV Semester

Unit IV

Topic: **Evaluation of Management Portfolio**

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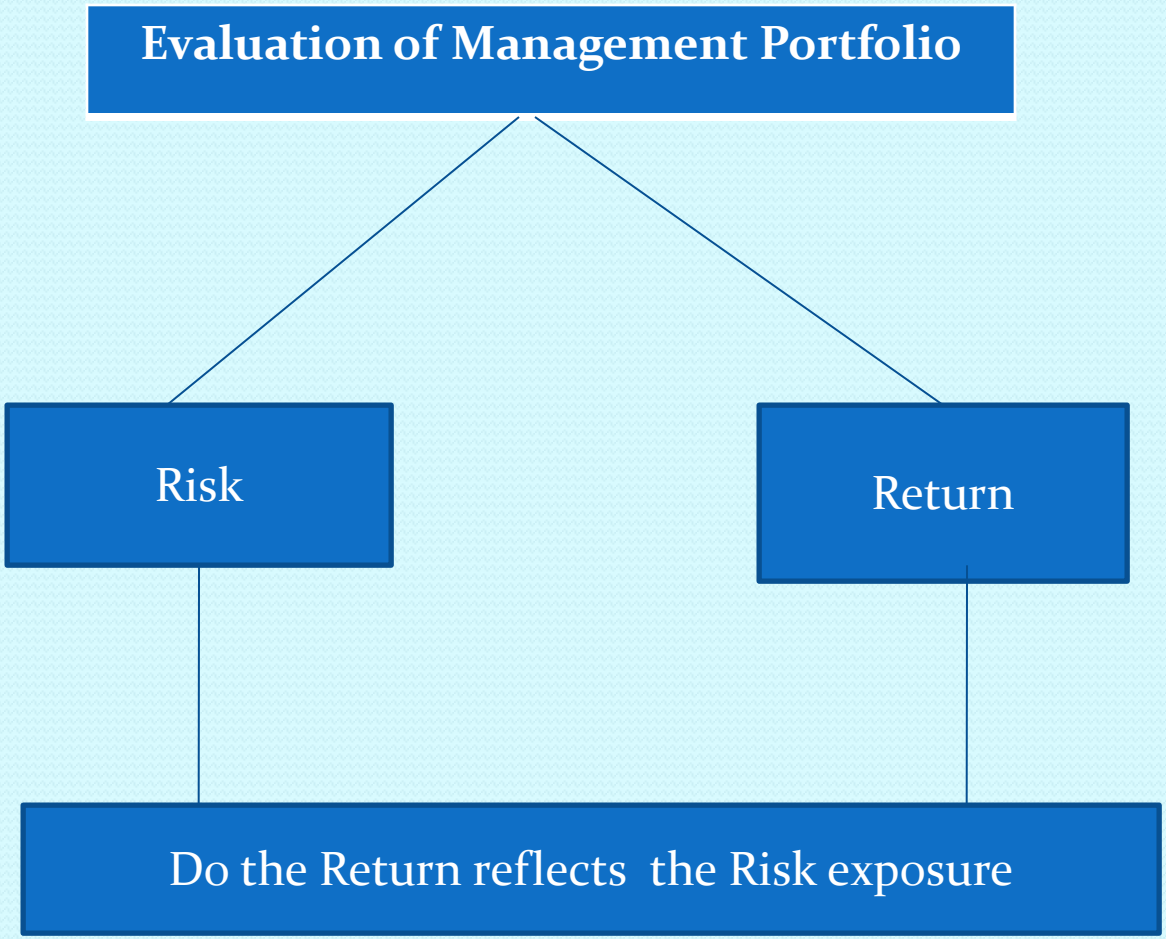
Meaning : Evaluation of management portfolio is the last step in the process of portfolio management. Portfolio evaluation is the stage where we examine to what extent the objective has been achieved. Through portfolio evaluation the investor tries to find out how well the portfolio has performed. Performance evaluation addresses such issues as whether the performance was superior or, whether the performance was due to skill or luck, etc.While evaluating the performance of a portfolio the return earned on the portfolio has to be evaluated in the context of the risk associated with that portfolio.


Evaluation of Management Portfolio
Risk
Return
Do the Return reflects the Risk exposure

It is evaluation of the performance of the portfolio. It is essentially the process of comparing the return earned on a portfolio with the return earned on one or more other portfolios or on a benchmark portfolio.

To study the evaluation of management portfolio one should know the following essentials terms:

- (β_m) Beta of the portfolio
- (Rn) Portfolio Return
- (Rf) Risk-free return
- (R_{MI})Return on market index

(β) Beta of the portfolio : Beta is a measure of a portfolio risk (volatility of returns) reflected by measuring the fluctuation of its price changes relative to the overall market. In other words, it is the stock's sensitivity to market risk. For example, if a company's beta is equal to 1.2 the security has 120 % of the volatility of the market average.

(Rn)Portfolio Return : Portfolio return refers to the gain or loss realized by an investment portfolio containing investment in various types of securities.

(Rf) Risk-free return : It is rate of return of an investment with zero risk. It represents the interest an investor would expect from an absolutely risk-free investment over a specified period of time. E.g.: Treasury Bills

(R_{MI})Return on market index: Stock Market Indices give an insight into the overall trends of the capital markets and sentiment of the investors towards a particular stock or set of stocks in an industry.

Methods of Evaluation of Portfolio Management

Following methods or measurements can be used for evaluating portfolio management:

- **Treynor's Measure**
- **Sharpe's Measure**
- **Jensen's Measure**

1. Treynor's Measure/Index

It was developed by Jack Treynor in 1965.This defines the relationship between portfolio returns and market rates of returns. The Treynor's Ratio is also known as the "reward-to-volatility ratio". Treynor's Ratio takes into account market risk while calculating risk-adjusted returns.

The performance of portfolio is calculated in Treynor's measure as the ratio of excess portfolio return to the beta of the portfolio which is systematic risk. It is measured by the parameter known as 'beta' that represents the slope of the regression of the returns of the managed portfolio on the returns to the market portfolio.

This can be easily defined as;

$$T_n = (R_n - Rf)/\beta_m$$

Where;

Tn= Teynor's measure

Rn= Portfolio Returns

Rf= Risk free returns

βm= Beta of the portfolio

Example:

- Suppose that the 10-year annual return for a market portfolio is 10%, while the average annual return on Treasury bills is 5%. Beta of market is 1. Then assume you are evaluating three distinct portfolio with the following 10-year results:

Portfolio	Average Annual Return	Beta
Portfolio A	12%	0.90
Portfolio B	14%	1.03
Portfolio C	16%	1.20

Solution

- Portfolio return (A) = (0.12 - 0.05)/0.90 = 0.077 or 7.7%
- Portfolio return (B) = (0.14 - 0.05)/1.03 = 0.087 or 8.7%
- Portfolio return (C) = (0.16 - 0.05)/1.20 = 0.091 or **9.1%**
- Market rate of return = (0.10-0.05)/1= 0.05 or 5 %

For individual evaluation based on portfolio return, Portfolio B is doing good but based on risk-adjusted return, C is better.

All the three portfolio perform better than the aggregate market return of 5 %.

Assumptions:

- Investor already has an adequate diversified portfolio.
- Unsystematic risk is not considered.
- Portfolios can be ranked and best performing one can be determined.

2. Sharpe's Measure/Index

Sharpe's Single Index Model The model has been generated by "WILLIAM SHARPE" in 1966.The Single Index Model is a simplified analysis of "Portfolio Selection Model" To measure both Risk and Return on the stock. Sharpe ratio measures the performance of an investment compared to a risk-free asset, after adjusting for its risk. It is defined as the difference between the returns of the investment and the risk-free return, divided by the standard deviation of the investment.

$$SI = \frac{\text{Average return on portfolio(Rp)} - \text{Risk free return(Rf)}}{\text{Standard deviation of the portfolio return (Bp)}}$$

The Sharpe ratio is almost identical to the Treynor measure, except that the risk measure is the standard deviation of the portfolio instead of considering only the systematic risk, as represented by beta.

Example

Suppose that the 10-year annual return for a market portfolio had a standard deviation of 18 %, while the average annual return on Treasury bills is 5%. Then assume you are evaluating three distinct portfolio, let's determine the Sharpe ratios for the following portfolios:

Portfolios	Annual Return	Portfolio Standard Deviation
Portfolio X	16%	0.11
Portfolio Y	18%	0.20
PortfolioZ	20%	0.27

Solution:

Portfolio return(X) = (0.15 - 0.05)/0.11 = 0.909 or 9.09 %

Portfolio return(Y) = (0.18 - 0.05)/0.20 = 0.65 or 6.5 %

Portfolio return(Z) = (0.20 - 0.05)/0.27 = 0.555 or 5.55 %

We find that the best portfolio is not necessarily the one with the highest return. Instead, it's the one with the most superior risk-adjusted return is portfolio X.

Sharpe ratio is more appropriate for well diversified portfolios, because it more accurately takes into account the total risks of the portfolio.

Assumptions:

- There is only macroeconomic factor that causes the systematic risk affecting all stock returns and this factor can be represented by the rate of return on a market index, such as the S&P 500.
- The return of any stock can be decomposed into the expected excess return of the individual stock due to firm-specific factors, commonly denoted by its alpha coefficient (α), which is the return that exceeds the risk-free rate.
- The return due to macroeconomic events that affect the market, and the unexpected microeconomic events that affect only the firm.

Treynor's v/s Sharpe's Measure

- Treynor's measure uses Beta, Sharpe's uses standard deviation.
- Treynor's measure is used for individual asset or security, Sharpe's is more appropriate for well diversified portfolio.

3. Jensen's Measure/Index

Jensen's measure, or Jensen's alpha, developed by Michael Jensen in 1968.This measure is based on Capital Asset Pricing Model (CAPM) model. The CAPM specifies the expected return in terms of the risk-free rate, systematic risk, and the market risk premium.

Jensen's ratio measures the portfolio manager's predictive ability to achieve higher return than expected for the accepted risk.

The ability to earn returns through successful prediction of security prices on a standard measurement. Formula;

$$R_p = R_f + (R_{MI} - R_f)^*\beta$$

Where;

R_p : Return on portfolio

R_f : Risk free Returns

R_{MI} : Return on market index

β : Beta of the portfolio

Example:

Assume a risk-free rate of 5% and a market return of 10%, what is the alpha for the following funds?

Portfolios	Average Annual Return	Beta
Portfolio X	12%	1.00
Portfolio Y	15%	1.20
PortfolioZ	15%	1.30

Solution: Following two steps required:

Step 1

- ER(X)= 0.05 + (0.10 - 0.05)1.00 = 0.1 or 10% return
- ER(Y)= 0.05 + (0.10 - 0.05)1.20 = 0.11 or 11% return
- ER(Z)= 0.05 + (0.10 - 0.05)1.30 = 0.115 or 11.5% return

STEP 2

- Calculate the portfolio's alpha by subtracting the expected return of the portfolio from the actual return:

- Alpha X = 12%- 10% = 1.5%
- Alpha Y = 15%- 11% = 5%
- Alpha Z = 15%- 11.5% = 4.5%

Portfolio Y did best because, although portfolio Z had the same annual return, it was expected that manager Y would yield a lower return because the portfolio's beta was significantly lower than that of portfolio Z.

The Jensen measure requires the use of a different risk-free rate of return for each time interval considered.

Conclusion

The above four risk-adjusted performance measures used to evaluate portfolios performance. Investors should kept in mind market conditions, relative asset mix and investors' circumstances etc. These changes are dynamic in nature and so there is need for rebalancing the portfolio towards optimal point.