

PORTFOLIO ANALYSIS

Lecture 1

Individual securities have risk return characteristics of their own. The future return expected from a security is variable and this variability of returns is termed risk. It is rare to find investors investing their entire wealth in a single security. This is because most investors have an aversion to risk. It is hoped that if money is invested in several securities simultaneously, the loss in one will be compensated by the gain in others. Thus, holding more than one security at a time is an attempt to spread and minimize risk by not putting all our eggs in one basket.

Most investors thus tend to invest in a group of securities rather than a single security. Such a group of securities held together as an investment is what is known as a portfolio. The process of creating such a portfolio is called diversification. It is an attempt to spread and minimize the risk in investment. This is sought to be achieved by holding different types of securities across different industry groups.

From a given set of securities, any number of portfolios can be constructed. A rational investor attempts to find the most efficient of these portfolios. The efficiency of each portfolio can be evaluated only in terms of the expected return and risk of the portfolio as such. Thus, determining the expected return and risk of different portfolios is a primary step in portfolio management. This step is designated as portfolio analysis.

➤ **EXPECTED RETURN OF A PORTFOLIO**

As a first step in portfolio analysis, an investor needs to specify the list of securities eligible for selection or inclusion in the portfolio. Next he has to generate the risk-return expectations for these securities. These are typically expressed as the expected rate of return (mean) and the variance or standard deviation of the return.

The expected return of a portfolio of assets is simply the weighted average of the return of the individual securities held in the portfolio. The weight applied to each return is the fraction of the portfolio invested in that security.

Let us consider a portfolio of two equity shares P and Q with expected returns of 15 per cent and 20 per cent respectively.

If 40 per cent of the total funds are invested in share P and the remaining 60 per cent, in share Q, then the expected portfolio return will be:

$$(0.40 \times 15) + (0.60 \times 20) = 18 \text{ per cent}$$

The formula for the calculation of expected portfolio return may be expressed as shown below:

$$\bar{r}_p = \sum_{i=1}^n x_i r_i$$

Where

\bar{r}_p = Expected return of the portfolio

x_i = Proportion of funds invested in security i.

\bar{r}_i = Expected return of security i.

n = Number of securities in the portfolio

➤ **RISK OF A PORTFOLIO**

The variance of return and standard deviation of return are alternative statistical measures that are used for measuring risk in investment. These statistics measure the extent to which returns are expected to vary around an average over time. The calculation of variance of a portfolio is a little more difficult than determining its expected return.

The variance or standard deviation of an individual security measures the riskiness of a security in absolute sense. For calculating the risk of a portfolio of securities, the riskiness of each security within the context of the overall portfolio has to be considered.

It is given by the following:

$$\sigma_p^2 = x_1^2 \sigma_1^2 + x_2^2 \sigma_2^2 + 2x_1 x_2 (r_{12} \sigma_1 \sigma_2)$$

Where

σ_p = Portfolio variance.

x_1 = Proportion of funds invested in the first security.

x_2 = Proportion of funds invested in the second security. σ_1^2 =
Variance of first security.

σ_2^2 = Variance of second security.

σ_1 = Standard deviation of first security

σ_2 = Standard deviation of second security.

r_{12} = Correlation coefficient between the returns of first and second security.

Portfolio standard deviation can be obtained by taking the square root of portfolio

variance.

Thus the portfolio risk depends on their interactive risk, i.e. how the returns of a security move with the returns of other securities in the portfolio and contribute to the overall risk of the portfolio.