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"PORT FOLIO MANAGEMENTAND ITS APPLICATIONSIN MUTUAL FUND'S SECURITY MARKET"

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ABSTRACT

This paper gives

- Definition of Portfolio and Portfolio Management.
- Objectives and functions of Portfolio Management.
- Risk and Return Relationship and its application in Mutual Fund's Security Market.
- Professionally Portfolio Management by Portfolio Manager.
- Measurement of diversification of risk.
- This paper also consider same issues related to Portfolio Management.
- Investment Portfolio Management.
- Portfolio Risk
- Selecting optimal Portfolio
- Establish / build a Profitable Portfolio.

Portfolio performance evaluation

- Introduction
- Method of Calculation
- Determination of the Portfolio Management
- Portfolio performance and risk adjusted method.

  This paper can be very gives useful for the Portfolio Manager and researcher to applied the following various Portfolio Management models and evaluation of performance of mutual fund.
- Capital Asset Pricing Model (CAPM)
- Arbitatage Price Theory (APT)
- Modern Portfolio Theory (MPT).

- Value at Risk Model (VRM).

Other portfolio risk model

- Markowite Diversification and Classification of Risk.
- Sharpe's Single Index Market Model.
- Risk-Return Relationship and Formation of Efficient Frontier.

Conclusion

Key Words : Portfolio, risk and return relationship, Diversification of risk, Portfolio risk,CAPM, APT, MPT.

INTRODUCTION

What is Portfolio

A Portfolio refers to a combination of investment tools such as stocks, shares, Mutual Funds, bonds, Cash, so on depending on the investor's income, budget and convenient time frame. The following are two types of portfolio.

[1] Market Portfolio And [2] Zero Investment Portfolio.

What is Portfolio Management

Definition

- Shape and Alexunder State that "Investment Management" also known as Portfolio Management is the process by which money is managed.
- Prasanna Chanda states that "Investment Management also referred to as Portfolio Management
- Other authors states that Portfolio Management is an art and science of making decision about investment mix and policy, matching investment to objectives, assets allocation for individual and institution and balancing risk against performance".
- Portfolio Management states that "The art of selecting the right investment policy or the individuals in term of minimum risk and maximum returns".
- Portfolio Management refers to managing an individuals investment in the form of bonus, shares, cash, mutual fund etc. so that he earns the maximum profits within the stipulated time frame.
- Portfolio Management refers to managing money of an individual under the expert guidance of Portfolio Managers.
- Portfolio Management refers to the art of managing various financial products and assets to help an individual earn maximum revenue with minimum risk involved in long run.

OBJECTIVES OF PORTFOLIO MANAGEMENT

- Portfolio Management presents the best Investment plans to individual as per their income, budget, age and ability to undertake the risk.
- Portfolio Management minimize the risk involved in investing and also invests the avenue of making profit.
- Portfolio Manager's understanding the client's financial needs and suggest the best and unique investment policy for them with minimum risk involved.
- Portfolio Managers to provide customized investment solution to clients us per their needs and requirements.

THE FUNCTIONS OF PORTFOLIO MANAGEMENT

The following activities can be as functions of Portfolio Management.

- Formulation of the Investment Policy.
- Performance of Security Analysis.
- Construction of a Portfolio.
- Formulation of Portfolio strategy
- Evaluation of Performance of the Portfolio.

PROFESSIONALLY MANAGED PORTFOLIOS

This section will briefly introduce the types of professionally managed portfolio For this purpose we will consider the Mutual Funds which are the best examples of Managed Portfolios.

The essence of mutual funds is management of funds provided by members and provide them with a reasonable return in relation to the risks involved. The fund management charges the members a certain amount of management fees for providing the services of professional money management.. Basically, mutual funds are managers of funds of individuals and bodies who may not have the time and skills to cope with the 1éal and technical intricales associated with investments in financial assets.

Mutual funds provide a well designed ready made portfolio for the benefit of the investorwho doesn't have the managerial skills to create a well diversified, and balanced portfolio ofhis own. Mutual funds are professional managers who take into account the diverie nee c)fdifferent categorie of investors. The need of the investors may be income of capital growth ortax shelters or a combination of all these. Therefore, the Mutual funds may float severalschemes or funds to suit diverse needs and each suth scheme or fund is a professionallymanaged portfolio having pei with identical or near identical needs as members/subscribers. Mutual funds can be generally classified under two broad heads:

a) Open Ended Mutual Fund: Open ended mutual fund is divided into units which areissued on an unlimited basis and are bought back from the investors at prices based on theNet Asset Value of the fund.

b) Close Ended Mutual Fund: Close ended mutual fund is so named because its basic capitalisation is limited, i.e., 'closed'. They offer their res or units for public subscription like any joint stock company.

Mutual funds may also be classified, on the basis of the type of portfolio offered or functionalspecialisation, as follows:

1) Income Funds: Income funds try to offer average returns higher than that from bankdeposits but the capital appreciation will be much less than that of equity shares.

2) Growth Funds: These funds do not regularly distribute returns by way of dividends but offer considerable capital appreciation in the long run by re-investment of dividends.

3) Industry Funds: funds of the economy which is considered to be the high growth industry.

4) Money Market Mutual Funds: These funds make investments in short term moneymarket instruments like Certificate of deposits, commercial paper, treasury bills etc.

5) Off-Shore Mutual Funds: Off-shore mutual funds are aimed at the foreign investors.

DIVERSIFICATION OF RISK

(When Diversification eliminates risk)

In the preceding section we have seen that total risk consist of various components and that variability of the rates of returns is generally used as a measure of total risk. In this section, we will see that the total risk is entirely relevant investment decision making. For this, we will make an assumption that investors are rational and are also risk averse. Portfolio theory suggests that if a security Is combined with other securities, a portion of the variation In its returns- can be smoothed by complementary variation in the other securities. The portfolio diversification lowers the variability of the returns from the portfolio when compared to the variability of the individual stocks in that portfolio. Much of the total risk of individual stocks can be eliminated by diversification, i.e., by holding stocks in a portfolio. Therefore, it is not necessary for us to relate the rates of return with the total risk. On the other hand, It makes sense to relate the rate of return with that part of the risk which cannot eliminated becausethat much of risk the investor has to bear.

Diversification of risk results from combining securities having less ithan perfect correlation among themselves. The portfolio return, being a weighted average of the indMdual securities returns, remains unaffected by the diversification. The general principle for diversification is: “the lower the correlation among the rates of returns on securities, the greater is the impact of diversification”, if the returns from two stocks are perfectly negatively correlated, combining the two securities to form a portfolio would diversi1 the ‘entire’ risk, and combining two securities whose returns are perfectly positively correlated would not at all reduce the total risk. In reality, we do not come across any two securities whose returns are either perfectly positively or perfectly negatively correlated. Hence, portfolio formation results in substantial risk diversification but not complete elimination of risk. This can be demonstrated with the help of the following empirical work.

From the monthly returns of 112 stocks spread over 158 months from January-1977 to March-1990, 5 randomly selected portfolios consisting of 1 to 20 stocks each were formed. The portfolio returns were calculate for the 158 months, month by month, for each of the 5 random portfolios and then averaged across the 5 samples. Table shows the average standard deviation for each of the sub-groups.

Table Portfolios and Diversification of Risk

No. of securities in portfolio	Average Std. Dev. % per month	Correlation with market		Average return (%) per month
		ρ	ρ^2	
1	10.5	0.433	0.187	0.94
2	8.30 *21%	0.580	0.337	1.32
3	7.40	0.58 1	0.338	0.79
4	6.91	0.644	0.415	0.88
5	5.95 **43%	0.791	0.626	1.13
8	5.68	0.863	0.744	1.18
10	5.34	0.871	0.759	1.12
15	5.14 ***51%	0.917	0.815	1.29
20	5.17	0.903	0.840	1.19
112 stock portfolio	5.01	1.000	1.000	1.20

$$* \frac{10.5-8.3}{10.5} = 21\%$$

$$** \frac{10.5-5.95}{10.5} = 43\%$$

$$*** \frac{10.5-5.14}{10.5} = 51\%$$

Note:

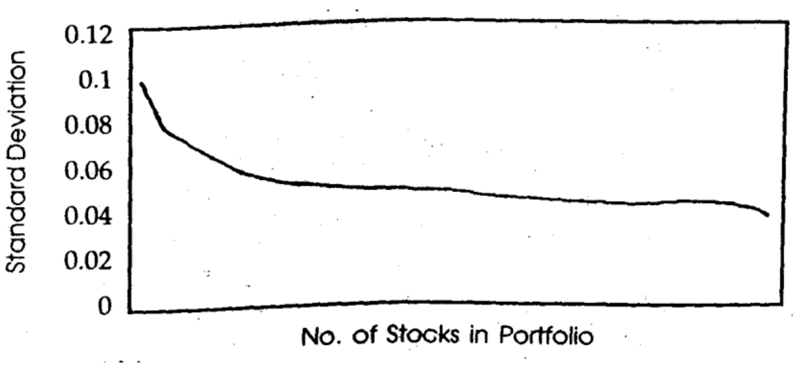
ρ stands for Pearson's correlation coefficient.

ρ^2 denotes co-efficient of determination

112 stock equally weighted portfolio is assumed to be the market portfolio.

The Table shows that average return is unrelated to the number of stocks in the portfolio? On the other hand, the standard deviation starts declining as more stocks are added to the portfolio, and approximately 21% of the total risk is diversified away by mere addition of one more stock to the existing one-stock portfolio; 43% of the total risk is reduced by forming a stock portfolio and a 51% reduction in total risk by forming a 20 stock portfolio. In can be seen that additional diversification after 5 stocks reduces the total risk at a slower rate and after 10 stocks there is hardly any reduction in total risk. Fig. shows graphically the relationship between the risk and the number of stocks in the portfolio. The risk curvebecomes Latter as the portfolio size increases.

Fig. Diversification of Risk in Portfolios



The risk that is reduced by diversification is called the unsystematic risk or the diversifiable risk; the risk that cannot be diversified away is known as the systematic risk. In the context of Modern Portfolio Theory, the systematic risk is called the Market risk. It may be noted that the risk of 112 stock portfolio is merely the systematic risk under the assumption that it is the market portfolio. Thus from the above table we find that the total risk is about 10.5%. systematic risk is 5.01% and the unsystematic risk in individual stocks is about 6.4%. Thus 20 stock portfolio sheds about 5.36%, i.e., 84% of its unsystematic risk It has about 16% of it unsystematic risk left undiversified.

Table also shows that return from the portfolios moves with the market closely as the diversification increases. The returns from the 20 stock portfolio exhibit a correlation coefficient of 0.917 with the market. The ρ^2 values measure the proportion of variability in portfolio return that is attributable to the variability in the returns of the market portfolio. Thus, for the same 20 stock portfolio, 84% is explained by the market but remaining 16% is attributable to unique risk factors which are diversifiable. For a very efficient portfolio which is correctly diversified, the correlation with market will be unity; that is, such a portfolio will have only systematic risk. Fig decomposes the total risk Into the systematic and unsystematic components.

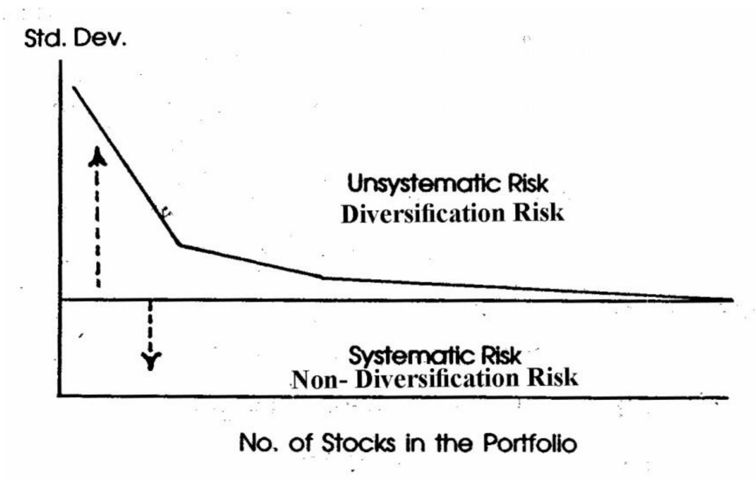


Fig. Components of Total Risk and Diversification

CALCULATION OF VARIANCE

While risk denotes the variability in an Assets' returns, the more the variability, more risky the investment. The variance in returns are either calculated by 'variance' measure or by 'standard deviation'. Variance is just the squared value of standard deviation. It is denoted as a (sigma). The foriitula for calculating the variance on Historical returns is as follows

$$\rho^2 = 1/n \, \Sigma \, (R_{it} - \overline{R})^2$$

Where

σ^2 = Variance in returns (risk)n = number of holding periods

R_{it} = Return on 1th scrip during t^{th} period

$\overline{R}i$ = Average historical return on i^{th} securities

The positive square root of the variance results in standard deviation

$$\sigma = \sqrt{\sigma^2} \quad \sqrt{1/n\sum(R_{it} - \overline{R}i)^2}$$

To calculate standard deviation as a measure of risk of an investment, we have to first calculate the average returns of the given security. Then we have to find the deviation of each holding period return from the average return. These deviations are to be squared and summed up. The sum to be divided by number of observations to arrive at the Standard Deviation.

To illustrate the calculation of standard deviation, let us consider case of the following Mutual Funds.

Table

Calculation of Standard deviation for two Mutual Fund Returns

Returns for the year	**Can bonus (%)**	**MEP 91 (%)**
1993 1994 1995	+ 31.5 + 17.37 (-) 45.56	+ 39.63 + 9.83 (-) 39.83
Average Annual Return	1.10	3.21
Standard deviation (σ)	33.49	32.77

$\sigma = \; 1/n\sum(X - X)^2$

i.e. = $1/3(31.5 - 1.10)^2 + (17.37 - 1.10)^2 + (-45.46 - 1.10)^2$

32.77 = $1/3(39.5 - 3.21)^2 + (9.83 - 3.21)^2 + (-39.83 - 3.21)^2$

The Average historical returns and the size of Standard deviation provide necessary information about the profitability and size of risk associated with a security, enabling the investors to take decisions of Buy and sell.

However, in a market place investors' future Expected Returns are likely to play a major role than the historical returns. Although Historical Returns provide the base for all future expectations, a large varieties of factors such as changes in economic, political, technological conditions are likely to influence the rates of returns in different industries. For example if a favourable Ex- TM policy by the government of India provide additional revenues to Textiles or Garment business, an investor of Arihant Fabrics may expect a 35 percent return. These future expectations primarily influence the stock prices in the market today.

MEASUREMENT OF PORTFOLIO RISK

Since correlation is playing aprominenttole in the estimation of portfolio risk, the formula for calculating Portfolio Risk has to accommodate this term as well. Then what is correlation and how to estimate it? A detailed discussion on this statistical measure is available in any standard Basic Statistics Text Book. Anyhow, we will show you the working of correlation for the Rates of Return in between two Stocks M and W here under.

- Correlation is basically a relationship measure between two variables X and Y. It gives the degree of relationship as a coefficient called 'Correlation Coefficient'.
- Correlation Coefficient is denoted by small 'r' whose value ranges from + 1.0 to 1.0 While +1.0 refers to perfect positive correlation, -1.0 refers to perfect negative correlation.
- Correlation is calculated as ratio between Covariance (Cov) and Variance (σ) of individual variables

$$r = \frac{Cov(xy)}{\sigma_x \sigma_y}$$

Covariance (Cov) is the average product of deviations of individual values in a gven series

from their means

$$Cov = 1/n \sum_{j=1}^{n} (X_1 - \bar{X})(Y_1 - \bar{Y})$$

Table

Calculating at correlation between M and W

Year	Returns on M(X)	Returns On W(Y)	$(X - \bar{X})$	$(Y - \bar{Y})$	$(X - \bar{X})(Y - \bar{Y})$
1990	40%	-10%	25%	-25%	-625
1991	-10%	40%	-25%	25%	-625
1992	35%	5%	20%	-20%	-400
1993	-5%	35%	-20%	20%	-400
1994	15%	15%	0%	0%	0
Average	15%	15%			Σ = -2050
Standard Deviation	22.6	22.6			

$$Cov_{(xy)} = \frac{\sum(X-\bar{X})(Y-\bar{Y})}{n} = \frac{-2050}{5} = -410.0$$

$$\text{Correlation } r = \frac{Cov(xy)}{\sigma x\, \sigma y} = \frac{-410.0}{22.6 \times 22.6} = -1.0$$

Then using these correlation values, we can estimate the Portfolio Risk by solving the formula which is almost similar to the expanded form of $(a+b)^2$. In a Two-Asset case, the Portfolio Risk formula is

$$\sigma_p = \sqrt{W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2.W_A.W_B.r_{AB}.\sigma_A.\sigma_B}$$

Where W_A = Weightage / Proportion of Asset A in the Total portfolio W_B = Proportion of Investment in Asset B

$\sigma_A.\sigma_B$ = Standard Deviations of Stock A and Stock B

r_{AB} = Correlation Coefficient between the returns of Two Stocks $Cov_{(AB)}$

Since $r = \frac{Cov_{(AB)}}{\sigma_A.\sigma_B}$ or $\frac{Cov_{(AB)}}{\sigma_A.\sigma_B} = r$.

Then the Portfolio Risk can also be calculated as

$$\sigma_p = \sqrt{W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2W_A W_B Cov_{(AB)}}$$

This formula can be extended with additional terms when the number of stocks in a Portfolio increases. Say in case of 3 Asset case it is something similar to expanded form of $(a+b+c)^3$, with three correlation terms rAB, rBC, rAC. Of course, in case of a portfolio with 'n' assets, one has to use Quadratic Mathematical Programming Approach to find the Portfolio risk.

Using the above formula, Let .us illustrate the working of Portfolio risk for two portfoliosthat we have considered earlier

Portfolio = MW (r = - 1.0)

$$\sigma_P = \sqrt{(0.5^2 \times 0.226^2) + (0.5^2 \times 0.226)^2 + 2(0.5)(0.5)(-)(0.226)(0.226)} = 0$$

Portfolio wz (r = 0.65)

$$P = \sqrt{(0.5^2 \times 0.226^2) + (0.5^2 \times 0.226)^2 + 2(0.5)(0.5)(0.65)(0.226)(0.226)} = 0.206 \text{Or } 20.6\%$$

Whenever the number of Assets are more than two in .a portfolio, there is another method to calculate the portfolio risk. It requires one to start with the estimation of Covariance -Variance Matrix between all assets under consideration. Oglate, the availability Computer Software Packages have facilitated this Matrix computation very easily for a sample not exceeding 30 Assets at a given time. Alter establishing the Correlation Matrix, the Portfolio risk is found by the square rooting the Weighted product of all the Cells in the Matrixwherein the Weights refers to Proportion of each Asset in the given Portfolio. Let us see how a Covariance - Variance Matrix look like in case of 3 Assets.

		WA	WB	WC
		A	B	C
WA	A	σ^2_A	CovAB	CovAC
WB	B	CovAB	σ^2_B	CovBC
WC	C	CovAC	CovBC	σ^2_C

Portfolio Risk =

$$\sigma p = \sqrt{(W_A \times W_A \times \sigma^2_A) + (W_A \times W_B \times Cov_{AB}) + (W_A \times W_C \times Cov_{AC})}$$
$$+ \sqrt{(W_B \times W_A \times Cov_{AB}) + (W_B \times W_B \times \sigma^2_B) + (W_B \times W_C \times Cov_{BC})}$$
$$+ \sqrt{(W_C \times W_A \times Cov_{AC}) + (W_C \times W_B \times Cov_{BC}) + (W_C \times W_C \times \sigma^2_C)}$$

To illustrate the working, consider the following Stocks

Table

Variance - Covariance Matrix for Three Stocks

Weight	Company		0.33	0.33	0.34
		X	Y	Z	
0.33	X	382.09	08.73	39.87	
0.33	Y	68.73	63.82	68.87	
0.34	Z	39.87	68.87	38.25	

σ^2 = (0.33 x 0.33 x 382.09) + (0.33 x 0.33 x 68.73) + (0.34 x 0.33 x 39.87) + (0.33 x 0.33 x 68.73) + (0.33 x 0.33 x 63.82) + (0.34 x 0.33 x 68.87) + (0.33 x 0.34 x 39.87) + (0.33 x 0.34 x 68.87) + (0.34 x 0.34 x 38.25) = 92.35

$$P = \sqrt{92.35} = 9.61\%$$

INVESTMENT PORTFOLIO MANAGEMENT

Investment management involves the professorial management of various assets and securities including shares, bowls, commodities and other securities for meeting the particular investment goals for the advantages of the investors.

Examples of Investors

- Institutions
- Insurance companies
- Pension funds
- Corporations
- Charities
- Educational establishments
- private investors via investment contracts.

- collective investment schemes such as mutual funds

The investment management of collective investments is also known as Asset Management. It also includes investment management for private investors and all forms of institutional investment. Investment managers who are experts in discretionary management for wealthy private investors also termed their services as a1th management or portfolio management in perspective of private banking.

Investment styles

Investment Portfolio Management involves implementation of a wide range of investmentstyles of fund management.

- Growth
- Value
- Growth at a reasonable price (GARP)
- Market neutral
- Small capitalization
- Indexed

Challenges of Investment Portfolio Management

Revenue is correlated to the market valuations directly therefore major fall in asset prices canlead to steep decline in revenues related to costs

- Difficult to sustain above-average fund performance and clients may get impatientduring periods of poor performance
- Successful fund managers are high-priced and are headhunted by competitors
- Fund performance depends on the unique skills tithe fund manager

- Analysts who earn above-average returns manage their personal portfolios on theirown.

Ps of Investment Portfolio Management

- Philosophy means the beliefs of the investment organization.
- Process is the procedure for implanting the overall philosophy.
- People constitute the staff including the fund managers.

Asset Allocation

There are four common asset classes including real-estate, commodities stocks. and bonds. Investment portfolio management firms are responsible for allocating the funds among the various classes of assets and also among the individual securities within each such asset class. Asset classes demonstrate varied market dynamics, and interaction effects. The performance tithe fund depends on the allocation of money among asset classes.

As per some research studies, the allocation of funds among asset classes exhibit more projecting power in determining portfolio return as compared to selecting individual holdings. The successful investment manager constructs the asset allocation and the individual holdings separately for breaking certain benchmarks.

Long-term returns

Investment portfolio management involves studying the long-term returns to different assets and analysing the holding period returns. For example, during the longer periods of time, equities may yield higher returns than bonds, and bonds may yield higher returns than cash. As per the financial theory, equities are riskier than bonds and bonds are more risky thancash.

Diversification

The degree of diversification is considered by investment portfolio managers against the asset allocation and planned holdings list is constructed. The list comprises of the details regarding what percentage of the fund is required to be invested in a specific stock or bond.

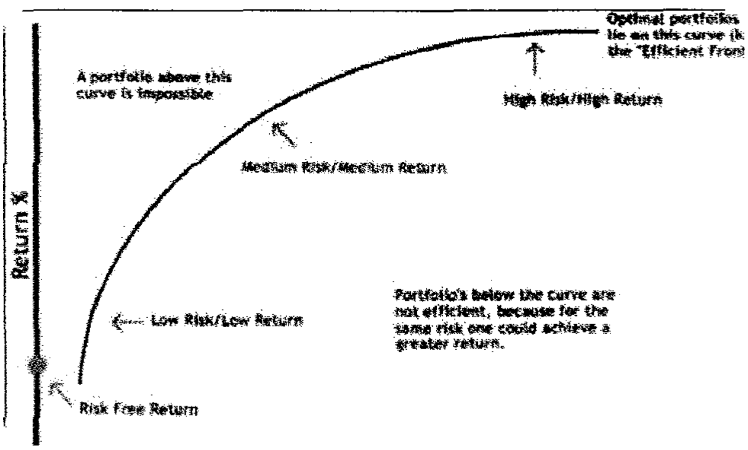
The effective diversification needs the effective management of the following factors.

- Relationship between Asset returns and the liability returns
- issues internal to the portfolio
- Cross-correlations between the returns Related posts:

HOW TO SELECT AN OPTIMAL PORTFOLIO

An optimal stock portfolio refers to a stock portfolio that incorporates the stocks configured in such a manner that they yield the optimal return statistically possible at a given level of risk accepted by an investor. The modem portfolio theory stresses on the optimal portfolio concept by assuming that the investors try to minimize risk obsessively while looking for the highest return possible. As per this theory, investors should make rational decisions for achieving maximum returns at their acceptable level of risk.

The working of the optimal portfolio can be easily understood by looking at the chart below. The optimal-risk portfolio is generally found in the middle of the curve. If one goes further higher up the curve, it will mean taking more risk proportionately for achieving lowerincremental return. Similarly if one goes at lower end of the curve, it will mean low riskf low return portfolios.



Risk % (Standard Deviation]

As an investor, you can select how math risk is acceptable to you in the portfolio by selecting any other point that lies on the efficient frontier. It will provide you the maximum returns for the amount of risk acceptable to you.. One cannot calculate the optimization of the portfolio mentally. Investors use various sophisticated computer programs for determining optimal portfolios by estimating hundreds or thousands of different expected returns at each level of risk. For example, if you have $10,000 to invest to build your portfolio of stocks of three companies A, B and C; then you need to decide how much money should be invested in each stock that can provide best return possible at a level of risk acceptable by you. For this, let’s create to random portfolios where each portfolio comprises of different proportions of the three stocks A, B and C.

The RISK/RETURN profiles of all these portfolios are mentioned in table below.

Risk Return Profile

Portfolio A B C Risk Returns

Portfolio 3 2% 38% 30% 12.10% 11.51%

Portfolio 2 68% 12% 20% 15.54% 12.76%

Portfolio 3 27% 51% 22% 12.91% 11.59%

Portlislio 4 20% 20% 60% 9.89% 11.00%

Portfolio 5 60% 20% 20% 14.86% 12.71%

Portfolio 6 12% 74% 14% 1348% 11.22%

Portfolio 7 15% 80% 5% 14.28% 1140%

Portfolio 8 38% 19% 43% 11.76% 11.71%

Portfolio 9 42% 19% 39% 12.05% 1249%

Portfolio 10 74% 10% 16% 16.35% 13.06%

In this table, you can observe that each portfolio has a unique RISK/RETURN profilebecause of different cash/stock allocation.

Risk/Reward Profile

After the analysis of the collection of stocks, these portfolio configurations that fall on the efficient frontier are considered as optimal portfolios. The various optimal portfolios are summarised in the risk/return table. This table allows the investors to choose that optimal portfolio which provide highest return statistically possible at a given level of risk acceptable to them.

Risk/Return Table of Optimal Portfolios

Risk Returns ABC 9.0% 10.98% 21% 69%

9.5% 11.21% 18% 17% 65%

10.0% 11.% 21% 15% 63%

10.5% 11.96% 28% 14% 58%

11.0% 12.23% 22% 19% 61%

11.5% 12.61% 30% 27% 43%

12.0% 12.83% 28% 21% 50%

12.5% 12.92% 37% 12% 51%

13.0% 13.02% 30% 38% 32%

13.5% 13.12% 26% 27% 47%

14.0% 13.23% 21% 46% 33%

Thus, the optimal portfolio configuration that contains three stocks (A, B, C) is the one thatgives a return higher than 11.21% at a risk of 9.50%

Optimal Portfolio

Risk Return A B C

9.5% 11.21% 18% 17% 65%

k

HOW TO BUILD A PROFITABLE PORTFOLIO

Portfolio management is basically an approach of balancing funds and rewards. Investors should keep the following tips in mind while deciding about the right portfolio blend.

Goals: You should be clear about your goals as an investor. The objective of the portfolio management should be utmost dear if one wants to accumulate wealth by good returns or to hold on his investments.

Risk Tolerance: As an investor one should know how to handle the fluctuations of ever changing volatile market. It is important to know the ways for tolerating the risks and subsequent rise and fall of net worth. If you are not capable of handling the pressure of sharp decline in the values of tour investments then you should try to invest in more stable funds/stocks. By this way, you may not make the returns quickly however it can offer you sound sleep at night.

Know your investments: it is recommended to invest in the stocks/funds of the businesses and industries that you are aware of. You should know the activities of the companies and procure knowledge about the sector you are investing in. This way you would be able toknow if the company will continue to lie successful. The performance of the specific businessor industry cannot be easily predicted with certainty.

When to Buy/Sell: In order to succeed in the stock markets, it is very important to know when to buy or when to sell. You should do every purchase with a purpose, and constantly re-assess that purpose as per the prevailing market and other conditions.

Measuring Return on Investment (ROI): The performance of the portfolio is measured by the return on investment (ROI). The individuals can successfully formulate a logical money- management strategy by knowing the probability of returns received by each dollar invested. ROI = (Gains — Cost)/Cost The ROI can change depending on the improvement or worsening of the market conditions. It also depends on the kind of assets or securities held by the investor. In general, the higher potential ROI involves higher risk and vice-versa. Thus, one of the major tasks of the portfolio management is the proper risk control.

Measuring Risk: The risk tolerance of the person determines the pace of his/her returns. The risks and rewards are in essence interrelated to each other where tolerance of the risks tends to influence or even dictate the rewards. An investor whose goal is to maintain his/her current assets instead of growing them, he/she will keep only safe and secure investments in the portfolio.

Diversification of the portfolio: The diversification of the portfolio is required to minimize the risks and maximizes the returns in the long term. It is preferred to diversify your portfolio however; one should take care to avoid over-diversifying. The diversified portfolio led to smoothing of peak-and-valley pricing effects caused by the fluctuations in the normal market and in surviving long term market downturns. The over diversification can become counterproductive so it needs to be avoided.

Avoiding the gambling: As an investor, one should avoid portfolio that relies on high-risk, high-return investments. It is because; the higher speculative investment can lend to conditions where investor may require selling his holdings prematurely at a loss due to liquidity crisis and expected returns won't materialize.

PORTFOLIO MANAGEMENT MODELS

Capital Asset Pricing Model

Capital Asset Pricing Model also abbreviated as CAPM was proposed by Jack Treynor, William Sharpe, John Lintner and Jan Mossin.

When an asset needs to be added to an already well diversified portfolio, Capital Asset Pricing Model is used to calculate the asset's rate of profit or rate of return (ROI).

In Capital Asset Pricing Model, the asset responds only to :

- Market risks or non diversifiable risks often represented by beta
- Expected return of the market

- Expected rate of return of an asset with no risks involved

What are Non Diversifiable Risks?

Risks which are similar to the entire range of assets and liabilities are called non diversifiable risks.

Where is Capital Asset Pricing Model Used?

Capital Asset Pricing Model is used to determine the price of an individual security through security market line (SML) and how it is related to systematic risks.

What is Security Market Line?

Security Market Line is nothing but the graphical representation of capital asset pricing model to determine the rate of return of an asset sensitive to non diversifiable risk (Beta).

Modern Portfolio Theory

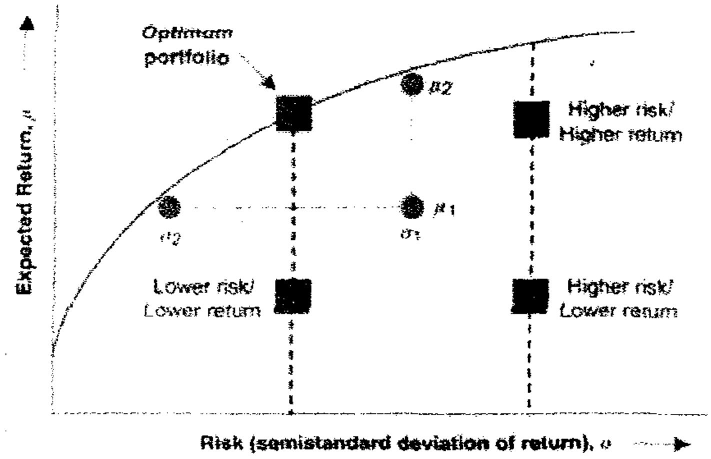
Modern Portfolio Theory was introduced by Harry Markowitz According to Modern Portfolio Theory, while designing a portfolio, the ratio of each asset must be chosen and combined carefully in a portfolio for maximum returns and minimum risks.

In Modern Portfolio Theory emphasis is not laid on a single asset in a portfolio, but how eachasset changes in relation to the other asset in the portfolio with reference to fluctuations in theprice.

Modern Portfolio theory proposes that a portfolio manager must carefully choose various assets while designing a portfolio for maximum guaranteed returns in the future.

Modern Portfolio theory (MPT) presents the concept of diversification in investing by using mathematical formulation. It aims to select a collection of investment assets which has lower risk than any individual asset. It can be observed spontaneously as dynamic market conditions cause changes in value of different types of assets in conflicting ways. The prices in the bond market may fall independently from prices in the stocks market, thus there is overall lower r(sk in a collection of both bond and stocks assets as compared to individual asset. Moreover, the diversification reduces the risk even if cases where assets' returns are positively correlated.

MPT stress the fact that assets than investment portfolio must not be chosen individually where each asset is selected on the basis of its own merits. Instead, it is important to observe the changes in price of each asset relative to changes in the price of every other asset in the portfolio. Investing in the assets is basically the exchange between risk and expected return. The assets with higher expected returns are usually more risky.



A Portfolio Manager is responsible for building a portfolio of assets such as stocks, bondsand other assets that generates the maximum possible rate of return at the least possible level of risk. The portfolio management involves allocation of funds in various assets to achieve diversification of portfolio that offer maximum return at the lowest possible risk.

MPT assists in the selection of a portfolio with the maximum possible expected return at a given level of risk. Similarly. MPT assists in the selection of a portfolio with the lowest possible risk at a given amount of expected return. Thus, it is not possible to have a targeted expected return exceeding the highest-returning available security except there is possibility of negative holdings. MPT stresses the diversification and assists the portfolio managers in finding the best possible diversification strategy.

Modern portfolio theory (MPT) refers to the theory of investment that seeks to maximize the expected return of portfolio at a given level of risk. Similarly it also attempts to diminish risk for a given level of return expected. To achieve this, portfolio manager choose the proportions of different assets in a portfolio carefully. The modern portfolio theory is extensively used for practice in the financial industry, however basic assumptions of this theory has faced certain challenges in fields like behavioral economics.

In technical terms, a Modern Portfolio theory (MPT) represents the return of asset as a normally distributed function or as an elliptically distributed random variable where risk isdefined as the standard deviation of return. According to MPT, the return of a portfolio isequivalent to the weighted combination of the assets returns because the portfolio is modeled as a weighted combination of assets. MPT aims to reduce the total variance of the return of portfolio by combining various assets whose returns are negatively correlated or notpositively correlated. MPT assumes that the markets are competent and investors are logical.

Arbitrage Pricing Theory

Stephen Ross proposed the Arbitrage Pricing Theory in 1976.

Arbitrage Pricing Theory highlights the relationship between an asset and several similar market risk factors.

According to Arbitrage Pricing Theory, the value of an asset is dependent on macro and company specific factors.

Value at Risk Model

Value at Risk Model was proposed to calculate the risk involved in financial market. Financial markets are characterized by risks and uncertainty over the returns earned in future on various investment products. Market conditions can fluctuate anytime giving rise to major crisis.

The potential risk involved and the potential loss in value of a portfolio over a certain period of time is defined as value at risk model.

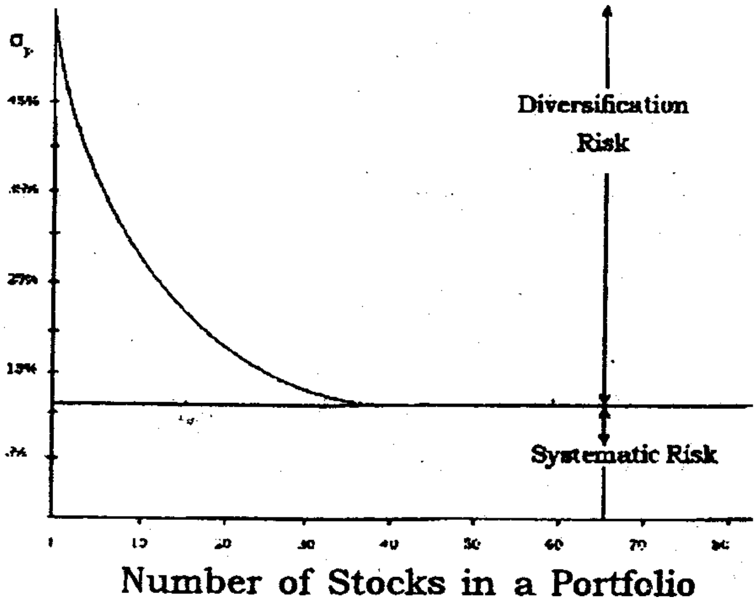
Value at Risk model is used by financial experts to estimate the risk involved in any financial portfolio over a given period of time.

MARKOWITZ DIVERSIFICATION AND CLASSIFICATION OP RISKS

In all our earlier illustrations, we have seen 'that the Portfolio Risk is smaller than the risk of individual assets. It indicates that the Portfolios are less risky than the isolated Assets. This p1ienomenon has been often attributed to Markowjtz's contribution. If an Investor intodiversify his investment into different assets instead of investing the whole in one security, heis certain to benefit from reduced risk level. Further, if he can find assets with negative correlation, the combined risk, works out zero or near zero. But unreality it is difficult to find many assets with negative correlation.

What will happen to portfolio risk if we 'go on adding more and more stocks to a Portfolio? Itis logical to believe that the risk is bound to reduce as the number of stocks in a portfolio increases. Can we eliminate risk completely P It all depends an the correlation in between Assets. Smaller the correlation, lower will be the risk m the Portfolio. Infact, if we can find stocks with either zero correlation negative correlation, the portfolio risk would be certainly low. But it is impossible to find such stocks to construct our Portfolios. In -such a case thereexists a minimum level of risk in every portfolio, however large the number of Assets in it may be.

Effect of Portfolio Size on Portfolio Risk



Observe the above diagram which depicts the decline in size of portfolio as the number of individual stocks increase in a portfolio.

That portion of the total risk which declines due to diversification of I investment, from a single asset to others is called diversifiable risk or firm specific risk. It may arise due to the internal firm level or company level [or industry level reasons like strikes and lock outs, sudden full ‘in demand for the product, entry of new technology, specific governmental restrictions, fluctuating growth to the given industry. On the other hand, the undiversiflable risk which is also called ‘systematic risk’, is that portion of risk which cannot be further reduced by adding any number of newer scraps to the given portfolio. It is called ‘systematic’ or ‘market risk’ as the reasons like general changes in the economy political and market fluctuations, inflation and interest rates which have a common bearing on all stocks. As these factors simultaneously affect all industries as well as firms alike this risk is universal to all risky assets.

SHARPE’S SINGLE INDEX MARKET MODEL

In an attempt to capture the relative contribution of each stock towards portfolio risk, William Sharpe has developed a simple but elegant model called as ‘Market Model’. His argument is like this. We appreciate that the portfolio risk declines as the number of stocks increases butto certain extent. That part of the risk which cannot be further reduced even when we add fewmore stocks into a portfolio is called systematic risk. That undiversified risk is attributed to the influence of systematic factors principally open at a given market. Ii one includes all traded scantiest in a market in jj3 portfolio, that portfolio reduces the risk to the extent of what market inflame In such a case one can easily capture every individual stocks' conti1&ij0 to portfolio risk by simply relating its returns with that of the Market. Such relationship is expected to give us the market sensitivity of the glen scrip. This is exactly the relationship that William Sharpe has estimated a simple regression equation considering the returns on Market Index, such as SENSEX, ET Imides, NSE Index or RBI Index as independent variable and returns on individual stocks as dependent.

$$R_{it} = \alpha_j + \beta_i\ R_{mt} + e_{it}$$

Where

R_{it} = Return on i^{th} security during t^{th} holding period

R_{mt} = Return on a Market Index during t^{th} holding periodα = Constant term

β_{it} = Market Beta or 4arket Sensitivity of a given stock

Since the regression coefficient (Beta) indicates the manner in which a Security's return change systematically with the changes in market, this linear line is also called Characteristic Line.

The slope of the line is called Beta. I was gained lot of popularity in Security Analysis as a measure of relative market risk. If Beta is 'one' for such a stock which is said to have the risk exactly equal to that of the Market. On the other hand, the stock with Beta greater than one indicates the aggressiveness of the stock in the market and less than one indicates the slow response in the price of that stock. The Calculation of Beta for a given stock can be worked out as follows:

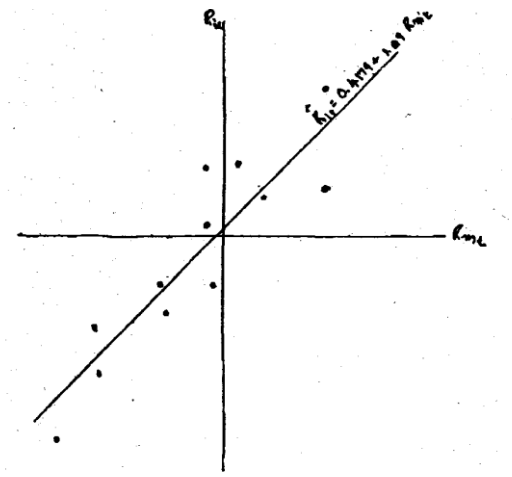
Consider the following data on monthly changes in Bombay SENSEX and a cotton firm's stock price during the last 12 months.

Months	Monthly stock price charge (return) %	change in Market Index %
1	-70	-5.0
2	-11.5	-9.5
3	-5.0	-5.0
4	-45	-0.5
5	+2.0	+5.0
6	+3.0	+2.0
7	+4.5	+1.5
8	+1.0	-1.5
9	+7.5	+5.0
10	+3.0	-2.0
11	-7.0	-10.5

12	16.5	-2.5

The estimated relationship can be shown as in the following figure.

Characteristic Line Estimation



$R_{it} = 0.4179 + 1.09\ R_{mt}$

The Regression line to be estimated here, and the 'beta' IS

$$R_{it} = \alpha + \beta\,(R_{mt})$$

Where

$$\beta = \frac{\sum (R_{it} - \bar{R}_i)(R_{mt} - \bar{R}_m)}{\sum (R_{mt} - \bar{R}_m)^2}$$

$$\alpha = \bar{R}_m - \beta(\bar{R}_i)$$

To get a realistic idea on the values of estimated Betas

RISK - RETURN RELATIONSHIP AND FORMATION OF EFFICIENT FRONTIER

An efficient capital market is one wherein there exists a proportional relationship between the risk and the expected rates of return in all risky assets. The share prices are expected to change in such a way that they should generate atonal returns for every additional unit of risk that a security possesses. However, the designation of risk changes if one takes portfolios into account. As a part of the risk can be diversified away if an asset is hold in portfolios, the market is expected to bring an equilibrium relationship in between the return and the Portfolio risk. Then price changes are addressed towards portfolios rather than individual assets. This aspect can be seen with an illustration developed by Brigham and Gopansni in their Text book Intermediate Financial Management (P. 52 -53).

Consider Two Securities : Security A

Security B

Possible corrections in between the return of these securities (Three situations)	r_{ab} = r_{ab} r_{ab}	= -1.0 (or) = 0.0 (0r) = -1.0
Expected Returns $(\bar{R})$	Security A Security B	= 5.0% = 8.0%
Estimated Risks (σ)	= Security A Security B	=4.00% = 10.0%

Portfolios (Five)	**Proportion of Total Investment in Stock A**	**Proportion of Total Investment in Stock B**
I	10%	0%
II	75%	25%
III	50%	50%
IV	25%	75%
V	0	100%

Calculated Portfolio Returns and Risks

Portfolio	Weightage for stock A (WA)	Weightage for stock B (1-WA)	RAB + 1.0		VAB = 0.0		VAB = (-) 1.0	
			$\hat{R}_p$	$\hat{\alpha}_p$	$\hat{R}_p$	$\hat{\alpha}_p$	$\hat{R}_p$	$\hat{\alpha}_p$
I	1.0	0.0	5.0	4.0	5.0	4.0	5.0	4.0
II	0.75	0.25	5.75	5.5	5.75	3.9	5.75	0.5
III	0.50	0.50	6.50	7.0.	6.50	5.4	6.50	3.0
IV	0.25	0.75	7.25	8.5	7:25	7.60	7.25	6.5
V	0.0	1.00	8.0	10.0	8.0	10.0	8.0	10.0

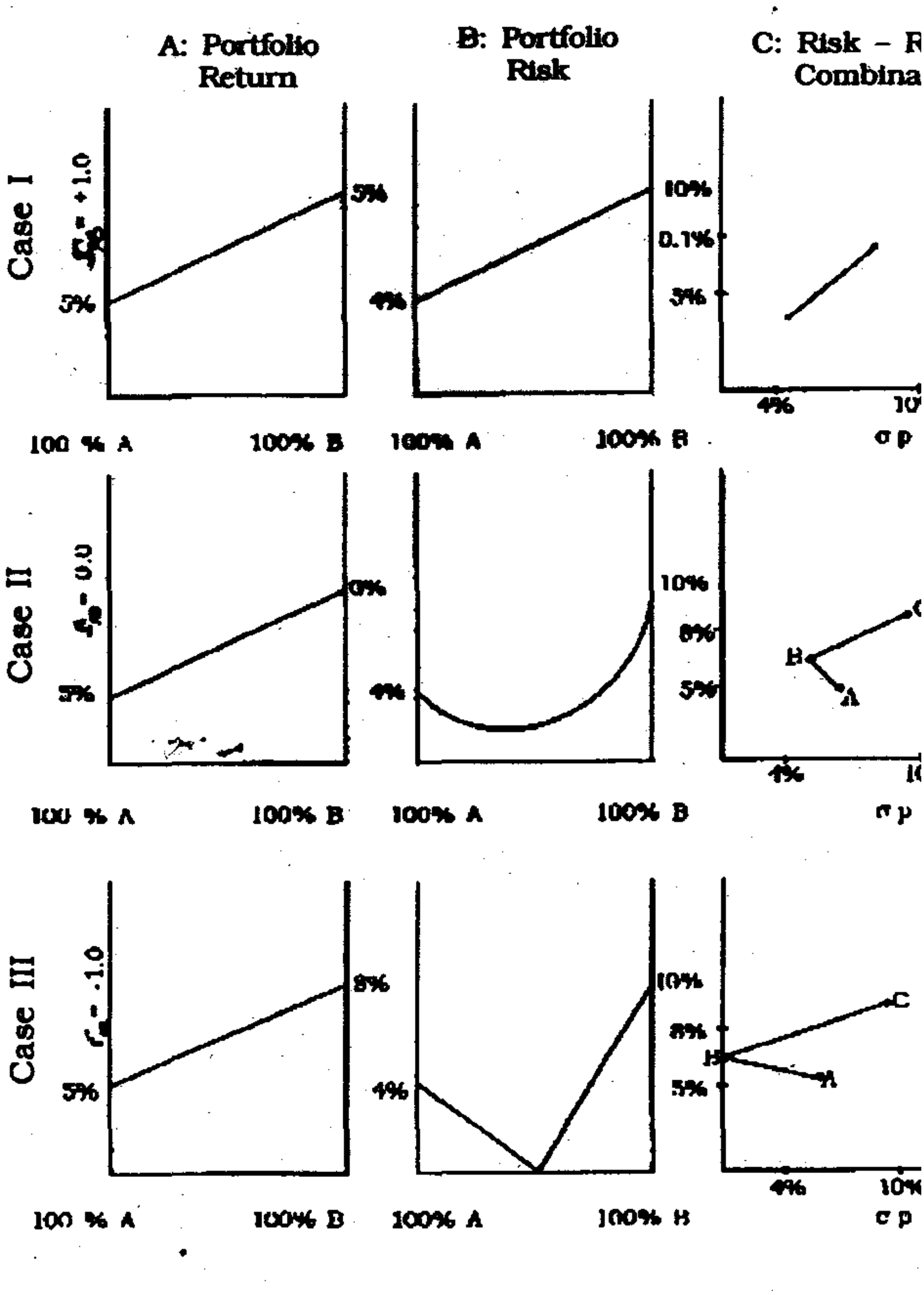
Let us plot the above calculated portfolio returns and risks in a graph. The following Figure Vifi shows three graphs for three cases. Case I refers - to the situation when assets possess acorrelation r_{AD} =+1.0, case U refer to the correlation r_{AB} = 0.0 and case III refer to r_{AB} = -1.0 The left column of graphs in the Figure show the Expected Returns, the-middle column shows the size of portfolio risk across different combinations of stock A and stock 13. TheRight column of graphs shows the Risk and Return combinations under different situations ofcorrelation between two stocks.

One can easily observe that the Expected returns are identical in all situations indicating that the Portfolio return (R_P) is a linear function of weighted average of the assets (W_i) in thegiven portfolio.

In case of middle graphs, the portfolio risk (σ_p) maintain a linear relationship when assets possess a correlation . A situation of complete diversification of risk can be seen when Assetspossess a correction r_{AB} = -1.0

The Right Column graphs indicate the possible attainable sets of portfolios of stock A and stock B. A part of attainatable sets in case II and can III are found inefficient (A to B) since they maintain negative relationship between- risk and return. Therefore the entire attainatableset is not always efficient.

Figure



EVALUTION OF PORTFOLIO PERFORMACE

INTRODUCTION

Of late, Mutual Funds gained popularity in India since early '90s. As most individual investors are fading it difficult to identify and diversify his investment across different portfolios either due to lack of complete knowledge of investment management principle or due to lack of skills needed to play actively with the complex system of taking quick decisions for proper handling of their portfolios, they are just turning to specialised institutions like Mutual Funds. Mutual Funds in turn with their skilled portfolio managers are promising to generate a rate of return almost similar to the size of return that market yields on efficient portfolios. These specialised institutions are able to invest across different industries and different securities with the available large amounts of money entrusted to them by Investors. This facilitates to take the fuller benefits of diversification. Further the varieties of schemes of Mutual Funds throw opportunities to suit to the varied requirements of different investors. This lesson is towards examining the performance of a Portfolio Manager ininvesting the funds entrusted to a Mutual Fund. Such an evaluation is important to an investorin different directions.

I. It enables investor to appraise how well the Portfolio Manager has achieved thetargeted return.

II. It enables the investor to examine how well the manager has achieved the targetsin comparison with other Mutual Funds;

III. It enables the fund authorities to evaluate the performance of their investmentdecisions not only earning a specified rate of return, but return in relative terms i.e. per unit of risk.

METHODS OF CALCULATING PORTFOLIO RETURNS

Calculation of Portfolio Returns is almost similar to the calculation of Rate of Return on individual stock. The rate of return is generally estimated for a specific holding period. The Performance of a Portfolio Fund is evaluated by considering the returns generated over a timeframe with number of sub holding periods. The calculation of portfolio return is relatively easy when there are no additions or withdrawals from the initial corpus during the given time period. The Portfolio retuxns can be calculated as was illustrated in the following example.

Portfolio Composition : (Beginnlng)

Scrip	No. of shares	Market Price at Beginning	Portfolio value at Beginning
Alpic Finance	100	93	9,300
Ashok leyland	50	70	3,500
Ballarpur Industries	100	150	15,000
CIPLA	50	221	11,050
Federal Bank	200	156	31,200
		P0	70,050

Portfolio value at the end of holding period

Scrip	No. of shares	Market Price at End	Portfolio value at the End
Alpic Finance	100	120	12,000
Ashok leyland	50	122	6,100
Ballarpur Industries	100	164	16,400
CIPLA	50	358	17,900
Federal Bank	200	160	32,000
		P1	84,400

Portfolio Return

$$R = \frac{P_1 - P_0}{P_0} = \frac{84,400 - 70,050}{70,050}$$

= 20.48%

In the above illustration we have calculated the Portfolio returns by taking the price changes of all individual stocks during the holding period. If we get the net ending value of a portfolioas less than the beginning value, then the Portfolio return would be negative.

We have seen earlier, all Mutual Funds are specially designed portfolios. The returns from such portfolios are cumulated by considering the Net Asset values (NAVs) of each of these funds rather than the changes in Market prices of all stocks constituting the given portfolio. Then the Portfolio returns (Fund Returns) are

$$RP = \frac{NAV_t - NAV_{t-1}}{NAV_{t-1}}$$

The calculation of portfolio return becomes complicated when there exists certain additionsor withdrawals into the Funds during the specific evaluating period. Further, when thereexists intermediate cash flows which may be due to dividend declarations by some companiesand when such cash flows are reinvested into the Units of the given Mutual Fund, the calculation of portfolio return becomes complicated. The following methods are used to calculate the portfolio return during such situations.

DETERMINENTS OF PORTFOLIO PERFORMANCE

Performance of Portfolio depends on certain critical decisions taken by a portfolio manager. An evaluation of these decisions help us to determine the activities which need efficiency for better portfolio performance. The popular activities associated in this regard are

a) Investment policy

b) Stock Selection

c) Market Timing

The risk adjusted performance measures discussed earlier primarily provide an analysis on the overall performance of a portfolio without breaking it up into sources or components. Eugene Fama has given a Framework towards this purpose. Let it see it now.

As we know that Security Market Line (SML) is likely to provide a relationship between thesystematic risk (β) and Return on an Asset, Fama used this framework to break the actualrealised return into two parts. A part of the return may be due to the size of risk that the asscecarries and the remaining due to the superior selectivity skills of the portfolio manager. The excess return-form of SML can be used to estimate the Expected returns. If actual return is more or less than such Expected returns it can be attributed to superior or inferior stockselection. Then

Total excess return on a Portfolio (say A) = Selectivity + Risk

Using the notation used in the following Figure, the above relationship can be show as

$$\boxed{(R_A - R_F) = [R_A - R(\beta_A)] + [R(B_A) - R_F]}$$

(Illustration from Fuller & Farrell (P. 573))Suppose :

R_A = 8%

R_F = 2%

R_m = 9%

β_A = 0.67

σ_A = 15%

σ_M = 21%

Then expected return on Portfolio A is

$\hat{R}_A$ = $R_F + (R_M - R_F)\beta$

= 2.0% + (9.0% - 2.0%) 0.67

= 6.69 or 6.7%

Actual R_A = 8.00

^

Excess return due to selectivity = Actual R_A - R_A

= 8.00 - 6.69 = 1.31 or 1.3%

Return due to Risk = (R_A - R_F) - (Return due to Selectivity)

= (8% - 2%) - (1.31%)

= 4.69 or 4.7%

Total Excess Return = Selectivity + Risk

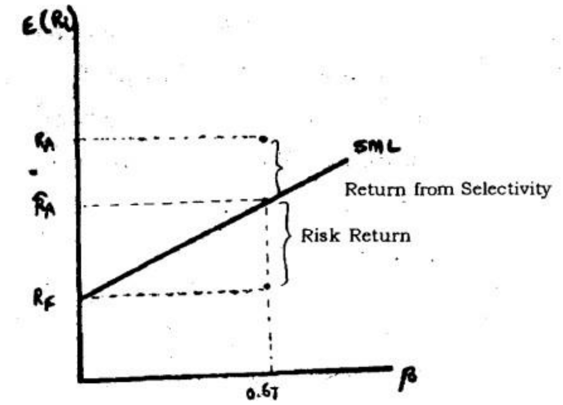
(R_A – R_F) = [R_A - R(βA)] + [R(βA) - R_F]

[8.0% - 2.0%] = [8.0% - 6.7%] + [6.7% - 2.0%]

6% = 1.3% + 4.7%

Figure

Division of Portfolio Returns Towards Risk and Selectivity



Portfolio Managers generally resort to new diversifications to earn exec : return. New Diversifications are bound to bring additional risk to the existed portfolios. Naturally the excess return is to be validated in' the light of addition diversification risk. This aspect can beexamined if the above problem i evaluated by using the logic developed for portfolios i.e., Capital Market Line In the context of ML

$$R_P = R_F + \left[\frac{R_M - R_F}{\sigma_M}\right]\sigma_P$$

(or)

$$R_A = R_F + \left[\frac{[R_M - R_F]}{\sigma_M}\right]\sigma_A$$

We can determine the Normal return on Portfolio A as follows

$$\hat{R}_A = R_F + \left(\frac{R_M - R_F}{\sigma_M}\right)\sigma_A$$

$$= 2.0\% + \left[(9\% - 2\%)\frac{15\%}{21\%}\right]$$

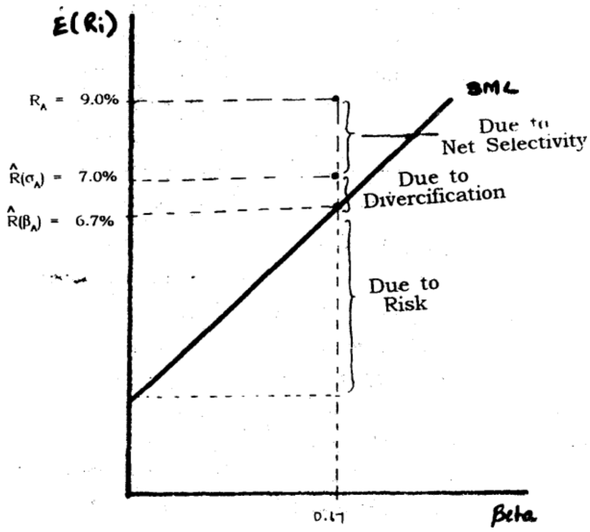
$$= 7$$

The difference between the return estimated by SML and CML refers to the additional reward needed for bearing the diversification risk. Therefore Compensation for Diversification

Risk = * 7.0% - 6.7% = 0.3% * $(R_A = R_F + (R_A - R_F)\beta)$

Then the Net Selectivity of the portfolio is the overall selectivity less whatever additional reward expected from diversification risk. In the following figure, the net selectivity could be shown as difference between actual return (RA) and returns as estimated by Portfolio Standard Deviation [$R(\sigma_A)$]. It cash be shown as

Figure
Division of Portfolio Returns Into
Net Selectivity Diversification and Risk



Selectivity + Compensation for diversification RiskTherefore,

Net Selectivity = [RA - RA(βA)] - [RA(σA - R(βA)]

= (8.0% - 6.7%] - [7.0% - 6.7%]

= 1.3% - 0.3%

= 1.0%

Return from selectivity and Net selectivity would be equal only when the Portfolio is well diversified. If one can estimate the R2 value while fitting the regression line of SML in between R1 and Beta the size of R^2 reveals tire degree of diversification. A high R^2 value of

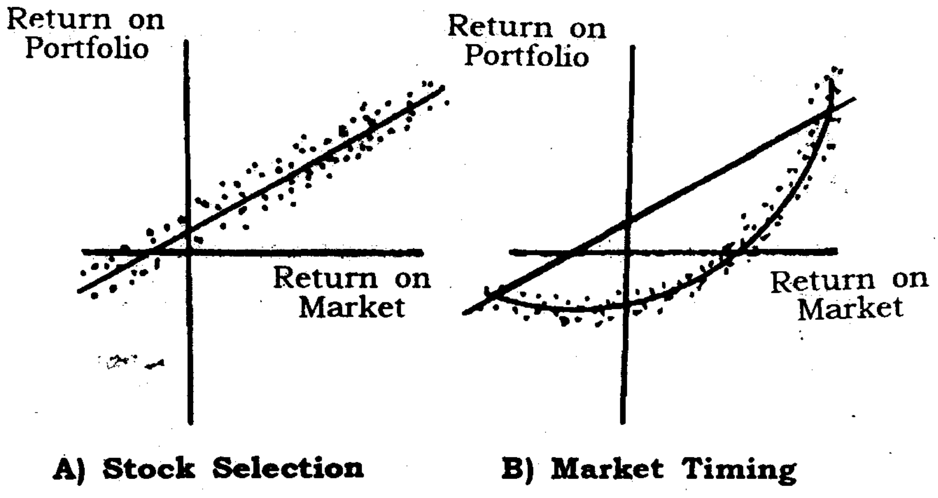
0.97 or 0.95 indicates complete diversification in the given portfolio and 0.85 or 0.80 indicates the existence of undiversifiable risk iii the portfolio which needs reward to bear it.

MARKET TIMING

A portfolio manager's performance is seen so far in the context of stock- selection for superior performance. Managers can also generate superior performance from a portfolio by planning the investment and disinvestment activities by shifting from stocks to bonds orbonds to stocks based on good market timing sense. Positioning of a portfolio is to beadjusted by correctly adjusting the direction of Market either bull or bear phases. Managers with a forecast of a declining market can position a portfolio either by shifting resources fromstocks to bonds or restructure the component stocks in such a way that the beta of the equity portion of the portfolio comes down.

One way of finding the performance of a portfolio in this regard is to simply look directly at the way the fund return behaves relative-to the Return of the Market. This method calls for calculating the returns of the portfolio and the Market at different intervals and plot a scatter diagram to seethe direction of relationship between these. If a portfolio is constructed by concentrating on stock selection rather keeping the market timing in mind, the average beta of the portfolio stands fairly constant and if we plot such a portfolio's returns and Market returns we observe a linear relationship. On the other- hand, if a manager was able tosuccessfully assess the market direction and reshuffle the portfolio accordingly, we would observe a situation of high portfolio betas at times of market raise and low portfolio beta at times of define in the market. These issues are shown in the following Figures.

Portfolio Returns Vs Market Returns



PORTFOLIO PERFORMANCE AND RISK ADJUSI'ED METHODS

Modern Portfolio Theory provides a variety of measures to measure the return on a portfolio. as well as the risk. When a Portfolio carries a degree of risk, the return from it should be evaluated in terms of risk. More specifically, it is better to evaluate the performance of fundin terms of return per unit of risk. In case of a well diversified Portfolio the standard deviationcould be used as a measure of risk, but in case of individual assets and not-so- well diversified portfolios the relevant measure of risk could be the systematic risk. We have already seen in earlier units the measurement aspects of Portfolio risk and the systematic risks.

There are 3 popular measures to estimate the return per unit of risk from a portfolio. Theyare:-

a) Sharpe's Ratio

b) Treynor's Measure

c) Jensen's Differential returns

SHARPE'S RATIO

Sharpe's measure is called as the 'Reward to Variability' Ratio. The returns from a portfolio are initially adjusted for risk free return. These excess returns attributable as reward for investing in Risky assets are validated in terms of return per unit of risk. Sharpe's ratio is as follows :-

$$\text{Sharpe's ratio (SR)} = \left[\frac{RP - RF}{\sigma}\right]$$

Where

RP = Realized Return on a portfolio during a holding periodRF= Risk-free rate of Return

σP = Standard Deviation of the PortfolioTo illustrate, Let us consider two portfolios

Portfolio	Return (RP)	Risk Free rate (RF)	Excess return (R_p - RF)	Portfolio risk (SD)
A	21	8	13	10
B	17	8	9	8

Sharpe's Ratio: Portfolio A = $\frac{21-8}{10} = 1.33$

Portfolio B = $\frac{17-8}{8} = 1.32$

Reward per unit of risk in case of Portfolio A is relatively higher. Hence its performance issaid to be good.

TREYNOR'S MEASURE

Treynor's measure is called as 'reward to Volatility ratio. Treynor considers portfolio &ta asa measure of risk. Portfolio eta is the average 3eta of individual assets in the given Portfolio. This eta designates the market risk of the given portfolio. The Treynor's measure is

calculated as follows:

$$\text{Treynor's Measure (TR)} = \left[\frac{R_P - R_F}{\beta_P}\right]$$

Where

R_P = Realised Return on a PortfolioR_F = Risk free Rate of Return

β_P = Portfolio βeta

The following table provides the Relative Performance of select portfolio funds as measuredby the above said measures.

Portfolio	Return R_P(%)	Risk free Return (R_F)	Excess Return (R_P-R_F)	Standard deviation σ_P%	Sharpe's Ratio (SR)	Beta (β_P)	Treynor's measure (TR)
X	16	8	8	5	1.60	0.75	10.0
Y	18	8	10	6.5	1.54	1.00	9.6
Z	20	8	12	8	1.50	1.25	10.0

As a matter of fact, the ranking according to both measures - reward to variability and rewardto volatility - will be identical when funds under consideration are perfectly diversified. Otherway may likely to resi.ilt in if they are so well diversified.

JENSEN'S DIFFERENTIAL RETURN

Jensen measure looks for the estimation of security Market Line (SMC) as discussed in theearlier lesson. Under CAPM approach, we assume that in efficient market the expected or realised returns of individual assets are likely to maintain a proportional relationship to the size of risk that an asset canoes. Jenson's measure tries to find the difference if any in the actual realised return from that of the expected. The underlying objective of this technique is the comparison of expected return for the given level of risk with that of the actually realised returns.

The CAPM suggests the following relationship between the expected returns and the portfolio risk or Beta

$$\hat{R_i} = R_f + \beta(R_m - R_f)$$

Where

R_i = Expected Return on i AssetR_f = Return as a Riskfree rate

R_m = Return as a Market Portfolio

The above said equation, if expressed on ex-post basis as well as terms of Excess Returns, itwill be as follows:

$(R_i - R_f) = \alpha_i + \beta_i (R_m – R_f) + e_i$ Where

α_i = Intercept e_i = error term

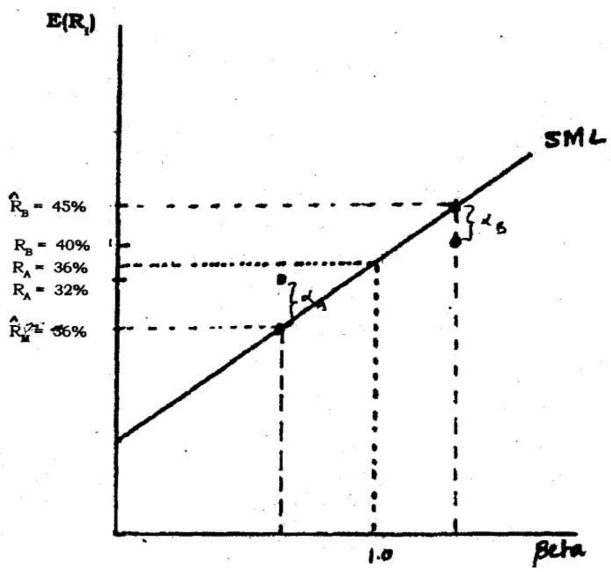
If a Portfolio manager) can predict the possible relationship between the reward and risk that exists in a market before deciding on portfolio building there should not be any value for 'i' term when the actual returns are adjusted for risk free return. If there is any value for i term it indicates that the superior returns from the portfolio earned due to superior managerial skills by the portfolio manager.

Let us consider the following illustration to drive the point more clearly.

Portfolio	Return	Risk free return	Beta	Alpha
A	32.0	8.0	0.67	6.00
Z	40.0	8.0	1.33	-5.00
M	36.0	8.0	1.00	0.00

The Jensen's alpha can be calculated by substituting the values in the above given equation. If one considers the portfolio M is equivalent to Market portfolio, the other portfolios can be shown as in the following Figure.

Differential Returns on Portfolio (A) and (Z)



Differential Returns on Portfolio (A) =

(32 - 8) = $\alpha + 0.67\ (36.0 – 8.0)$

24.0 = $\alpha + 0.67\ (28) = \alpha + (18.0) = 24$

A = 24 – 18 = 6.0% (Excess)

Portfolio (Z)

(40.0 - 8.0) = $\alpha + 1.33\ (36.0 – 8.0)$

32.0	=	$\alpha + 1.33\ (28)$
$\alpha + (37.0)$	=	$32.0 - 37.0$
α	=	(-) 5.0% (Negative)

CONCLUSION

Portfolio Management models are process. We can learn from experience. We can modify the modalities as we go a long.

This paper, I have established a relationship between risk and return of Portfolio Management in relating to mutual fund's security market. The main theme of the above paper eliminate thehigh risk with low return.

As a Portfolio Manager or researcher we should always keeps in mind the benefit of the application of Portfolio Management by following ways:

- To help and individual earn maximum revenues with minimum risks involved in the long run.
- To help an individual to decide where and how to invest this hard earned money for guaranteed return in the future.

This area is very need to research work by the Portfolio Manager and researcher applied the various model and methodology to real time and growth the investor's moral to invest their money without any risk.

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