PGBA (S4) 01

Investment Management

SEMESTER - IV

BUSINESS ADMINISTRATION

(Finance Specialisation)

BLOCK - 2

KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY

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MASTER IN BUSINESS ADMINISTRATION

INVESTMENT MANAGEMENT
(FINANCE SPECIALISATION)
Block 2

DETAILED SYLLABUS

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Share valuation, Earnings valuation,Cash flow valuation,Asset valuation and Dividend-Discount model

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BLOCK INTRODUCTION:

This is the second block of the course 'Investment Management'. The Block is divided into 7 units which are related to the differnt concepts of Investment Management.

This block comprises of the following seven units:

The ninth unit introduces us to Share valuation, Earnings valuation,Cash flow valuation,Asset valuation and Dividend-Discount model

The tenth unit gives us a broad idea on the concepts of Inputs to Portfolio Management,Return and Risk Characteristics of Individual Assets, Expected Return and Risk of a Portfolio, Diversification of Risk, Portfolio Analysis and Selection,Correlation between Securities and its Impact on Portfolio Risk and Portfolio Selection

The eleventh unit gives us an idea on the Benefits of Portfolios, Approaches in Portfolio Construction: Traditional approach, Modern Approach and Portfolio Risk Return

The twelvlth unit will help us in knowing the The Markowitz Model: Assumptions and Concept, Varying Degrees of Correlation, Simple Diversification,Problems of vast Diversification, Risk and Return with Different Correlation, Markowitz Efficient Frontier, Utility Analysis, Risk Free Asset, Sharpe-The Single Index Model and Sharpe's Optimal Portfolio

The thirteenth unit gives us a broad idea on Capital Asset Pricing Theory: An Introduction,

Security Market Line,Evaluation of Securities, Market Imperfection and SML, Empirical Tests of the CAPM and Present Validity of CAPM

The forteenth unit will help us in understanding the Capital Asset Pricing Model (CAPM), Concepts of Risk-free Asset, Risk-free Lending and Risk-free Borrowing, Efficient Set with Risk Free Lending and Borrowing, Leveraged Portfolio, The CAPM, Assumptions, Security Market Line and Arbitrage Pricing Theory (APT)

The fiftennth unit will help us in understanding the Mutual Fund, Importnace Mutual Funds,Schemes of Mutual Funds, Mutual Funds in India, Constitution of Mutual Fund, Operational Efficiency of Mutual Funds, Making Mutual funds Investor Friendly and Technology And Mutual Funds In India.

The Block is devided into seven units:

UNIT 9: Valuation of variable Income Securities or Equity Share Valuation

UNIT 10: Portfolio Management

UNIT 11: Portfolio Construction

UNIT 12: The Markowitz Model

UNIT 13: Capital Asset Pricing Theory

UNIT 14: Capital Market Theory and the Arbitrage Pricing Theory

UNIT 15: Mutual Funds

UNIT 9: VALUATION OF VARIABLE INCOME SECURITIES OR EQUITY SHARE VALUATION

UNIT STRUCTURE

9.1 Learning Objectives

9.2 Introduction

9.3 Basic Concepts

9.4 Share valuation

- 9.4.1 Earnings valuation
- 9.4.2 Cash flow valuation
- 9.4.3 Asset valuation
- 9.4.4 Dividend-Discount model

9.5 Let Us Sum Up

9.6 Further Reading

9.7 Answers To Check Your Progress

9.8 Model Questions

9.1 OBJECTIVES

After going through this unit, you will be able to :

- learn valuations of equity instruments
- discuss their interpretation and applicability of valuation in the stock market.
- analyse share valuation through the most often used methods such as earnings valuation, cash flow valuation, book valuation and dividend valuation.

9.2 INTRODUCTION

In this unit we are going to discuss about the share valuation, Earnings valuation, Cash flow valuation, Asset valuation and Dividend-Discount model.

Let us now discuss these concepts in the following sections.

9.3 BASIC CONCEPTS

Equity shares are floated in the market at face value, or at a premium or at a discount. Only companies with a track record or companies floated by other firms/companies with a track record are allowed to charge a premium. The premium is normally arrived at after detailed discussions with the merchant bankers. This is the first exercise involving the valuation of share by the company itself.

After allotment of shares to the shareholders, the company may distribute its surplus profits as returns to investors. The returns to equity shareholders are in the form of distribution of business profits. This is termed as declaration of dividends. Dividends are declared only out of the profits of the company. Dividends are paid in the form of cash and are called cash dividends. When shares are issued additionally to the existing investors in the form of returns, they are called bonus shares. These decisions are taken in the annual general meeting of the shareholders. The announcement of dividend is followed by the book closure dates, when the register of shareholders maintained by the company is closed till the distribution of dividends. The shareholders whose names appear on the register on the date are entitled to receive the dividend payment. Cash dividend payments reduce the cash balance of the company while bonus share payments reduce the reserve position of the company.

Thus, the dividends are a direct benefit from the company to its owners. It is an income stream to the owners of equity capital. Many expectations surround the company's quarterly announcement periods in terms of the dividend declared by the corporate enterprises to its shareholders. The payment of dividend itself is expected to influence the share price of the company. To the extent that cash goes out of the company, the book value of the company stands reduced and it is theoretically expected to lower the market price of the share. This is based on the argument that future expectations are exchanged for current benefits from the company in the form of dividends.

While bonus shares do not reduce the cash flow of the company,

they increase the future obligations of the company to pay extra dividend in the future. Bonus shares result in an increase in the number of existing shares. Hence, the company has to pay dividend on its newly issued bonus shares in addition to its existing number of shares. These bonus shares are different from stock splits. Stock splits simply imply a reduction in the face value of the instrument with an increase in the quantity of stock. A stock split does not increase the value of current equity capital. Bonus shares, on the other hand, increase the value of equity capital to the company.

All these exercises by the company call for a renewed valuation of the shares traded in the secondary market. Hence, investment evaluation begins with the computation of the value of securities.

9.4 SHARE VALUATION

Share valuation is the process of assigning a rupee value to a specific share. An ideal share valuation technique would assign an accurate value to all shares. Share valuation is a complex topic and no single valuation model can truly predict the intrinsic value of a share. Likewise, no valuation model can predict with certainty how the price of a share will vary in the future. However, valuation models can provide a basis to compare the relative merits of two different shares.

Common ways for equity valuations could be classified into the following categories:

1. Earnings valuation
2. Cash flow valuation
3. Asset valuation
4. Dividend-discount model

Let us discuss categories in the follwoing sections:



CHECK YOUR PROGRESS

Q1: What is Stock Splits

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Q2: Write the ways for equity valuations.

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9.4.1 Earnings Valuation

Earnings (net income or net profit) is the money left after a company meets all its expenditure. To allow for comparisons across companies and time, the measure of earnings is stated as earnings per share (EPS). This figure is arrived at by dividing the earnings by the total number of shares outstanding.

Thus, if a company has one crore shares outstanding and has earned Rs. 2 crore in the past 12 months, it has an EPS of Rs. 2.00.

Rs. 20,000,000/10,000,000 shares = Rs. 2.00 earnings per share

EPS alone would not be able to measure if a company's share in the market is undervalued or overalued. Another measure used to arrive at investment valuation is the Price/Earnings (P/E) ratio that relates the market price of a share with its earnings per share. The P/E ratio divides the share price by the EPS of the last four quarters. For example, if a company is currently trading at Rs. 150 per share with a EPS of Rs. 5 per share, it would have a P/E of 30.

The P/E ratio or multiplier has been used most often to make an investment decision. A high P/E multiplier implies that the market has overvalued the security and a low P/E multiplier gives the impression that the market has undervalued the security. When the P/E multiple is low, it implies that the earnings per share is comparatively higher than the prevailing market price. Hence, the

conclusion that the company has been 'undervalued' by the market. Assume a P/E multiplier of 1.0. The implication is that the earnings per share is equal to the prevalent market price. While market price is an expectation of the future worth of the firm, the earnings per share is the current results of the firm. Hence, the notion that the firm has been 'undervalued' by the market. On the other hand, a high P/E ratio would imply that the market is 'overvaluing' the security for a given level of earnings.

Asian paints had a P/E ratio of 25.3 on July 26, 2005. The market price as on that date was Rs. 457.65 and the earnings per share was Rs. 18.1. Zee Telefilms, had a consistent P/E multiplier. ICICI Bank, had a price of Rs. 509.25 and PE ratio of 18.8 on the same date. The interpretation of 'overvaluation' will hold good when the market is expected to adjust towards the real worth of the company. A consistent high ratio, on the other hand, implies that the future returns expectations from the company is consistently good and that the high P/E ratio need not necessarily indicate a 'overvalued' position for the company.

The forward P/E valuation is another technique that is based on the assumption that prices adjust to future P/E multipliers. The assumption is that shares typically trade at a constant P/E and therefore the 'future' value of a share can be calculated by comparing the current P/E with the future P/E (as predicated using analysts' estimated earnings for that year).

The forecasted market price is calculated as [Price* (P/E, current)/ (P/E, future)]. For example, if current market price is Rs. 20, current P/E is 4 and forecasted P/E is 2.5, the forecast price is Rs. 32 $\left(\frac{20 \times 4}{2.5}\right)$. This valuation technique cannot be applied to shares with negative current or future earnings.

The forward P/E ratio is most often used in comparison with the current rate of growth in earnings per share. This is based on the assumption that for a growth company, in a fairly valued situation,

the price/earnings ratio ought to be equal to the rate of EPS growth. When the growth rate is not in tune with P/E multiplier, then P/E multiplier can be modified to include the growth ratio.

Assume, for example, that a company's P/E ratio is 15; earnings growth rate of 13 per cent -14 per cent would substantiate the fair valuation of the share in the market price. This can be incorporated in the P/E growth ratio (PEG). The PEG considers the annualised rate of growth and compares this with the current share price. Since it is future growth that makes a company valuable to the investors in the market, the earnings growth is expected to depict the valuation of a company better than the historical earnings per share. If a company is expected to grow at 10 per cent a year over the next two years and has a current P/E multiple of 15, the PEG will be computed as 15/10 = 1.5. The interpretation of PEG is that the market price is worth 0.5 times more than what it really is worth, since the assumption is that the P/E multiplier ought to be equal to the earnings growth rate.

A PEG of 1.0 suggests that a company is fairly valued. That is, in the previous example, if the P/E multiplier is 15 and the earnings growth rate is also 15, then PEG is equal to (15/15) 1.0. Here the company is evaluated as priced correctly by the market. If the company in the above example had a P/E of 15 but was expected to grow at 20 per cent a year, it would have a PEG of (15/20), 0.75. This means the shares are selling for 75 per cent of their real value. This leads to the conclusion that the shares are 'underpriced' in the market.

The PEG measure is useful only for positive growth companies. When the companies are not experiencing a growth opportunity or there is a short spell of negative performance due to various factors, the PEG will not be the right measure to use to assess the valuation of shares.

The forward P/E and growth ratio (FPEG) can be used for valuing companies with an expected long-term performance. Rather

than looking at the current historical price earning multiplier, the measure considers the price earnings multiplier forecast by analysts. This is compared with the expected earnings growth rate to evaluate the fair price of the shares. Assuming the analysts' expectation of the P/E multiplier of a company is 20 and the earnings growth is expected to be 25 per cent over the next five years, the FPEG is computed as 20/5 = 0.8. The interpretation of this number is similar to the interpretation of PEG, that is, the company is evaluated in the market at only 80 per cent of its realistic price. This will be an indicator of 'underpricing' of shares in the market. Similarly, a company that has an expected P/E multiplier of 20 and the growth in earnings in the next five years of 10 per cent will have a FPEG of (20/10) =2.0. This indicates an 'overpricing' of the share by the market by double its fair value.

Although the PEG and FPEG are helpful, they both operate on the assumption that the P/E should equal the EPS rate of growth. In the real market, the assumptions behind the earnings valuation methods need not necessarily hold good. A modification to the P/E multiplier approach is to determine the relationship between the company's P/ E and the average P/E of the stock index. This is called as the price-earnings relative. Price-earnings relative is given by the following formula:

P/E relative = (share P/E) / (Index P/E)

This formula estimates the shares' P/E movement along with the index P/E. A P/E relative of 1.5 implies that the share is sold in the market 1.5 times that of the index price/earnings.

However, these earnings multipliers become inapplicable when the earnings are negative. Negative earnings cannot be used for valuation of shares. However, when negative earnings occur, appropriate alternative estimates may be used for valuation. The substitute measures would depend on the cause for negative earnings.

There are a number of reasons for a company to have

negative earnings. Some of the reasons for negative earnings can be listed as follows:

- Cyclical nature of industry
- Unforeseeable circumstances
- Poor management
- Persistent negative earnings
- High leverage cost

Earnings Forecast

Earnings can be forecast through the forecasts of the rates resulting in the earnings. The variables that can be considered for forecasting earnings can be the future return on assets, expected financial cost (interest cost), the forecasted leverage position (debt equity ratio), and the future tax obligation of the company. The formula for forecasting the earnings could be stated as follows:

Forecasted earnings (value) = (1-t)x[ROA + (ROA-I)x(D/E)]xE

Where,

ROA = Forecasted return on assets

I = Future interest rate

D = Total expected long term debt

E = Expected equity capital

t = Expected tax rate

Alternatively, a forecast of sales and projected profit margin can be made to compute the forecasted earnings. The sales forecast would depend on the market share of the estimated industry sales forecast. The profit margin forecast will depend on the operational and financial expenses of the company. From this information earnings can be forecast using the following formula:

Forecasted Sales = Industry Sales Target x Company's Expected Share in Industry Sales

Forecasted Earnings = Forecasted Sales x Projected Profit Margin

The third method of forecasting earnings is to identify the individual variables constituting the earnings determination and

forecast each of these variables separately. This will involve the forecast of the fixed and variable components of the operational expenses and the financial expense. This method is most applicable when the fixed and variable components of the cost structure of a company do not vary drastically with that of the average industry cost figures.

Consider a company with a high fixed cost relative to that of the industry average. The company will be able to make a positive return only when the projected sales dramatically exceeds this high cost.

The company's total cost far exceeds the industry total cost. Given a sales level and variable cost level, a company whose fixed costs are above the industry average will be able to reach a profit figure at a comparatively higher level of activity. Similarly, any company that is able to minimise its fixed costs will have a better position in terms of profitability than the industry average. Hence the need to forecast the individual variables that constitute profit rather than the overall return on assets.

9.4.2 Cash Flows Valuation

Cash flows indicate the net of inflows less outflows from operations. Cash flows differ from book profits reported by companies since accounting profits identify expenses that are non-cash items such as depreciation. Cash flows can also be used in the valuation of shares. It is used for valuing public and private companies by investment bankers. Cash flow is normally defined as earnings before depreciation, interest, taxes, and other amortisation expenses (EBDIT). There are also valuation methods that use free cash flows. Free cash flows is the money earned from operations that a business can use without any constraints. Free cash flows are computed as cash from operations less capital expenditures, which are invested in property, plant and machinery and so on.

EBDIT is relevant since interest income and expense, as well as taxes, are all ignored because cash flow is designed to focus on the operating business and not secondary costs or profits. Taxes especially depend on the legal rules and regulation of a given year and hence can cause dramatic fluctuations in earning power. The company makes tax provisions in the year in which the profits accrue while the real tax payments will be made the following year. This is likely to overstate/ understate the profit of the current year.

Depreciation and amortisation, are called non-cash charges, as the company is not actually spending any money on them. Rather, depreciation is an accounting allocation for tax purposes that allows companies to save on capital expenditures as plant and equipment age by the year or their use deteriorates in value as time goes by. Amortisation is writing off a capital expenses from current year profit. Such amortised expenses are also the setting aside of profit rather than involving real cash outflows. Considering that they are not actual cash expenditures, rather than accounting profits, cash profits will indicate the real strength of the company while evaluating its worth in the market.

Cash flow is most commonly used to value industries that involve tremendous initial project (capital) expenditures and hence have large amortisation burdens. These companies take a longer time to recoup their initial investments and hence tend to report negative earnings for years due to the huge capital expense, even though their cash flow has actually grown in these years.

The most common valuation application of EBDIT is the discounted cash flow method, where the forecast of cash flows over a period fo time are made and these are discounted for their present worth.

The formula for computing the value of the firm will be

$$v = \sum_{i=1}^{n} \frac{C}{(1+d)^t}$$

Where C_i = cash flows forecast for year i

d = expected rate of return

n = number of years for which forecasts have been made.

This can be easily computed using software applications such as the spreadsheet. The following table illustrates the computation of the value of firm based on cash flow expectations.

Year	Expected cash flows (Rs. In crore)	Discounted cash flows (Discount rate 12%) (Formula)	Discounted cash flows (Discount Rate 12%)
1	200	= B2/(1.12)^A2	178.57143
2	254	= B3/(1.12)^A3	202.48724
3	236	= B4/(1.12)^A4	167.98014
4	280	= B5/(1.12)^A5	177.94506
5	310	= B6/(1.12)^A6	175.90233
6	324	= B7/(1.12)^A8	164.14848
7	356	= B8/(1.12)^A8	161.03632
8	368	= B9/(1.12)^A9	148.62903
9	375	= B 10/(1.12)^A10	135.22876
10	420	= B11/(1.12)^A11	135.22876
11	451	= B12/(1.12)^A12	129.65172
12	473	= B13/(1.12)^A13	121.40732
13	492	= B14/(1.12)^A14	112.7537
14	520	= B15/(1.12)^A15	106.4023
15	534	= B16/(1.12)^A16	97.5598
16	567	= B17/(1.12)^A17	92.4899
17	591	= B18/(1.12)^A18	86.0758
18	612	= B19/(1.12)^A19	79.5842
19	634	= B20/(1.12)^A20	73.6116
20	657	= B21/(1.12)^A21	68.1090
Cash flows		= SUM (C2:C21)	2614.8032
No. of shares (in crore)		200	200
Value per share		= (C23/C24)	13.0740

Buying a company with good cash flows can yield a lot of benefits to an investor. Cash can fund product development and

strategic acquisitions and can be used to meet operational and financial expenditures.

Cash forecasts are made for a limited time duration. However, the shares are valued for their ability to produce an indefinite stream of cash flows. This is referred to as the terminal value of shares. Terminal value usually refers to the value of the company (or equity) at the end of a high growth period. When an indefinite duration of growth is considered, it is normal to assume that a stable growth will follow the high growth. This stable growth rate is expected to remain constant. With this assumption, the terminal value computation can be given by the following formula:

Terminal value in year

n = Cash flow in year (n + 1)/(d – g)

Where,

'd' is the discount rate of the cash flows

'g' is the stable growth rate

This approach also requires the assumption that growth is constant forever, and that the cost of capital (discount rate) will not change over time.

A stable growth rate is one that can be sustained forever. Since no company, in the long term, can grow faster than the economy that it operates in, a stable growth rate cannot be greater than the growth rate of the economy.

This stable growth rate cannot be greater than the discount rate either because of the risk-free rate that is implied in the discount rate. This invariably means that the discount rate has to be fixed after considering the inflation rate, economic growth rate, time value, and so on.

Price to cash flow ratio can also be used as a valuation model. Cash flow multiplier is computed as: market price/cash flow per share. For example, if the current market price is Rs. 60 and cash flow per share is Rs. 20, the cash flow multiplier would be 3. If the

forecasted cash flow per share is Rs. 23, then the market value can be estimated as (23 × 3)= Rs. 69.

Economic value added (EVA) is another modification of cash flow that considers the cost of capital and the incremental return above that cost.

Assuming the after tax return from operations is 18% and the cost of capital is 10%, the incremental return for the company would be 8% (18 – 10). If the face value of the investment in the company is Rs. 100 per share, the economic value added per share will be Rs. 8. If the current market price of the share is Rs. 200, then the EVA multiplier will be (200/8) 25. EVA multiple can then be used to identify the under pricing or over pricing of a share in the market.



CHECK YOUR PROGRESS

Q3: What is Earning.

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Q2: How are earning forecasted.

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9.4.3 Asset valuation

Expectation of earnings, and cash flows alone may not be able to identify the correct value of a company. This is because the intangibles such as brand names give credentials for a business. In view of this, investors have begun to consider the valuation of equity through the company's assets.

Asset valuation is an accounting convention that includes a company's liquid assets such as cash, immovable assets such as real estate, as well as intangible assets. This is an overall measure of how much liquidation value a company has if all of its assets were sold off. All types of assets, irrespective of whether those assets

are office buildings, desks, inventory in the form of products for sale or raw materials and so on are considered for valuation.

Asset valuation gives the exact book value of the company. Book value is the value of a company that can be found on the balance sheet. A company's total asset value is divided by the current number of shares outstanding to calculate the book value per share. This can also be found through the following method- the value of the total assets of a company less the long-term debt obligations divided by the current number of share outstanding.

The formulas for computing the book value of the share are given below:

Book value = Equity worth (capital including reserves belonging to shareholders)/Number of outstanding shares

Book value = (Total assets – Long-term debt)/Number of outstanding shares

Book value is a simple valuation model. If the investor can buy the shares from the market at a value closer to the book value, it is most valuable to the investor since it is like gaining the assets of the company at cost. However, the extent of revaluation reserve that has been created in the books of the company may distract the true value of assets. The revaluation reserve need not necessarily reflect the true book value of the company; on the other hand, it might be depicting the market price of the assets better.

Book value, however, may not correctly depict the company value, since most companies use different accounting methods. Further, the adjustment to the historical figures in terms of economic inflation or deflation of the asset book values are not incorporated in these value estimations. The book values are also subject to adjustments depending on the tax framework within which the company falls and the consequences relating to the company's tax planning measures. But, with increased corporate governance practices, the book value concept is becoming more relevant to the investor for valuation purposes.

Another useful measure of asset valuation is the price to book ratio. This ratio is arrived at by relating the current market price of the share to the book value per share. The intention is to compare the prevailing market price with the book value per share and identify if the shares are undervalued or overvalued in the market. The computation of price to book ratio is computed as follows:

Price to book value ratio = Market price/Book value per share.

The undervaluation of shares will be established when the price to book ratio is relatively low. A high price to book ratio, on the other hand, implies that the shares are sold at a price not supported by its asset value in the market.

For example, if a company has total assets less long-term liabilities as Rs. 43950 crores and the number of outstanding shares at 2,000 crores, the book value per share will be (43950/2000) = Rs. 21.975. If the market price is quoted at Rs. 84, the Price to Book multiplier will be (84/21.975) 3.82.

Another use of asset valuation is through the return on equity, (ROE). Return on equity is a measure of how much earnings a company generates in four quarters compared to its shareholder's equity. For instance, if a company earned Rs. 2 crores in the preceding year and has a shareholder's equity of Rs. 10 crores, then the ROE is 20 per cent. Investors might use ROE as a filter to select companies that can generate large profits with a relatively small amount as capital investment. The nature of ROE, however, depends on the type of industry the company belongs to. The ROE figures of trading companies are expected to be comparatively higher than that of heavy manufacturing concerns since trading companies need not necessarily require constant capital expenditure.

The book value computation that includes within its fold the valuation of intangible assets such as brands and patents, are viewed positively by investors. Investors view brands as valuable and they are assumed to increase the expected future profits of the company. Brands also tend to have a strong market potential since customers

prefer a brand exclusively for its name and sometimes, brands convey more meaning than the product quality. Specific value is given to brands that have recently established unshakable credentials. Companies also spend a lot of money on building brands in their product portfolios. Some companies build the brand name around their company name; this has a direct impact on the valuation by companies build the brand name around their company name; this has a direct impact on the valuation by investors. Companies such as Colgate, Intel, Nestle, and Bata have built their company names into brands that give them an incredible edge over their competitors in the market. Intangibles can also sometimes mean that a company's shares can trade at a premium to its historical growth rate. Thus, a company with large profit margins, a dominant market share, consistent performance can trade at a slightly higher multiple than its growth rate would otherwise suggest.

A company can sometimes be worth more in reality than when viewed individually in terms of all the assets in its Balance Sheet. Many times, human resource strength is an intangible that is built inside the organisation and neither the company nor the shareholders give a uniform quantification to such strengths. The book valuation process of a company is hence the exercise of a few investment bankers and consultants who get to know the intricate details of the company. Rather than attempting to make a book valuation of the company individually, investors can rely on such sources to assess the undervaluation or overvaluation of shares in the market.

9.4.4 Dividend Discount model

The dividend discount model (DDM) is a quantitative method used for predicting the price of a company's stock based on the theory that its present day price is worth the sum of all of its future dividend payments, when discounted back to their present value. It

attempts to calculate the fair value of a stock irrespective of the prevailing market conditions, and takes into consideration the dividend payout factors and the market expected returns. If the value obtained from the DDM is higher than the current trading price of shares, then the stock is undervalued and qualifies for a buy, and vice versa.

In other words, it is used to value stocks based on the net present value of the future dividends. The equation most widely used is called the Gordon growth model (GGM), the Gordon Growth Model, which uses next year's estimated dividend (D), the company's cost of equity capital (r), and the estimated future dividend growth rate (g).

$$Price = \frac{D}{r - g}$$

Let us take an example.



Example 9.1:

Let's assume that a certain stock is expected to pay a $2.00 dividend next year, and its dividend has historically grown by 4% per year, so it's fair to assume this same growth rate going forward. And we'll say that my desired rate of return is 10%. Using these input values, we can calculate the stock's value (to me) using the dividend discount model as:

$$Price = \frac{\$2.00}{1.10 - 1.04} = \$33.33$$

Therefore, according to the dividend discount model, I should pay about $33.33 for the stock based on my required rate of return. If the stock were trading for say, $40, an investor using this model may consider the stock to be overvalued, while a price of $25 might make it look like a buying opportunity.

Some examples of regular dividend paying companies are McDonalds, Procter & Gamble, Kimberly Clark, PepsiCo, 3M, CocaCola, Johnson & Johnson, AT&T, Walmart etc. We can use Dividend Discount Model to value these companies.

There are 3 models used in the dividend discount model:

1. zero-growth, which assumes that all dividends paid by a stock remain the same;
2. constant-growth model, which assumes that dividends grow by a specific percent annually;
3. variable-growth model, which typically divides growth into 3 phases: a fast initial phase, then a slower transition phase that ultimately ends with a lower rate that is sustainable over a long period.

Let us discuss this model in the following ways:

1. Zero-growth model : Zero-growth model assumes that the dividend always stays the same i.e. there is no growth in dividends. Therefore, the stock price would be equal to the annual dividends divided by the required rate of return.

Stock's Intrinsic Value = Annual Dividends / Required Rate of Return

This is basically the same formula used to calculate the Present Value of Perpetuity, and can be used to price preferred stock, which pays a dividend that is a specified percentage of its par value. A stock based on the zero-growth model can still change in price if the required rate changes when perceived risk changes, for instance.

Example 9.2

If a preferred share of stock pays dividends of $1.80 per year, and the required rate of return for the stock is 8%, then what is its intrinsic value?

Sol: Here we use the dividend discount model formula for zero growth dividend,

Dividend Discount Model Formula = Intrinsic Value = Annual Dividends / Required Rate of Return

Intrinsic Value = $1.80/0.08 = $22.50.

2. Constant Growth Model

One of the most popular dividend discount models assumes that the dividend per share grows at a constant rate (g). The value of a share, under this assumption, is:

$$P_0 = \frac{D_1}{(1+r)} + \frac{D_1(1+g)}{(1+r)^2} + \ldots \frac{D_1(1+g)^n}{(1+r)^{n+1}} + ..$$

Applying the formula for the sum of a geometric progression, the above expression simplifies to:

$$P_0 = \frac{D_1}{r-g}$$



Example 9.3:

Ramesh Engineering Limited is expected to grow at the rate of 6 per cent per annum. The dividend expected on Ramesh's equity share a year hence is Rs. 2.00. What price will you put on it if your required rate of return for this share is 14 per cent?

$$P_0 = \frac{2.00}{0.14 - 0.06} \quad = \text{Rs. } 25.00$$

3. Variable-Growth Model

Variable Growth rate Dividend Discount Model or DDM Model is much closer to reality as compared to the other two types of dividend dicount model. This model solves the problems related to unsteady dividends by assuming that the company will experience different growth phases.

Variable growth rates can take different forms, you can even assume that the growth rates are different for each year. However, the most common form is one that assumes 3 different rates of growth:

a. an initial high rate of growth,

b. a transition to slower growth, and

c. lastly, a sustainable, steady rate of growth.

Variable Growth Model further can be classified as under:

i*. Two stage Dividend Discount Model DDM:* This model is designed to value the equity in a firm, with two stages of growth, an initial period of higher growth and a subsequent period of stable growth. Two-stage Dividend Discount Model is best suited for firms paying residual cash in dividends while having moderate growth. For instance, it is more reasonable to assume that a firm growing at 12% in the high growth period will see its growth rate drops to 6% afterwards.

Assumptions of this model:

a. Higher growth rate is expected the first period.

b. This higher growth rate will drop at the end of the first period to a stable growth rate.

c. The dividend payout ratio is consistent with the expected growth rate.

ii. Three stage Dividend Discount Model DDM: One improvement that we can make to the two-stage DDM Model is to allow the growth rate to change slowly rather than instantaneously.

The three-stage Dividend Discount Model or DDM Model is given by:

First phase: there is a constant dividend growth (g1) or with no dividend

Second phase: there is a gradual dividend decline to the final level

Third phase: there is a constant dividend growth again (g3), i.e. the growth company opportunities are over.

The logic that we applied to two-stage model can be applied to three-stage model in a similar fashion. Below is the dividend discount model formula for applying three stage.

$$V_0 = \sum_{t=1}^{T} \frac{D_0(1+g_1)^t}{(1+k)^t} + \sum_{t=T+1}^{N} \frac{D_t}{(1+k)^t} + \frac{D_{N+1}}{(k-g_3)(1+k)^N}$$



9.5 LET US SUM UP

Equity shares carry with them ownership rights. They give voting rights to the holders. They have a face value (in monetary terms) at the time of issue and are evaluated at their market value when they are listed on a stock exchange.

Equity valuation is a complex procedure since there is no consistent definition regarding what constitutes the intrinsic value of a share. Different valuation approaches and models with different assumptions and implications are available to investors to assess the true worth of a share. These include earnings approach, cash flow approach and dividend discount approach.

An investor can choose the appropriate procedure of valuation for shares and make profits from the stock market.

Asset valuation is an accounting convention that includes a company's liquid assets such as cash, immovable assets such as real estate, as well as intangible assets.



9.6 FURTHER READING

- M. Ranganathan and R. Madhumathi: Investment Analysis and Portfolio Management, Pearson Education, New Delhi.
- Punithavathy Pandian: Security Analysis and Portfolio Management, Vikas Publishing House Pvt. Ltd., New Delhi.
- Bharti V. Phathak: Indian Financial System, Pearson Education, Delhi.
- Donald E. Fischer and Ronald J. Jordon: Security Analysis and Portfolio Management, PHI.
- Prasanna Chandra: Investment Analysis and Portfolio Management, TMH, Delhi.



9.7 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q1: Stock splits simply imply a reduction in the face value of the instrument with an increase in the quantity of stock.

Ans to Q2: Common ways for equity valuations could be classified into the following categories:

1. Earnings valuation
2. Cash flow valuation
3. Asset valuation
4. Dividend-discount model

Ans to Q3: Earnings (net income or net profit) is the money left after a company meets all its expenditure.

Ans to Q4: Earnings can be forecast through the forecasts of the rates resulting in the earnings.



9.8 MODEL QUESTIONS

1. Discuss the assumptions and implications of earnings approach to equity valuation.
2. What are the quantitative models of equity valuation? What are their limitations?
3. Explain zero-growth model, constant-growth model, and variable-growth model dividend discount model.

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UNIT 10 : PORTFOLIO MANAGEMENT

UNIT STRUCTURE

10.1 Learning Objective

10.2 Introduction

10.3 Inputs to Portfolio Management

- 10.3.1 Return and Risk Characteristics of Individual Assets
- 10.3.2 Expected Return and Risk of a Portfolio
- 10.3.3 Diversification of Risk

10.4 Portfolio Analysis and Selection

- 10.4.1 Correlation between Securities and its Impact on Portfolio Risk
- 10.4.2 Portfolio Selection

10.5 Let Us Sum Up

10.6 Further Reading

10.7 Answers to Check Your Progress

10.8 Model Questions

10.1 LEARNING OBJECTIVES

After going through this unit, tyou will be able to:

- explain and illustrate the concepts and measures of return and risk as they apply to individual assets as well as portfolio of assets
- highlight the concept of diversification of risk
- discuss the portfolio selection problem and the process.

10.1 INTRODUCTION

In this unit we are going to discuss about Portfolio Management: Return and Risk Characteristics of Individual Assets,Expected Return and Risk of a Portfolio and Diversification of Risk.

We will also discuss Portfolio Analysis and Selection, Portfolio Risk Selection Problem and election of Optimal Portfolio

In this unit, we will discuss more about how one should go about in

constructing a portfolio that suits specific objectives of the investment. In this unit, we will address some of the basic issues measuring return and risk of the portfolio before addressing the main issue of selecting optimal portfolio.

In this unit, We will begin with the analysis of return -risk characteristics of individual assets, and then proceed to examine how individual assets combine into a portfolio to determine its return and risk attributes.

10.3 INPUTS TO PORTFOLIO MANAGEMENT

The term 'portfolio' generally means a collection or combination and in the context of investment management, it means a collection or combination of financial assets (or securities) such as shares, debentures and government securities. However, in a more wider context the term 'portfolio' may be used synonymously with the expression 'collection of assets', which can even include physical assets (gold, silver, real estate, etc.). What is to be borne in mind is that, in the portfolio context, assets are held for 'investment' purposes and not for 'consumption' purposes.

Portfolio analysis builds on the estimates of future return and risk of holding various combinations of assets. As we know, individual assets have risk return characteristics of their own. Portfolios, on the other hand, may or may not take on the aggregate characteristics of their individual parts. In this section, we will reflect on the assessment of return-risk attributes of individual assets and portfolios.

10.3.1 Return and Risk Characteristics of Individual Assets

Any investment decision requires an estimate of return and risk associated with the investment. However the most difficult task of investment decision is estimation of return and risk. Earlier in the previous units, we spent about discussing how should one estimate the future value of the asset so that return can be measured. If we are able to estimate a range of expected return, then it is possible to

estimate the probabilities associated with the range of expected return to get the risk measure. In practice, however, the return and risk of the securities are estimated based on the historical return and risk of securities. A stock's single period basic return is:

$$\text{Total Return} = \frac{\text{Dividend} + (\text{Market Price}_t - \text{Market Price}_{t-1})}{\text{Market Price}_{t-1}} \times 100$$

There are different measures of historical return. The most elementary form of return measure is holding period yield or return. Here, the dividend received during the holding period is added along with the capital gain and divided by the purchase price. If the holding period is more or less than one year, normally the holding period return is stated for one-year period. This measure is not much useful if one wants to measure the risk associated with the security. There are two other measures of return by which one can measure risk.

a) Arithmetic Average: The arithmetic average return is equal to sum of returns of period and divided by 'n'. For instance, if the stock has offered a holding period return of 11% in period 1, 12% in period 2 and 16% in period 3, then the arithmetic average return is equal to 13%. Though it is better than holding period return, this measure suffers because of its failure in considering time value of money. Another problem of this measure is differential treatment of positive and negative return. For instance if a stock price increases from Rs. 10 to Rs. 20 in period 1 and declines back to Rs. 10 in period 2, the Arithmetic average return is still positive value of 25% (Period I return is 100% and Period 2 return is -50%; Total return is 50% and hence average return is 25%).

b) Geometric Average(GA): The geometric average return is based on the compound value and is also called time-weighted average return. It addresses the problem of differential treatment of positive and negative return described above. The geometric average return is computed as follows:

$$GMR = [(1 + R_1) \times (1 + R_2) \times (1 + R_3) \ldots\ldots \times (1 + R_n)]^{1/n} \text{ “1}$$



Example 10.1:

Five years back, you have applied and was allotted 100 shares of a company at the rate of Rs. 50 per share (Face Value Rs. 10) .The price at the end of each year along with annual dividend per share received from the stock are as follows:

Year	1	2	3	4	5
Dividend per share (Rs.)	1	1.5	1.5	2	2
Market Price (Rs.)	40	55	70	77	91

Find the Holding Period Return (HPR), Arithmetic Average(AA) and Geometric Average return of the stock (GA).

HPR : [Dividend (Rs. 8) + Capital Appreciation (Rs. 41)] / Investment (Rs. 50)

: 49/50 = 98% for five years or 19.60% per year

AA Return : [R_1 (-18%) + R_2 (41.25%) + R_3 (30%) + R_4 (12.86%) + R_5(20.78%)]/5 17.38%

Note: R_1 is equal to [(41-50)/50], R_2 is equal to [(56.5 - 40)/40], etc.

GA Return : $[(1+R_1)x(1+R_2)x(1+R_3)x(1+R_4)x(1+R_5)]^{1/5} - 1$

: $[(.82)x(1.41)x(1.30)x\ l.13)x(1.21\%)]^{1/5}$-1

: 15.47%

As you may observe, for the same set of data, we get different values of return. HPR is the highest and GAR is the lowest. The Geometric Return is lower than other two returns because of compounding. In Table 8.1, the different measures of return of NSE-50 companies are given based on last ten years data. The list contains only for the companies, which have 10-year listed life.

In addition to the above two types of return, a foreign investor or foreign fund would compute dollar-weighted return to adjust

differences in the foreign exchanges between the point of investment and sale. For example, if a foreign fund purchased a stock at Rs. 50 today when the US Dollar - Rupee rate is Rs. 50 per US Dollar and sold the stock at Rs. 55 at the end of one year, the holding period return in Rupee term is 10% [(55-50)/50]. However, if the Rupee depreciates during this period and quotes Rs. 56 per US Dollar, the foreign fund incurs a loss because it can get less than one Dollar with the sale value of the stock. The loss is equal to 1.79% [$1-$(55/56)].

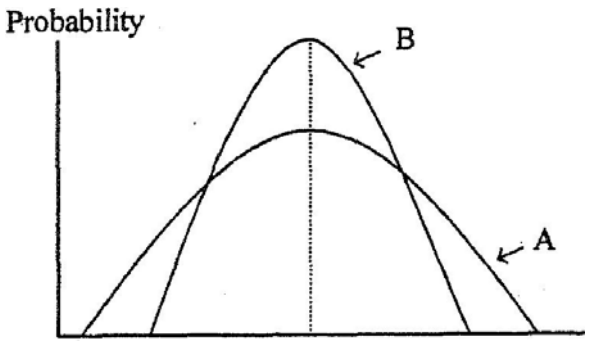
While historical return gives a fair idea about the future return, they are often used to measure the risk. It is true that it is more relevant to use expected risk by measuring the probability associated with various returns, often such measure is not used in practice. Historical data is generally used to measure the risk. The risk associated with an investment in. stocks is measured using variance or standard deviation of the historical return. Table 8.1 also shows the standard deviation of stock return along with different return measures. A question with variance as a measure of risk is: why count 'happy' surprises (those above the average historical return or expected return) at all in a measure of risk? Why not just consider the deviations below the average historical return or expected return (i.e. the downside danger)? Measures to do so have much to recommend them. But if a distribution is symmetric, such as the normal distribution, the result will be the same. Because, left side of a symmetric distribution is a mirror image of the right side. Although distributions of historical or forecasted returns are often not normal, analysts generally assume normality to simplify their analysis.

Table 10.1: Return and Risk Measures of select stocks of NSE-50

Company Name	Holding Period Return	Arithmetic Mean Return	Geometric Mean Return	Variance	Standard Deviation
Wipro	2857%	57%	38%	65%	81%
Cipla	646%	42%	19%	58%	76%
Dr. Reddy's Laboratories	517%	40%	24%	44%	66%
Hero Honda Motors	233%	32%	24%	25%	50%
HDFC	202%	31%	22%	26%	51%
Hindustan Lever	126%	26%	24%	7%	27%
Ranbaxy Laboratories	95%	24%	15%	26%	51%
Digital Globalsoft	47%	17%	-4%	55%	74%
I T C	36%	15%	10%	12%	34%
Reliance Industries	36%	15%	8%	16%	40%
Asian Paints (India)	36%	15%	14%	3%	18%
Nestle India	34%	15%	12%	6%	24%
Britannia Industries	28%	13%	3%	19%	43%
Bajaj Auto	26%	13%	4%	22%	47%
Gujarat Ambuja Cements	21%	11%	1%	19%	43%
Castrol India	19%	11%	4%	17%	41%
Hindalco Industries	19%	11%	6%	12%	35%
Procter & Gamble	18%	10%	6%	10%	32%
Glaxosmithkline Pharma	18%	10%	3%	14%	37%
Smithkline Beecham	17%	10%	7%	6%	25%
Indian Hotels Co.	15%	9%	-2%	29%	54%
Mahindra & Mahindra	11%	9%	-2%	22%	47%
Asea Brown Boveri	8%	6%	-4%	20%	44%
B S E S	8%	6%	1%	12%	34%
State Bank of India	7%	5%	0%	13%	36%
Tata Power Co.	6%	5%	1%	9%	29%
Larsen & Toubro	6%	4%	3%	4%	20%
Associated Cement Cos.	4%	3%	-5%	22%	46%
Colgate-Palmolive (India)	2%	2%	-3%	13%	36%
Tata Tea	0%	0%	-18%	31%	56%
I C I C I	0%	0%	-16%	34%	58%
Novartis India	-1%	-1%	-30%	32%	56%
Grasim Industries	-1%	-1%	-10%	19%	44%
Tata Chemicals	-3%	-4%	-12%	21%	46%
Telco	-4%	-5%	-18%	15%	39%
Tata Iron & Steel Co.	-5%	-8%	-10%	4%	21%

Previously, we had discussed how to compute mean and variance (or standard deviation), so we need not reiterate the procedure here. You may, however, look up appendix at the end of this unit to quickly revise the concepts of portfolio return and risk. We may now refer to Figure 8.1 that depicts the distribution of returns that might be expected for two investments, A and B.

Figure 10.1 : Possible Outcomes of two Independent Investments



The mean or expected return, at the vertical dotted line, is the same for both investments. But, investment B is more risky. With investment A, the distribution of returns (or possible outcomes) is more closely grouped about the mean value. In other words, the variance is smaller than that of investment B. Consequently, it can be said with greater degree of accuracy that our forecast will be close to the actual return from investment A.

When we move from evaluating a single asset in isolation to evaluating a portfolio, our return -risk analysis changes. Return is still the expected return, but for a portfolio the return will be the average return from all the assets held in the portfolio. Risk is still the variance (or standard deviation) of the expected returns from the portfolio. The investor is still concerned with upside potential and downside danger. However, the risk of a combination of assets is very different from a simple average of the risk of individual assets. Most dramatically, the variance of a portfolio of two assets may be less than the variance of either of the assets themselves. We will

examine all these aspects in the discussion that follows.

10.3.2 Expected Return and Risk of a Portfolio

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 x 15) + (0.60 x 20) = 18 per cent

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

$$R_{(p)} = \sum_{i=1}^{N} X_i R_i$$

Where

R_p = Expected return of the portfolio

X_i = Proportion of funds invested in security i.

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.

This 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.

Covariance is the statistical measure that indicates the interactive risk of a security relative to others in a portfolio of securities. In other words, the way security returns vary with each other affects the overall risk of the portfolio.

The covariance between two securities X and Y may be calculated using the following formula:

$$Cov_{xy} = \sum_{i=1}^{n} \frac{(R_x - \overline{R}_x)(R_y - \overline{R}_y)}{N}$$

Where:

Cov_{xy} = Covariance between x and y.

R_x = Return of security x.

R_y = Return of security y

$\overline{R}_x$ = Expected or mean return of security x.

$\overline{R}_y$ = Expected or mean return of security y.

N = Number of observations.

The calculation of covariance is illustrated below with an example:

Calculation of Covariance

Year	Rx	Deviation $R_x - \overline{R}_x$	R...3 y	Deviation $R_y - \overline{R}_y$	Product of deviations $(R_x - \overline{R}_x)(R_y - \overline{R}_y)$
1	10	-4	17	5	-20
2	12	-2	13	1	-2
3	16	2	10	-2	-4
4	18	4	8	-4	-16

$$Cov_{xy} = \sum_{i=1}^{n} \frac{(R_x - \overline{R}_x)(R_y - \overline{R}_y)}{N}$$

=-42 / 4= -10.5

The covariance is a measure of how returns of two securities move together. If the returns of the two securities move in the same direction consistently the covariance would be positive. If the returns of the two securities move in opposite direction consistently the covariance would be negative. If the movements of returns are independent of each other, covariance would be close to zero.

Covariance is an absolute measure of interactive risk between two securities. To facilitate comparison, covariance can be standardized. Dividing the covariance between two securities by product of the standard deviation of each security gives such a standardised measure. This measure is called the coefficient of correlation. This may be expressed as:

$$r_{xy} = \frac{Cov_{xy}}{\sigma_x \sigma_y}$$

Where,

r_{xy} = Coefficient of correlation between x and y

Cov_{xy} =Covariance between x and y

σ_x = Standard deviation of x.

σ_y =Standard deviation of y

It may be noted from the above formula that covariance may be expressed as the product of correlation between the securities and the standard deviation of each of the securities. Thus,

$Cov_{xy} = r_{xy} ó_x ó_y$

The correlation coefficients may range from - 1 to 1. A value of -1 indicates perfect negative correlation between security returns, while a value of +1 indicates a perfect positive correlation. A value close to zero would indicate that the returns are independent.

The variance (or risk) of a portfolio is not simply a weighted average of the variances of the individual securities in the portfolio. The relationship between each security in the portfolio with every other security as measured by the covariance of return has also to be considered. The variance of a portfolio with only two securities in it may be calculated with the following formula.

$$ó^2_p = x_1^2 ó_1^2 + x_2^2 ó_2^2 + 2x_1x_2(r_{12} ó_1 ó_2)$$

Where

$ó^2_p$= Portfolio variance.

x_1 =Proportion of funds invested in the first security.

x_2= Proportion of funds invested in the second security.

$ó_1^2$=Variance of first security.

$ó_2^2$ =Variance of second security.

$ó_1$ =Standard deviation of first security.

$ó_2$ =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.

Let us take an example to understand the calculation of portfolio variance and portfolio standard deviation.

For example- Two securities P and Q generate the following sets of expected returns, standard deviations and correlation coefficient:

	P	Q
r = 15 percent		20 percent
ó = 50 percent		30 percent

r_{pq} = -0.60

The first set of factors is parametric to the investor in the sense that he has no control over the returns, risks and covariances of individual securities. The second sets of factors are choice variables in the sense that the investor can choose the proportions of each security in the portfolio.

A portfolio is constructed with 40 per cent of funds invested in P and the remaining 60 per cent of funds in Q.

The expected return of the portfolio is given by:

$$r_p = \sum_{i=1}^{n} X_i r_i$$

=(0.40x15)+(0.60x20)=18 Percent

The variance of the portfolio is given by:

$$ó^2_p = x_1^2 ó_1^2 + x_2^2 ó_2^2 + 2x_1x_2(r_{12} ó_1 ó_2)$$

$$= (0.40)_2 (50)_2 + (0.60)_2 (30)_2 + 2(0.40)(0.60)(- 0.60)(50)(30)$$

$$= 400 + 324 - 432 = 292$$

The standard deviation of the portfolio is:

$s_p = \sqrt{292}$ = 17.09 per cent.

The return and risk of a portfolio depends on two sets of factors (a) the returns and risks of individual securities and the

covariance between securities in the portfolio, (b) the proportion of investment in each security.

The return and risk of a portfolio depends on two sets of factors (a) the returns and risks of individual securities and the covariance between securities in the portfolio, (b) the proportion of investment in each security.

The first set of factors is parametric to the investor in the sense that he has no control over the returns, risks and covariances of individual securities. The second sets of factors are choice variables in the sense that the investor can choose the proportions of each security in the portfolio.

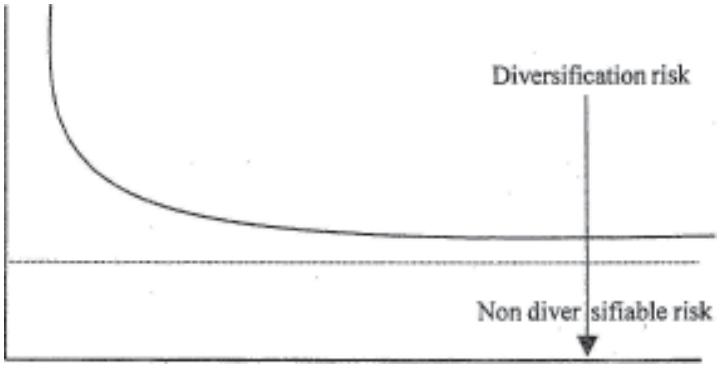
10.3.3 Diversification of Risk

Efforts to spread and minimize portfolio risk take the form of diversification. Most investors prefer to hold several assets rather than putting all their eggs into one basket, with the hope that if one goes bad, the others will provide some protection from extreme loss. Surely enough, there is merit in this approach; although some investors hold a contrary view point that recommends putting all eggs into one basket and then keeping a sharp eye on the basket.

It is not difficult to understand that adding more assets in the portfolio can reduce the overall portfolio risk. Consider the table drawn earlier to compute the portfolio risk and look into the diagonal cells. The diagonal cells contain the variance of securities in the portfolio. In that example, we assumed that an equal investment is made in three stocks. The sum of the diagonal cells is equal to sum of the variance of three securities multiplied by $(1/3)^2$. Suppose, we add one more stock in the portfolio and revise our weights to 0.25 for each stock. The values of diagonal cells is now equal to sum of the variance of four securities multiplied by $(1/4)^2$. We know $(1/4)^2 < (1/3)^2$. Suppose, if the number of securities in the portfolio is increased to 20, then the value of the diagonal cells is equal to sum of the

variance of individual securities multiplied by $(1/20)^2$. The value of $(1/20)^2$ is equal to .0025 and close to zero. Since the multiplier is now close to zero, the sum of the diagonal cells will reach close to zero. Thus, when a security is added to the portfolio, the value of diagonal cells is close to zero and thus reduced the variance of the portfolio. However, there is a limitation in adding securities to reduce the risk because the diagonal cells value can not be reduced below zero (i.e. negative) to reduce the portfolio risk further. Thus, beyond a level, diversification fails to yield further benefit by way of reducing the risk. This is being illustrated in Figure 10.2.

Figure 10.2 : Diversification of Risk



It may be noted that beyond certain portfolio size, the reduction in risk is marginal and insignificant.

We will discuss more about diversifiable and non-diversifiable risk in Unit 12.A word of caution may, however, be urged here. The above discussion would appear to suggest that the overall portfolio risk can be reduced by only increasing number of assets in the portfolio. This is not true. Several empirical studies have indicated that a portfolio comprising a few assets selected carefully for their risk-diversifying characteristics (i.e. nature. and degree of variance and covariance), would be less risky than a portfolio of considerably greater size with assets being selected without regard to risk. Thus, -what matters in diversification is not the number of assets *per se,* but right kinds.



CHECK YOUR PROGRESS

Q1: Define Portfolio.

.....

.....

.....

Q2: What is Arithmetic Average

.....

.....

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10. 4 PORTFOLIO ANALYSIS AND SELECTION

In the previous section, we have discussed how portfolio risk is measured. Let us summarise important points before discussing how an investor can use the concept in selection of the portfolio. Risk associated with investments can be reduced through diversification and such diversification helps the investors to reduce the risk of the portfolio. Investments in individual securities, risk (variance) associated with individual securities and the relationships (covariance) between the securities are the three variables that affect the risk of the portfolio. While diversification reduces the unsystematic risk of the portfolio, the number of securities required to minimize the portfolio risk is not very large. Finally more than the number of securities, what matters in reducing the risk of the portfolio is the kind of securities included in the portfolio. The last observation is stressed in this section.

10.4.1 Correlation between Securities and its Impact on Portfolio Risk

We have discussed that risk is reduced when the portfolio includes one stock in the portfolio. The above observation is not universal in a sense that if the new stock is perfectly correlated with other securities in the portfolio: In other words, the job of investment

analysts or any other persons responsible in constructing the portfolio is to identify stocks or securities that are less related with each other for portfolio construction. The risk of the portfolio can be reduced to zero if the correlation between the assets included in the portfolio is equal to minus 1. However, such securities are *difficult* to identify in the market. If two securities are perfectly correlated, then there is no diversification benefit and such combination will not reduce the risk of the portfolio. There are only very few securities in the market whose correlation is equal to minus one. What is more prevalent in the market is securities whose return are correlated between minus 1 to plus 1. Depending on the level of correlation, diversification reduces the risk of the portfolios. The relationship between the assets and its impact on portfolio risk is explained below in Figure 10.3 with the help of two securities.

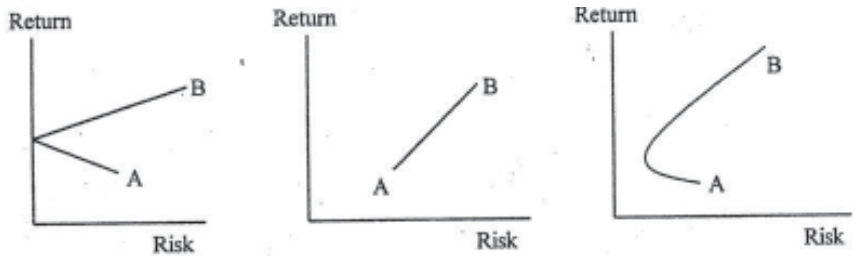


Figure 10.3: Correlation and Portfolio Risk

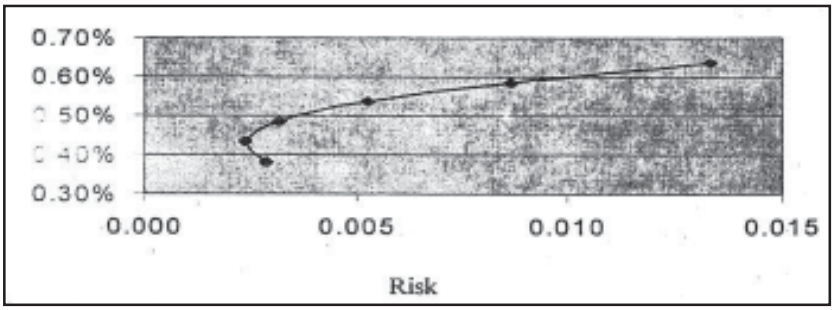
(a) Correlation = - 1 (b) Correlation = +1 (c) Correlation = 0.72

Figure 10.3 (c) is more relevant for our discussion since the correlation between the securities is often less than 1 and greater than zero. In such a situation, when an investor combine such securities, the risk of the security is initially reduced. We will show you with a real life example in the following Table:

Sl.No.	Proportion of Investment in		Portfolio	Portfolio Risk
	Hindustan Lever	Infosys	Return	(Variance)
1	100%	0%	0.38%	0.00289
2	80%	20%	0.43%	0.00240
3	60%	40%	0.48%	0.00320
4	40%	60%	0.54%	0.00529
5	20%	80%	0.59%	0.00867
6	0%	100%	0.64%	0.01334
Note: Correlation between Hindustan Lever Ltd. and Infosys is .0087				

The risk and return of the portfolio is plotted below to show how the graph looks similar to one shown in Figure 10.4

Figure10 .4: Risk and Return of Portfolios of HLL and Infosys



If there are 10 securities in *the* market, it is possible to draw the diagrams of the above for a number of combination of two-securities.

10.4.2 Portfolio Selection

The objective of every rational investor is to maximise his returns and minimise the risk. Diversification is the method adopted for reducing risk. It essentially results in the construction of portfolios. The proper goal of portfolio construction would be to generate a portfolio that provides the highest return and the lowest risk. Such a portfolio would be known as the optimal portfolio. The process of finding the optimal portfolio is described as portfolio selection. We will discuss this about more in the next unit.



10.5 LET US SUM UP

The unit describes the basic components of portfolio selection process. Beginning with the estimation of a portfolio's expected return and risk, which in turn involves estimation of such input data as expected return, variance and covariance for each of the assets contained in the portfolio, we have explained why an investor should consider only the 'efficient set' out of the feasible set of portfolios. Once the efficient portfolios are delineated, the investor will next 'select the 'optimal' portfolio depending upon his or her 'trade-off' between return and risk. In terms of graphical analysis such optimal portfolio will be located at the point where indifference curve that summarises the investors risk -return trade-off, is tangent to the efficient set. In this kind of approach to portfolio selection, it is assumed that rational investors are risk averse and prefer more return or loss. Finally, the portfolio selection approach presented here epitomises the Markowitz's model developed in early 1950s.



10.6 FURTHER READING

1) Elton, Edwin J. and Gruber, Matin J., 1987 *Modern Portfolio Theory and Investment Analysis, John Wiley 84 Sons.*

2) Alexander, Gordon J., Sharpe, William F., and Jeffery V. Baibey *Fundamentals of Investments,* (3rd ed.) Prentice-Hall, Inc.



10.7 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q1: The term 'portfolio' generally means a collection or combination and in the context of investment management, it means a collection or combination of financial assets (or securities) such as shares, debentures and government securities.

Ans to Q2: The arithmetic average return is equal to sum of returns of period and divided by 'n'.



10.8 MODEL QUESTIONS

1) The following forecasts have been made for investments A and B.

Investments A		Investments B	
Return (%)	Probability	Return (%)	Probability
10	.05	2	.05
15	.20	12	.25
20	.50	20	.40
25	.20	28	.25
30	.05	38	.05

Calculate the expected rate of return and standard deviation. Which investment has more upside potential and downside danger?

2) If a portfolio's expected return is always equal to the weighted average of the expected return of the component assets, why is not portfolio risk always equal to the weighted average of the component assets' variances? Explain.

3) Suppose an analysts has provided you with the following estimates in respect of equity shares of Century Textiles, Escorts and Hoechst:

	Century	Escorts	Hoechst
Expected monthly Return (%)	5	4	9
Standard Deviation (%)	8	7	17
Correlation coefficients of Returns Between			
Century and Escorts	0.4		
Century and Hoechst	0.6		
Escorts and Hoechst	0.3		

Assuming that equal amounts of the available funds will be invested in the three scrips, estimate the portfolio's mean return and standard deviation.

4) Consider two securities with the following characteristics:

	A	B
Expected Return	12	02
Standard Deviation	08	10

Assuming no correlation between the returns on two securities, calculated expected return and standard deviation for each of the following portfolios:

	Portfolio Weights (X_A)				
Security A	1.0	.75	.50	25	0.0

Plot these portfolios with expected portfolio returns *on x-axis* and standard deviation on y-axis. Locate the efficient frontier' and the portfolio with least risk or standard deviation.

Can you precisely determine X_A corresponding to the portfolio with minimum standard deviation? (Hint: Obtain the equation for σ_p with zero correlation between returns on two securities. To find X_A for which

is minimum, set the first order derivative of with respect to X_A equal to zero, and then solve for X_A).

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UNIT 11 : PORTFOLIO CONSTRUCTION

UNIT STRUCTURE

11.1 Learning Objectives

11.2 Introduction

11.3 Benefits of Portfolios

11.4 Approaches in Portfolio Construction

- 11.4.1 Traditional approach
- 11.4.2 Modern Approach

11.5 Portfolio Risk/Return

11.6 Let us Sum Up

11.7 Further Reading

11.8 Answers to Check Your Progress

11.9 Model Questions

11.1 LEARNING OBJECTIVES

After going through this unit, you will be able to :

- describe the meaning of portfolio construction
- discuss the approaches of portfolio construction
- discuss the reasons and process of portfolio construction of financial instruments.

11.2 INTRODUCTION

Portfolio is a combination of securities such as stocks, bonds and money market instruments. The process of blending together the broad asset classes so as to obtain optimum return with minimum risk is called portfolio construction. Individual securities have risk-return characteristics of their own. Portfolios may or may not take on the aggregate characteristics of their individual parts. Diversification of investment helps to spread risk over many assets. A diversification of securities gives the assurance of obtaining the anticipated return on the portfolio. In a diversified portfolio, some securities may not perform as expected, but others may exceed the expectation and making the actual return of the portfolio reasonably close to

the anticipated one. Keeping a portfolio of single security may lead to a greater likelihood of the actual return somewhat different from that of the expected return. Hence, it is a common practice to diversify securities in the portfolio.

In this unit we will also discuss about approaches in Portfolio Construction like the Traditional approach and Modern Approach.At the end of this unit we shall discuss Portfolio Risk Return and Managing the Portfolio

11.3 BENEFITS OF PORTFOLIOS

Portfolio construction is the process of blending together the broadasset classes to obtain optimum return with minimum risk.

We know that expected return from individual securities carry some degree of risk. Risk was defined as the standard deviation around the expected return. In effect we equated a security's risk with the variability of its return. More dispersion or variability about a security's expected return meant the security was riskier than one with less dispersion.

The simple fact that securities carrying differing degrees of expected risk lead most investors to the notion of holding more than one security at a time, is an attempt to spread risks by not putting all their eggs into one basket. Diversification of one's holdings is intended to reduce risk in an economy in which every asset's returns are subject to some degree of uncertainty. Even the value of cash suffers from the inroads of inflation. Most investors hope that if they hold several assets, even if one goes bad, the others will provide some protection from an extreme loss.

11.4 APPROACHES IN PORTFOLIO CONSTRUCTION

Commonly, there are two approaches in the construction of the portfolio of securities viz. traditional approach and Markowitz efficient frontier approach. In the traditional approach, investor's needs in terms of income and capital appreciation are evaluated and appropriate securities are selected to meet the needs of the investor. The common practice in the traditional approach is to evaluate the entire financial plan of the individual. In the modern

approach, portfolios are constructed to maximise the expected return for a given level of risk. It views portfolio construction in terms of the expected return and the risk associated with obtaining the expected return.

11.4.1 Traditional approach

Traditional approach of portfolio construction is based on thefinancial needs of the individual investors.The traditional approach basically deals with two major decisions.

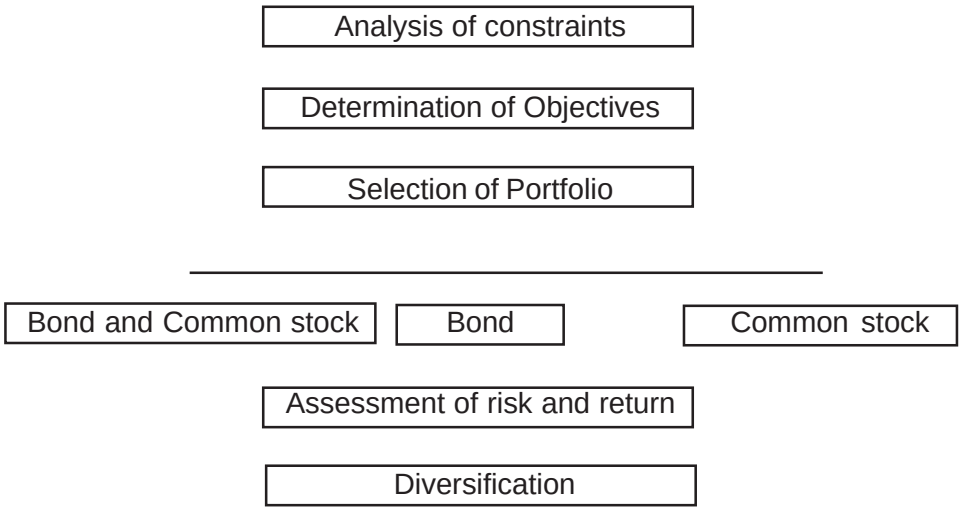
They are:

(a) Determining the objectives of the portfolio.

(b) Selection of securities to be included in the portfolio.

Normally, this is carried out in four to six steps. Before formulating the objectives, the constraints of the investor should be analysed. Within the given framework of constraints, objectives are formulated. Then based on the objectives, securities are selected. After that, the risk and return of the securities should be studied. The investor has to assess the major risk categories that he or she is trying to minimise. Compromise on risk and non-risk factors has to be carried out. Finally relative portfolio weights are assigned to securities like bonds, stocks and debentures and then diversification is carried out. The flow chart Fig 11.1 explains this.

Fig. 11.1 Steps in traditional approach



1. Analysis of constraints : The constraints normally discussed are: Income needs, liquidity, time horizon, safety, tax considerations and the temperament.

Income needs- The income needs depend on the need for incomein constant rupees and current rupees. The need for income in current rupees arises from the investor's need to meet all or part of the living expenses. At the same time inflation may erode the purchasing power, the investor may like to offset the effect of the inflation and so, needs income in constant rupees.

(a) Need for current income: The investor should establish theincome which the portfolio should generate. The current income need depends upon the entire current financial plan of the investor. The expenditure required to maintain a certain level of standard of living and all the other income generating sources should be determined. Once this information is arrived at, it is possible to decide how much income must be provided for the portfolio of securities.

(b) Need for constant income: Inflation reduces the purchasingpower of the money. Hence, the investor estimates the impact of inflation on his estimated stream of income and tries to build a portfolio which could offset the effect of inflation. Funds should be invested in such securities where income from them might increase at a rate that would offset the effect of inflation. The inflation or purchasing power risk must be recognised but this does not pose a serious constraint on portfolio if growth stocks are selected.

Liquidity- Liquidity need of the investment is highly individualisticof the investor. If the investor prefers to have high liquidity, then funds should be invested in high quality short term debt maturity issues such as money market funds, commercial papers and shares that are widely traded. Keeping the funds in shares that are poorly traded or stocks in closely held business and real estate lack liquidity. The

investor should plan his cash drain and the need for net cash inflows during the investment period.

Safety of the principal- Another serious constraint to be consideredby the investor is the safety of the principal value at the time of liquidation, investing in bonds and debentures is safer than investing in the stocks. Even among the stocks, the money should be invested in regularly traded companies of longstanding. Investing money in the unregistered finance companies may not provide adequate safety.

Time horizon- Time horizon is the investment-planning period ofthe individuals. This varies from individual to individual. Individual's risk and return preferences are often described in terms of his 'life cycle'. The states of the life cycle determine the nature of investment. The first stage is the early career situation. At the career starting point assets are lesser than their liabilities. More goods are purchased on credit. His house might have been built with the help of housing loan scheme. His major asset may be the house he owns. His priority towards investments may be in the form of savings for liquidity purposes. He takes life insurance for protecting him from unforeseen events like death and accidents and then he thinks of the investments. The investor is young at this stage and has long horizon of life expectancy with possibilities of growth in income, he can invest in high-risk and growth oriented investments.

The other stage of the time horizon is the mid-career individual. At this stage, his assets are larger than his liabilities. Potential pension benefits are available to him. By this time he establishes his investment program. The time horizon before him is not as long as the earlier stage and he wants to protect his capital investment. He may wish to reduce the overall risk exposure of the portfolio but, he may continue to invest in high risk and high return securities.

The final stage is the late career or the retirement stage. Here, the time horizon of the investment is very much limited. He

needs stable income and once he retires, the size of income he needs from investment also increases. In this stage, most of his loans are repaid by him and his assets far exceed the liabilities. His pension and life insurance programmes are completed by him. He shifts his investment to low return and low risk category investments, because safety of the principal is given priority. Mostly he likes to have lower risk with high interest or dividend paying component to be included in his portfolio. Thus, the time horizon puts restrictions on the investment decisions.

Tax consideration- Investors in the income tax paying group considerthe tax concessions they could get from their investments. For all practical purpose, they would like to reduce the taxes. For income tax purpose, interests and dividends are taxed under the head “income from other sources”. The capital appreciation is taxed under the head “capital gains” only when the investor sells the securities and realises the gain. The tax is then at a concessioanl rate depending on the period for which the asset has been held before being sold. From the tax point of view, the form in which the income is received i.e. interest, dividend, short term capital gains and long term capital gains are important. If the investor cannot avoid taxes, he can delay the taxes. Investing in government bonds and NSC can avoid taxation. This constraint makes the investor to include the items which will reduce the tax.

Temperament- The temperament of the investor himself poses aconstraint on framing his investment objectives. Some investors are risk lovers or takers who would like to take up higher risk even for low return. While some investors are risk averse, who may not be willing to undertake higher level of risk even for higher level of return. The risk neutral investors match the return and the risk. For example, if a stock is highly volatile in nature then the stock may be selling in a range of Rs. 100-200, and returns may fluctuate between Rs. 00-100 in a year. Investors who are risk averse would

find it disturbing and do not have the temperament to invest in this stock. Hence, the temperament of the investor plays an important role in setting the objectives.

2. **Determination of objectives :** Portfolios have the common objective of financing present and future expenditures from a large pool of assets. The return that the investor requires and the degree of risk he is willing to take depend upon the constraints. The objectives of portfolio range from income to capital appreciation. The common objectives are stated below:
   - Current income
   - Growth in income
   - Capital appreciation
   - Preservation of capital

The investor in general would like to achieve all the four objectives, nobody would like to lose his investment. But, it is not possible to achieve all the four objectives simultaneously. If the investor aims at capital appreciation, he should include risky securities where there is an equal likelihood of losing the capital. Thus, there is a conflict among the objectives.

3. **Selection of Portfolio :** The selection of portfolio depends on the various objectives of the investor. The selection of portfolio under different objectives are dealt subsequently.

Objectives and asset mix- If the main objective is getting adequateamount of current income, sixty per cent of the investment is made on debts and 40 per cent on equities. The proportions of investments on debt and equity differ according to the individual's preferences. Money is invested in short term debt and fixed income securities. Here the growth of income becomes the secondary objective and stability of principal amount may become the third. Even within the debt portfolio, the funds invested in short term bonds depends on the need for stability of principal amount in comparison with the stability of income. If the appreciation of capital is given third

priority, instead of short term debt the investor opts for long term debt. The period may not be a constraint.

Growth of income and asset mix- Here the investor requires a certainpercentage of growth in the income received from his investment. The investor's portfolio may consist of 60 to 100 per cent equities and 0 to 40 per cent debt instrument. The debt portion of the portfolio may consist of concession regarding tax exemption. Appreciation of principal amount is given third priority. For example computer software, hardware and non-conventional energy producing company shares provide good possibility of growth in dividend.

Capital appreciation and asset mix- Capital appreciation means thatthe value of the original investment increases over the years. Investment in real estates like land and house may provide a faster rate of capital appreciation but they lack liquidity. In the capital market, the values of the shares are much higher than their original issue prices. For example Satyam Computers, share value was Rs. 306 in April 1998 but in October 1999 the value was Rs. 1658. Likewise, several examples can be cited. The market capitalisation also has increased. Next to real assets, the stock markets provide best opportunity for capital appreciation. If the investor's objective is capital appreciation, 90 to 100 per cent of his portfolio may consist of equities and 0-10% of debts. The growth of income becomes the secondary objective.

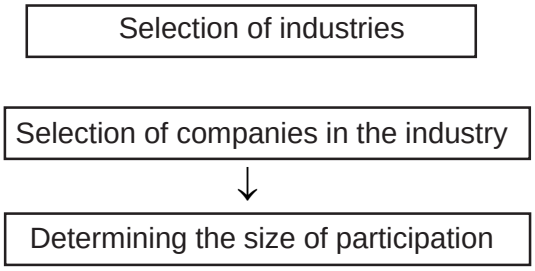
Safety of principal and asset mix- Usually, the risk averse investorsare very particular about the stability of principal. According to the life cycle theory, people in the third stage of life also give more importance to the safety of the principal. All the investors have this objective in their mind. No one like to lose his money invested in different assets. But, the degree may differ. The investor's portfolio may consist more of debt instruments and within the debt portfolio more would be on short term debts.

4. Risk and return analysis: The traditional approach to

portfoliobuilding has some basic assumptions. First, the individual prefers larger to smaller returns from securities. To achieve this goal, the investor has to take more risk. The ability to achieve higher returns is dependent upon his ability to judge risk and his ability to take specific risks. The risks are namely interest rate risk, purchasing power risk, financial risk and market risk. The investor analyses the varying degrees of risk and constructs his portfolio. At first, he establishes the minimum income that he must have to avoid hardships under most adverse economic condition and then he decides risk of loss of income that can be tolerated. The investor makes a series of compromises on risk and non-risk factors like taxation and marketability after he has assessed the major risk categories, which he is trying to minimise. The methods of calculating risk and return of a portfolio is classified in following pages of this chapter.

5. **Diversification:** Once the asset mix is determined and therisk and return are analysed, the final step is the diversification of portfolio. Financial risk can be minimised by commitments to top-quality bonds, but these securities offer poor resistance to inflation. Stocks provide better inflation protection than bonds but are more vulnerable to financial risks. Good quality convertibles may balance the financial risk and purchasing power risk. According to the investor's need for income and risk tolerance level portfolio is diversified. In the bond portfolio, the investor has to strike a balance between the short term and long term bonds. Short term fixed income securities offer more risk to income and long term fixed income securities offer more risk to principal. In the stock portfolio, he has to adopt the following steps which are shown in the following figure.

Fig. 11.2 Steps in Stock Portfolio



As investor, we have to select the industries appropriate to our investment objectives. Each industry corresponds to specific goals of the investors. The sales of some industries like two wheelers and steel tend to move in tandem with the business cycle, the housing industry sales move counter cyclically. If regular income is the criterion then industies, which resist the trade cycle should be selected. Likewise, the investor has to select one or two companies from each industry. The selection of the company depends upon its growth, yield, expected earnings, past earnings, expected price earning ratio, dividend and the amount spent on research and development. Selecting the best company is widely followed by all the investors but this depends upon the investors' knowledge and perceptions regarding the company. The final step in this process is to determine the number of shares of each stock to be purchased. This involves determining the number of different stocks that is required to give adequate diversification. Depending upon the size of the portfolio, equal amount is allocated to each stock. The investor has to purchase round lots to avoid transaction costs.

11.4.2 Modern Approach

Modern approach is based on the risk and return analysis.We have seen that the traditional approach is a comprehensive financial plan for the individual. It takes into account the individual needs such as housing, life insurance and pension plans. But these types of financial planning approaches are not done in the Markowitz approach. Markowitz gives more attention to the

process of selecting the portfolio. His planning can be applied more in the selection of common stocks portfolio than the bond portfolio. The stocks are not selected on the basis of need for income or appreciation. But the selection is based on the risk and return analysis. Return includes the market return and dividend. The investor needs return and it may be either in the form of market return or dividend. They are assumed to be indifferent towards the form of return.

Among the list of stocks quoted at the Bombay Stock Exchange or at any other regional stock exchange, the investor selects roughly some group of shares say of 10 or 15 stocks. For these stocks' expected return and risk would be calculated. The investor is assumed to have the objective of maximising the expected return and minimising the risk. Further, it is assumed that investors would take up risk in a situation when adequately rewarded for it. This implies that individuals would prefer the portfolio of highest expected return for a given level of risk.

In the modern approach, the final step is asset allocation process that is to choose the portfolio that meets the requirement of the investor. The risk taker i.e. who are willing to accept a higher probability of risk for getting the expected return would choose high risk portfolio. Investor with lower tolerance for risk would choose low level risk portfolio. The risk neutral investor would choose the medium level risk portfolio.



CHECK YOUR PROGRESS

Q1: Define Portfolio Construction.

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Q2: What is Traditional approach of portfolio construction

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Q3: Write the two major decisions. of traditional approach of of portfolio construction.

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11.5 PORTFOLIO RISK/RETURN

As mentioned earlier, an investment decision involves selection of a combination or group of securities for investment. This group of securities is referred to as a portfolio. The portfolio can be a combination of securities irrespective of their nature, maturity, profitability, or risk characteristics. Investors, rather than looking at individual securities, focus more on the performance of all securities together. While portfolio returns are the weighted returns of all securities constituting the portfolio, the portfolio risk is not the simple weighted average risk of all securities in the portfolio. Portfolio risk considers the standard deviation together with the covariance between securities. Co-variance measures the movement of assets together.

The portfolio risk and return using historical data is computed using the following formula:

Portfolio return $= E(r) = \sum_{i=1}^{n} w_i r_i$

Portfolio risk $= \sqrt{\sum_{i=1}^{n} w_i^2 \sigma_i^2} + \sum_{i=1}^{n} \sum_{j=1}^{n} w_i w_j \sigma_{ij}$

Where

ω = weights (percentage value)

r = return on the securities

Portfolio risk is thus the summation of the individual security variance and the co-movement with other securities in the portfolio. The above formula can be split into a spreadsheet showing all the co-movement measures of the securities.

The total variance is the summation of all cells in the following table. The diagonal summation represents the first part. This is the variance of each security individually. The weights of the securities in the portfolio are represented by the variables . Weights are the market values of the

securities held by the investor. When all securities in the portfolio are given equal weights, the will be simply (1/n). In a two security portfolio with equal weights the value of is (1/2) 0.5. When there are three securities in a portfolio, the market values being equal for all the three securities, the weights for each security will be (1/3) 0.33. Similar weights result in the multiplication of twice.

The second part of the variance computation equation is the summation of all other cells except the diagonal cells. These are the co-variance of one security with another security in the portfolio. The total covariance is computed by considering the weight of each security in the portfolio. When the weight of each security is different the weight of a combination in a portfolio will be (×); where i and j represent the two securities.

The square root of the variance gives the standard deviation of the portfolio, i.e., the risk of the portfolio. The following table gives the computation of the standard deviation elaborately. The group of individual securities 1,2,3, are related with each other to arrive at the co-variance matrix.

$$\sigma_{ij} = \frac{1}{n}\sum_{t=1}^{n}(r_{it} - \bar{r}_i) \times (r_{jt} - \bar{r}_j)$$

$$\sigma_p^2 = \boxed{\sum_{i=1}^{n} w_i^2 \sigma_i} + \sum_{i=1}^{n}\sum_{j=1}^{n} w_i\, w_j \sigma_{ij}$$

$$\sigma_p = \sqrt{\sum_{i=1}^{n} w_i^2 \sigma_i + \sum_{i=1}^{n}\sum_{j=1}^{n} w_i\, w_j \sigma_{ij}}$$

The computation of co-variance i.e., when i is not equal to j is as follows:

Co-variance can also be measured in terms of the correlation coefficient. The correlation coefficient is a measure of the relationship between two assets. The correlation coefficient ranges between the value +1 and –1. A correlation coefficient of +1 indicates that two securities returns move perfectly in tandem with each other. A negative correlation coefficient of -1 implies that when one securities' returns increase, the other securities' return reduces by the same quantum.

The computation of the co-variance σ_{ij} through the correlation coefficient is by the application of the following formula:

ρ_{ij} is the correlation coefficient

The correlation coefficient between two securities can be stated in any of the following formats.

$$\rho_{ij} = \frac{\sigma_{ij}}{\sigma_i \times \sigma_j}$$



Exercise 11.1:

Two securities P and Q are considered forinvestment. Compute the risk and return of the portfolio assuming the two securities, whose correlation coefficient of returns is –0.84, are combined in the following proportions in the portfolio: (a) 0: 100, (b) 10: 90, (c) 20: 80, (d) 50: 50, (e) 80: 20, (f) 90: 10, (g) 100: 0. The historical risk-return of the two securities is as follows:

Table 11.1 - Risk-Return

Security	Risk % (Std. Dev.)	Return %
P	20	15
Q	30	20

Solution. Computation of portfolio return:

(a) 0 : 100 = 20%

(b) 10 : 90 – (0.1*15) + (0.9*20) = 19.5%

(c) 20 : 80 – (0.2*15) + 0.8*20) = 19%

(d) 50 : 50 – (0.5*15) + (0.5*20) = 17.5%

(e) 80 : 20 – (0.8*15) + (0.2*20) = 16%

(f) 90 : 10 – (0.9*15) + (0.1*20) = 15.5%

(g) 100 : 0 = 15%

Computation of portfolio risk:

(a) 0 : 100 = 30%

(b) 10 : 90 = 25.34%

$$\sigma_p = \sqrt{(0.1^2 \times 20^2) + (0.9^2 \times 30^2) + (2 \times 0.1 \times 0.9 \times -0.84 \times 20 \times 30)}$$

(c) 20 : 80 = 20.75%

$$\sigma_p = \sqrt{(0.2^2 \times 20^2) + (0.8^2 \times 30^2) + (2 \times 0.2 \times 0.8 \times -0.84 \times 20 \times 30)}$$

(d) 50 : 50 = 8.54%

$$\sigma_p = \sqrt{(0.5^2 \times 20^2) + (0.5^2 \times 30^2) + (2 \times 0.5 \times 0.5 \times -0.84 \times 20 \times 30)}$$

(e) 80 : 20 = 11.43%

$$\sigma_p = \sqrt{(0.8^2 \times 20^2) + (0.2^2 \times 30^2) + (2 \times 0.8 \times 0.2 \times -0.84 \times 20 \times 30)}$$

(f) 90 : 10 = 15.57%

$$\sigma_p = \sqrt{(0.9^2 \times 20^2) + (0.2^2 \times 30^2) + (2 \times 0.8 \times 0.1 \times -0.84 \times 20 \times 30)}$$

(g) 100 : 0 = 20%



Exercise 11.2:

Compute the risk return characteristic of an equallyweighted portfolio of three securities whose individual risk and return are given in the following table. the correlation between Security A and B is –0.43 and the correlation between security B and C is 0.21 and the correlation coefficient between security A and C is –0.62.

Table 11.2 RiskReturn

Security	Risk	Return
A	15%	12%
B	20%	18%
C	25%	22%

Solution. The portfolio return is computed as follows:

(0.33*12) + (0.33*18) + (0.33*22) = 17.16%

the portfolio risk is computed as follows:

$$\sigma = \sqrt{(0.33_2 \times 15_2) + (0.33_2 \times 20_2) + (0.33_2 \times 25_2)(2 \times 0.33_2 \times 0.43 \times 15 \times 20) + (2 \times 0.33_2 \times 0.21_2 \times 20 \times 25) + (2 \times 0.33 \times -0.62 \times 15 \times 25)}$$

= 8.96%.

When the correlation coefficient ranges between 0 and -1, there is a possibility of minimising the total risk by combining the two securities.

For a two security combination it is possible to find the ratio of investment in the two securities that will result in minimum risk portfolio. The percentage of investment in security (A) can be ascertained using the following equation.

$$\omega_A = \frac{\sigma_B^2 - \rho_{AB} \times \sigma_A \times \sigma_B}{\sigma_A^2 + \sigma_B^2 - 2 \times \rho_{AB} \times \sigma_A \times \sigma_B}$$

The proportion of investment in security (B) will be 1 - ω_A or can also be computed using the following equation.

When the correlation coefficient is -1, the proportion of investment in each security can be given by the following equation.

$$\omega_A = \frac{\sigma_B^2 - \rho_{AB} \times \sigma_A \times \sigma_B}{\sigma_A^2 + \sigma_B^2 - 2 \times \rho_{AB} \times \sigma_A \times \sigma_B} = \frac{\sigma_A(\sigma_A + \sigma_B)}{(\sigma_A + \sigma_B)^2} = \frac{\sigma_B}{\sigma_A + \sigma_B}$$

$$\omega_B = \frac{\sigma_A^2 - \rho_{AB} \times \sigma_A \times \sigma_B}{\sigma_A^2 + \sigma_B^2 - 2 \times \rho_{AB} \times \sigma_A \times \sigma_B} = \frac{\sigma_A(\sigma_A + \sigma_B)}{(\sigma_A + \sigma_B)} = \frac{\sigma_A}{\sigma_A + \sigma_B}$$



Exercise 11.3:

From the two securities available for investment opportunity, find the proportion of investment in each security that will minimise the risk for the investor. The correlation coefficient between the two securities is –0.65. Determine portfolio risk.

Table 11.3 - Risk-return

Security	Risk%	Return%
A	25	18
B	30	22

$$\omega_A = \frac{\sigma_A^2 - \rho_{AB} \times \sigma_A \times \sigma_B}{\sigma_A^2 + \sigma_B^2 - 2 \times \rho_{AB} \times \sigma_A \times \sigma_B}$$

$$\omega_A = \frac{30^2 - (-0.65 \times 25 \times 30)}{30^2 + 25^2 - (2 \times -0.65 \times 25 \times 30)}$$

$\omega_A = 0.556 \ \omega_B = 1 - 0.556 = 0.444$

The risk return composition for a portfolio with these weights are as follows:

Portfolio return

(0.556*18) + (0.444*22) = 19.78%

Portfolio risk

$\sigma_P = \sqrt{(556^2 \times 25^2) + (0.444^2 \times 30^2) + (2 \times -0.65 \times 25 \times 30)}$

= 11.40%

Minimal risk is achieved since the correlation coefficient is ranging between 0 and –1. A positive correlation coefficient increases the portfolio risk proportionately. The following table illustrates the risk-return profile of a two security portfolio when the correlation coefficient is 0, 0.5, 1, -0.5 and –1.

Security	Risk%	Return%
A	20	15
B	30	20

ρ	0,100		40,60		50,50		60,40		100,0	
Risk	Return		Risk	Return	Risk	Return	Risk	Return	Risk	Return
0	30	20	19.7	18	18	17.5	17	17	20	15
0.5	30	20	23.1	18	21.8	17.5	20.8	17	20	15
1	30	20	26	18	25	17.5	24	17	20	15
-0.5	30	20	15.6	18	13.2	17.5	12	17	20	15
-1	30	20	10	18	5	17.5	10	17	20	15

The graph in Figure 11.3 plots all the combinations of securities for different correlation coefficients.

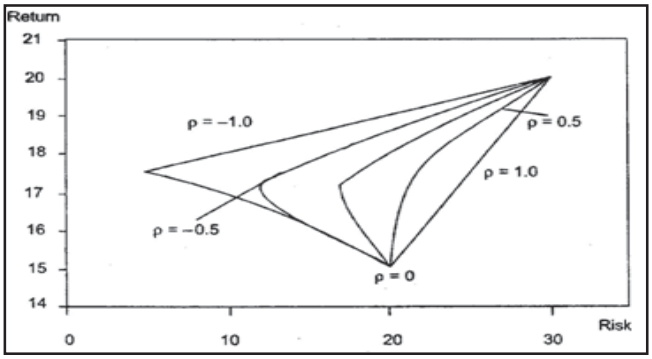


Figure 11.3. Risk-Return impact of different correlations

Plots for a larger number of securities are similar and can be represented through the graphs in Fig 11.4 and Fig 11.5.

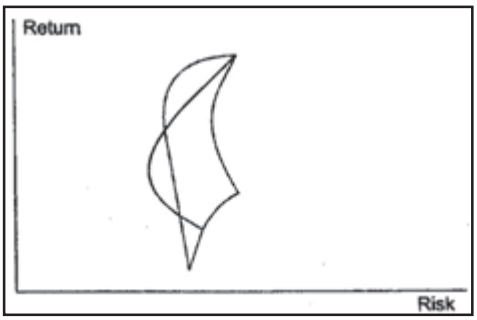


Fig 11.4

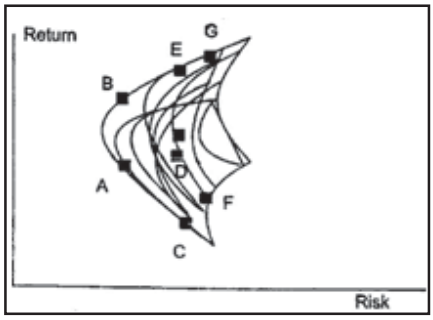


Fig 11.5.

A rational investor, given the above options of portfolios, will tend to select only those portfolios that give the highest return for a given risk or on the other hand, a lowest risk for a given return option. Consider the points A and B in Fig 11.5. Given the same risk level the return from B is higher than A, hence the rational investor will prefer B rather than A. Similarly, consider the points C, D, and E, compared to points C, and D, E gives a higher return for the same level of risk. The preference of investors will be E. Also, as risk level increases between the points F and G, G will be a preferred investment considering the higher return from this investment. The choice between B, E, and G will depend on the risk preference of investors. Given a higher risk preference level the choice of an investor will be towards point G. On the other hand if the investor is averse to risk the preference will be towards B rather than E and G.

The selection of portfolios for the investor is thus made only between the top most points in the feasible portfolio region shown in Figure 11.6. The feasible region is the combination of securities available in the market. The outer layer of the feasible region gives the investor maximum returns for a specific risk. Hence this is called the efficient frontier. An investor can evaluate among the efficient frontier to select the specific risk return portfolio that is preferred. These portfolios provide the highest return for a given level of risk.

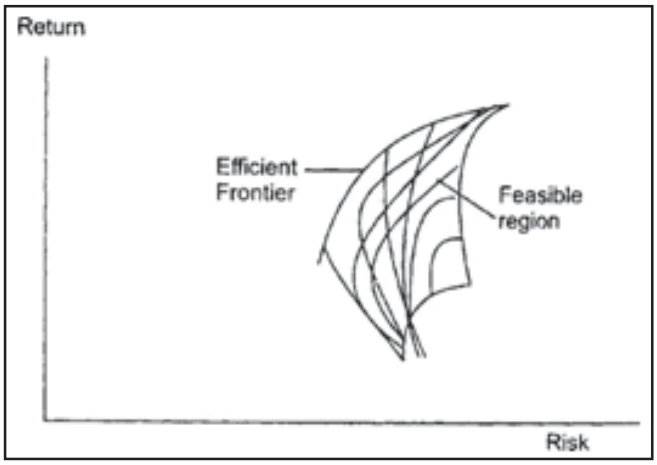


Fig:11.6



11.6 LET US SUM UP

- Portfolio is a combination of various securities.
- Portfolios can be constructed according to the traditional approach or modern approach.
- In the traditional approach the constraints, investor's need for current income and income in constant rupees are analysed. Liquidity, safety, time horizon of the investment, tax consideration and temperament of the individual investor's are the other constraints to frame the objectives.
- The general objectives of the portfolio are current income, constant income, capital appreciation and preservation of capital.
- According to the objectives the portfolio whether it is a bond portfolio or a stock portfolio or combination of both of bond and stock is decided. After that, the equity component of the portfolio is chosen. The traditional approach takes the entire financial plan of the individual investor.
- In the modern approach, Markowitz model is used. More importance is given to the risk and return analysis.



11.7 FURTHER READING

1) Farrell, J.I., Jr. *Guide to Portfolio Management.* New York: McGraw-Hill, 1983.
2) Harrington, D.R. *Modern Portfolio Theory.* 2d ed. Englewood Cliffs, N.J.: Prentice Hall, 1987.
3) Markowitz, H.M. *Portfolio Selection: Diversificationo f Investments.* New York: John Wiley, 1959.
4) Markowitz, H.M. "Individual versus Institutional Investing." *FinancialServices Review* 1 (1991).
5) Sharpe, W.F. "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk." *Journal of Finance* (September 1964).
6) Sharpe, W.F. *Portfolio Theory and Capital Markets.* New York: McGraw-Hill, 1970.
7) Statman, M. "How Many Stocks Make a Diversified Portfolio?" *Journalof Financial and Quantitative Analysis* (September 1987).



11.8 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q1: Portfolio construction is the process of blending to gether the broadasset classes to obtain optimum return with minimum risk.

Ans to Q2: Traditional approach of portfolio construction is based on thefinancial needs of the individual investors.

Ans to Q3: The traditional approach basically deals with two major decisions. They are:

(a) Determining the objectives of the portfolio.

(b) Selection of securities to be included in the portfolio.



11.9 MODEL QUESTIONS

1. What are the steps in the traditional approach?
2. Explain the constraints in the formation of objectives.
3. How would you formulate the asset mix according to the given objectives?
4. What are the differences between the traditional approach and modern approach?
5. State the modern approach in the construction of the portfolio.
6. Consider two situations: a young man X in early twenties and another young man Y in the late thirties X and Y earns same amount of money. Mr. Y has a family, a house, a car and all the encumbrances related with the marital status. Both of them like to invest in securities, what would be their constraints and objectives?
7. Ajay, aged 26 is chalking out an investment program to invest in common stocks. Ajay is married and working in a MNC. He is paid nearly 5 lakhs per year. He is having a well furnished house and a car. He is a member of the life insurance scheme. He has purchased his house on loan scheme. The MNC with whom he is working has given him 15 years of job contract.

   They may or may not renew their contract. Assist him in his investment plan. Advise him about the components of his portfolio worth of 5 lakhs.
8. Compute the risk and return of a portfolio of these securities.

   Assume equal weights.

Security	**S1**	**S2**	**S3**	**S4**	**S5**
Return	12%	10%	8%	15%	18%
Risk (standard deviation)	20%	18%	10%	18%	25%

9. Give the minimum risk portfolio from the combination of the following securities.

Security	**S1**	**S2**
Risk (standard deviation)	15%	20%
Return	20%	30%

10. Select suitable portfolios for an investor who falls in the risk bracket of 40 per cent.

Portfolio	**P1**	**P2**	**P3**	**P4**	**P5**
Standard deviation	15%	16%	18%	12%	19%
Return	16%	18%	22%	19%	23%

11. Use the Sharpe Index Model to select the best combination of securities for a portfolio. The risk free rate is 5% and market standard deviation is 20%.

Security	**S1**	**S2**	**S3**	**S4**	**S5**
Risk (Beta)	1.5	1.2	1.3	1.4	0.85
Return	12%	15%	10%	16%	8%
Error	20%	15%	12%	24%	22%

12. Compute the beta for the following security:

Security price	410	421	415	417	418	422	420	419
Market price	3282	3285	3286	3290	3285	3290	3294	3298

*** ***** ***

UNIT 12: THE MARKOWITZ MODEL

UNIT STRUCTURE

12.1 Learning Objectives

12.2 Introduction

12.3 The Markowitz Model: Assumptions and Concept

12.4 Varying Degrees of Correlation

12.5 Simple Diversification

12.6 Problems of vast Diversification

12.7 Risk and Return with Different Correlation

12.8 Markowitz Efficient Frontier

12.9 Utility Analysis

12.10 Risk Free Asset

12.11 Sharpe-The Single Index Model

12.12 Sharpe's Optimal Portfolio

12.13 Let Us Sum Up

12.14 Further Reading

12.15 Answers to Check Your Progress

12.16 Model Questions

12.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- describe Marrkowitz Model: Assumptions and Concept
- describe the Simple Diversification and Problems of vast Diversification
- outline the risk and return with different correlation
- explain Markowitz Efficient Frontier
- discuss Utility Analysis and Risk Free Asset
- describe Sharpe-The Single Index Model

12.2 INTRODUCTION

In this unit we are going to dicuss about the Marrkowitz Model: Assumptions

and Concept, Varying Degrees of Correlation, Simple Diversification and Problems of vast Diversification.In this unit we will also discuss the risk and return with Different Correlation, Markowitz Efficient Frontier.

At the end of this you will get some idea about Risk Free Asset,Sharpe-The Single Index Model and Sharpe's Optimal Portfolio

12.3 THE MARKOWITZ MODEL: ASSUMPTIONS AND CONCEPT

Most people agree that holding two stocks is less risky than holding one stock. For example, holding stocks from textile, banking, and electronic companies is better than investing all the money on the textile company's stock. But building up the optimal portfolio is very difficult. Markowitz provides an answer to it with the help of risk and return relationship.

Assumptions

The individual investor estimates risk on the basis of variability of returns i.e. the variance of returns. Investor's decision is solely based on the expected return and variance of returns only.

For a given level of risk, investor prefers higher return to lower return. Likewise, for a given level of return investor prefers lower risk than higher risk.

The Concept

In developing his model, Markowitz had given up the single stock portfolio and introduced diversification. The single security portfolio would be preference if the investor is perfectly certain that his expectation of highest return would turn out to be real. In the world of uncertainty, most of the risk averse investors would like to join Markowitz rather than keeping a single stock, because diversification reduces the risk. This can be shown with the help of the following illustration.

Take the stock of ABC company and XYZ company. The returns expected from each company and their probabilities of occurrence, expected returns and the variances are given. The calculation procedure is given in the table.

	Stock ABC	Stock XYZ
Return %	11 or 17	20 or 8
Probability	.5 each return	.5 each return
Expected Return	14	14
Variance	9	36
Standard deviation	3	6

ABC Expected return =.5 X 11 + .5 X 17 = 14

XYZ Expected return = .5 X 20 + .5 X 8 = 14

ABC variance = .5 (11-14)2 + .5 (17-14)2 = 9

XYZ variance = .5 (20-14)2 + .5 (8-14)2 = 36

ABC standard deviation = Variance = 9 = 3

XYZ standard deviation = Variance = 36 = 6

ABC and XYZ companies stocks have the same expected return of 9%. XYZ company's stock is much riskier than ABC stock, because the standard deviation of the former being 6 and latter 3. When ABC return is high XYZ return is low and vice-versa i.e. when there is 17% return from ABC, there would be 8% return from XYZ. Likewise when ABC return is 11% XYZ return is 20%. If a particular investor holds only ABC or XYZ he would stand to lose in the time of bad performance.

$R_p = \Sigma X_1 R_1$

Suppose the investor holds two thirds of ABC and one third of XYZ, the return can be calculated as follows

N

t=1

R_p = return on the portfolio

X_1 = proportion of total portfolio invested in security 1.

R_1 = expected return of security 1.

Let us calculate the expected return for the both the possibilities.

Possibility 1 = 2/3 X 11 + 1/3 X 20 = 14

Possibility 2 = 2/3 X 17 + 1/3 X 8 = 14

In both the situations, the investor stands to gain if the worst occurs, than by holding either of the security individually.

Holding two securities may reduce the portfolio risk too. The portfolio risk can be calculated with the help of the following formula.

σ_p = portfolio standard deviation

X_1 = percentage of total portfolio value in stock X_1

X_2 = percentage of total portfolio value in stock X_2

= standard deviation of stock X_1

= standard deviation of stock X_2

r_{12} = correlation co-efficient of X_1 and X_2

Using the same example given in the return analysis, the portfolio risk can be estimated. Let us assume ABC as X_1 and XYZ as X_2. Now the covariance is: X_{12}

$$\text{cov}\,ofX_{12} = 1/N\sum_{t=1}^{N}(R_1 - R_2)(R_1 - R_2)$$

= 1/2[(11-14)(20-14)(17-14)(18-14)

= ½ [(-18) + (-18)] = -36/2 = -18

$$R = \frac{\text{covariance of } X_{12}}{\sigma_1\sigma_2} = -18/3X6 = -1$$

The correlation co-efficient indicates the similarity or dissimilarity in the behavior of X_1 and X_2 stocks. In correlation, co-variance is not taken as an absolute value but relative to the standard deviation of individual securities. It shows, how much X and Y vary together as a proportion of their combined individual variations measured by σ_1 and . In our example, the correlation co-efficient is -1.0 which indicates that there is a perfect negative correlation exists between the securities and they tend to move in the same direction. If the correlation is 1, perfect positive correlation exists between the securities

and they tend to in the same direction. If the correlation co-efficient is zero, the securities' returns are independent. Thus, the correlation between two securities depends upon the covariance between the two securities and the standard deviation of each security.

Now, let us proceed to calculate the portfolio risk. Combination of two securities reduces the risk factor if less degree of positive correlation exists between them. In our case, the correlation coefficient is -1.

$= \sqrt{}(2/3)2 \times 9 + (1/3)2 \times 36 + 2 \times 2/3 \times 1/3 (-1 \times 3 \times 6)$

$= 4 + 4 + (-8)$

$= 0$

The portfolio risk is nil if the securities are related negatively. This indicates that the risk can be eliminated if the securities are perfectly negatively correlated. The standard deviation of the portfolio is sensitive to (1) the proportions of funds devoted to each stock (2) the standard deviation of each security and (3) co-variance between two stocks.

$\sigma_p \equiv \sqrt{} X_1^2 \sigma_1^2 + X_2^2 \sigma_2^2 + 2X_1X_2(r_{12}\sigma_1\sigma_2)$

The change in portfolio proportions can change the portfolio risk. Taking the same example of ABC and XYZ stock, the portfolio standard deviation is calculated for different proportions.

Stock ABC (X1)	Stock XYZ (X2)	Portfolio Standard Deviation
100	0	3
66.66	33.3	0
50.0	50.0	1.5
0	100	6

By skillful balancing of the investment proportions in different securities, the portfolio risk can be brought down to zero. The proportion to be invested in each security can be found out by the precondition is that the correlation co-efficient should be -1.0. Otherwise it is

If the correlation co-efficient is less than the ratio of smaller standard deviation to larger standard deviation, then the combination of two securities provides a lesser standard deviation of return than when either of the security is taken alone. In our example,

-1 < 3/6 i.e. -1 < + .50

If the standard deviation ratio is 4/6 and the correlation co-efficient is + .8, the combination of securities is not profitable because

+ 8 > 4/6 i.e. + 8 > .66

12.4 VARYING DEGREES OF CORRELATION

Here in order to learn more about the relationship between securities, different degrees of correlation co-efficients are analyzed. Extreme cases like +1, 1, intermediate values and no correlation are calculated for two securities namely X and Y. We assume that the investor has specific amount of money to invest and that can be allocated in any proportion between the securities. Security X has an expected rate of return of 5% and a standard deviation of 4%. While for security Y, the expected return is 8% and the standard deviation of return is 10%.

Let us first work out the expected return and the portfolio risk for different values of correlation coefficients for varying proportions of the securities X and Y. Portfolio return is calculated with the equation:

$R_p = X_x R_x + X_y R_y$

If there is 75% investment on X and 25% on Y, then Rp = .75(5%) + 0.25 (8%) = 5.75% then the σ_p would be found out by using equation

$= \sqrt{}$ 3/4 x ¾ x 16 + ¼ x ¼ x 100 + 2 x ¾ x ¼ (1 x 4 x10)

= 5.5

Table gives the values of R_p and for varying degrees of correlation co-efficients.

Proportion of X security in portfolio X	Proportion of Y security in portfolio 1-X	$R_p$rxy	Rxy +1	Rxy -1	Rxy 0	+.5
1.00	0.00	5.00	4.0	4.0	4.0	4.0
0.75	0.25	5.75	5.5	0.5	3.9	4.8
0.50	0.50	6.50	7.0	3.0	5.4	6.25
0.25	0.75	7.25	8.5	6.5	7.6	8.1
0.00	1.00	8.00	10.0	10.0	10.0	10.0

12.5 SIMPLE DIVERSIFICATION

Portfolio risk can be reduced by the simplest kind of diversification. Portfolio means the group of assets an investor owns. The assets may vary from stocks to different types of bonds. Some times the portfolio may consist of securities of different industries. When different assets are added to the portfolio, the total risk tends to decrease. In the case of common stocks, diversification reduces the unsystematic risk or unique risk. Analysts opine that if 15 stocks are added in a portfolio of the investor, the unsystematic risk can be reduced to zero. But at the same time if the number exceeds 15, additional risk reduction cannot be gained. But diversification cannot reduce systematic or undiversifiable risk.

σ_p

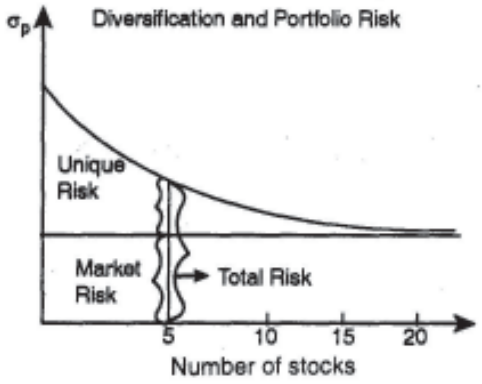
The naive kind of diversification is known as simple diversification. In the case of simple diversification, securities are selected at random and no analytical procedure is used.

Total risk of the portfolio consists of systematic and unsystematic risk and this total risk is measured by the variance of the rates of returns over time. Many studies have shown that the systematic risk forms one quarter of the total risk.

The simple random diversification reduces the total risk. The reason behind this is that the unsystematic price fluctuations are not correlated with the market's systematic fluctuations. The figure shows how the simple

diversification reduces the risk. The standard deviations of the portfolios are given in Y axis and the number of randomly selected portfolio securities in the X axis.

The standard deviation was calculated for each portfolio and plotted. As the portfolio size increases, the total risk line Starts declining. It flattens out after a certain point. Beyond that limit, risk cannot be reduced. This indicates that spreading out the assets beyond certain level cannot be expected to reduce the portfolio's total risk below the level of undiversifiable risk.



12.6 PROBLEMS OF VAST DIVERSIFICATION

Spreading the investment on too many assets will give rise to problems such as purchase of poor performers, information inadequacy, high research cost and transaction cost.They are discussed below:

1. Purchase of Poor Performers: While buying numerous stocks, sometimes the investor may also buy stocks that will not yield adequate return.

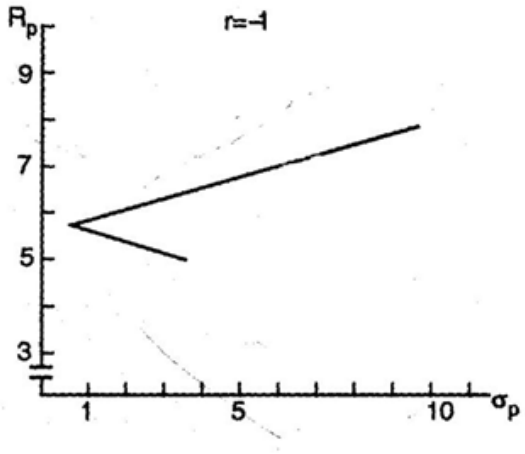
2. **Information Inadequacy:** If there are too many securities in a portfolio, it is difficult for the portfolio manager to get information about their individual performance. The portfolio manager has to be in touch with the details regarding the individual company performance. To get all the information simultaneously is quite High research cost If a large number of stocks are included, before the inclusion itself the returns and risk of the

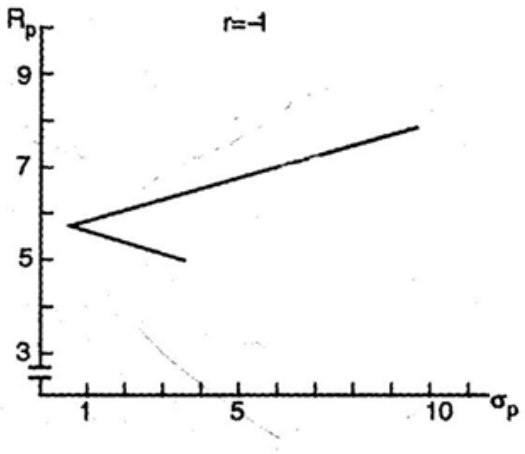
individual stock have to be analysed. Towards this end, lot of information has to be gathered and kept in store and these procedures involve high cost.

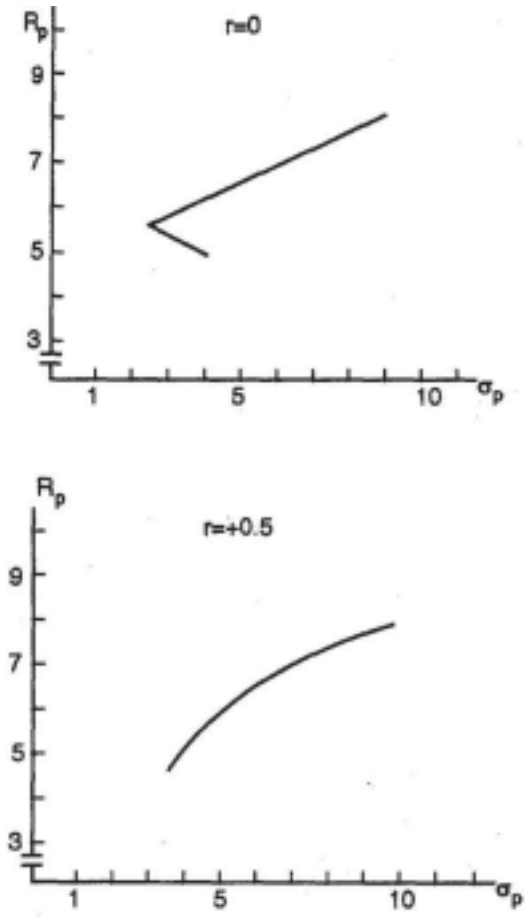
3. High Transaction Cost: When small quantities of stocks are purchased frequently, the investor has to incur higher transaction cost than the purchase of large blocks at less frequent intervals. In spite of all these difficulties big financial institutions purchase hundreds of different stocks. Likewise, mutual funds also invest in different stocks.

12.7 RISK AND RETURN WITH DIFFERENT CORRELATION

The four figures indicate the relationship between risk and return.

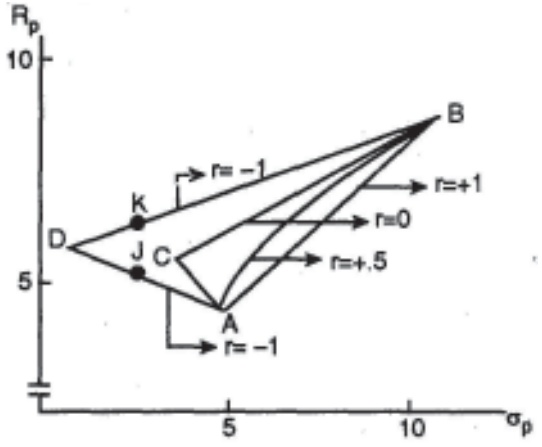






All the graphs show the portfolio risks under varying levels of correlation co-efficients. All the figures can be assembled together and placed in a single figure. The following figure expresses the relationship between expected returns and standard deviations of returns for various correlation coefficients.

Two Security Portfolios with Different Correlation Coefficients



In the figure, portfolio return is given on the vertical axis and portfolio risk on the horizontal axis. Point A represents 100 per cent holdings of X and point B represents 100 per cent holdings of Y. The intermediate points along the line segment AB represent portfolios containing various combinations of two securities.

The straight line r = + 1 shows that the portfolio risk increases with the increase in portfolio return. Here, the combination f two securities could not reduce the portfolio risk-because of their positive correlation. Again, the ratio of smaller standard deviation to larger deviation is less than the correlation coefficient.

1 > 4/10 = 1 > .4 which indicates that benefit cannot be derived by combining both the securities. In this case if an investor wish to minimize his risk, it would be better for him to invest all the money in security X where the risk is comparatively lower.

The r_{xy} = 0 line is a hyperbola. Along the line segment ACB, the r = 0. CB contains portfolios that a superior to those along the line segment AC. Markowitz says that all portfolios along the ACB line segment are feasible but some are more efficient than others. The line segment ADB indicates (r = -1) perfect inverse correlation and it is possible to reduce portfolio risk to zero. Portfolios on the line segment DB provides superior returns than on the line segment AD. For example, take two points on both the line segments K and J. The point K is superior to the point J because with the same level of risk the investor earns more return on point K than on pointy.

Thus, Markowitz diversification can lower the risk if the securities in the portfolio have low correlation coefficients.



CHECK YOUR PROGRESS

Q1: State the Assumption of Markowitz Model

.....

.....

Q2: Define Portfolio

.....

.....

12.8 MARKOWITZ EFFICIENT FRONTIER

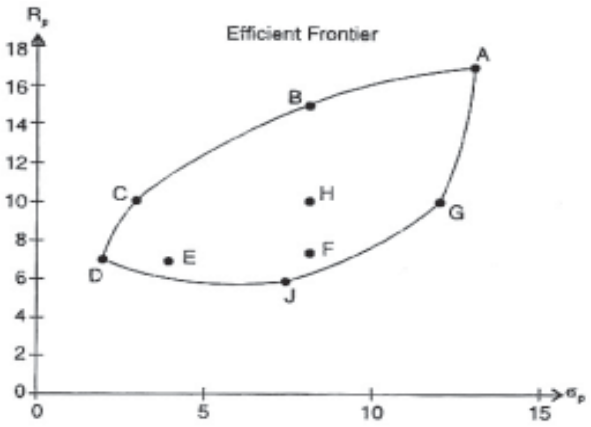
The risk and return of all portfolios plotted in risk-return space would be dominated by efficient portfolios. Portfolio may be constructed from available securities. All the possible combination of expected return and risk compose the attainable set. The following example shows the expected return and risk of different portfolios.

Portfolio Risk and Return

Portfolio	Expected Return (R_P) %	Risk ($ó_P$)
A	17	13
B	15	8
C	10	3
D	7	7
E	7	4
F	7	8
G	10	12
H	9	8
J	6	7.5

The attainable sets of portfolios are illustrated in figure. Each of the portfolios along the line or within the line ABCDEFGJ is possible. It is not possible for the investor to have portfolio outside of this perimeter because no combination of expected return and risk exists there.

When the attainable sets are examined, some are more attractive than others. Portfolio B is more attractive than portfolios F and H because B offers more return on the same level of risk. Likewise, C is more attractive than portfolio G even though same level of return is got in both the points; the risk level is lower at point C. In other words, any portfolio which gives more return for the same level of risk or same return with lower risk is more preferable than any other portfolio.



Among all the portfolios, the portfolios which offer the highest return at particular level of risk are called efficient portfolios. Here the efficient portfolios are A, B, C and D, because at these points no other portfolio offer higher return. The ABCD line is the efficient frontier along which all attainable and efficient portfolios are available. Now the question raised is which portfolio the investor should choose? He would choose a portfolio that maximizes his utility. For that utility analysis has to be done.

12.9 UTILITY ANALYSIS

Utility Analysis

Utility is the satisfaction the investor enjoys from the portfolio return. An ordinary investor is assumed to receive greater utility from higher return and vice-versa. The investor gets more satisfaction or more utility in X + 1 rupees than from X rupee.

If he is allowed to choose between two certain investments, he would always like to take the one with larger outcome. Thus, utility increases with increase in **return.**

The utility function makes certain assumptions about an investors' taste for risk. The investors are categorised into risk averse, risk neutral and risk seeking investor. All the three types can be explained with the help of a **fair gamble.**

In a fair gamble which cost ' 1, the on are A and B events. A event will yield ' 2. Occurrence of B event is a dead loss i.e 0. The chance of

occurrence of both the events are 50% and 50%.

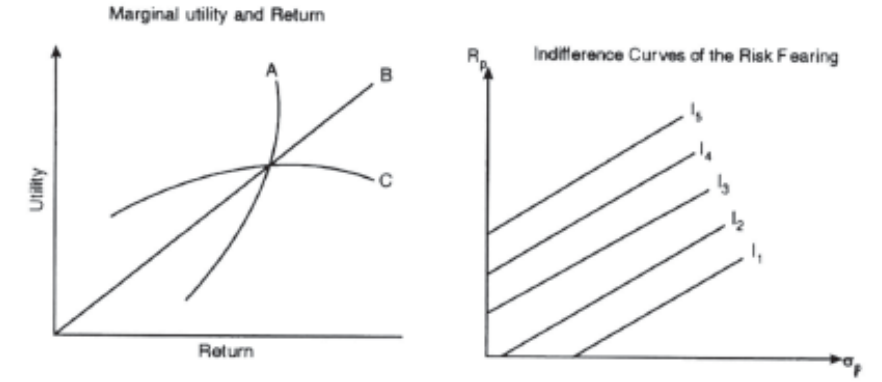
The expected value of investment is (1/2) 2 + 1/2 (0) = Rel> the expected value of the gamble is exactly equal to cost. Hence, it is a fair gamble. The position of the investor may, be improved or hurt by undertaking the gamble.

Risk avertor rejects a fair gamble because the disutility of the loss is greater for him than the utility of an equivalent gain. Risk neutral investor means that he is indifferent to whether a fair gamble is undertaken or not.

The risk seeking investor would select a fair gamble i.e. he would choose to invest. The expected utility of investment is higher than the expected utility of not investing. These three different types of investors are shown in figure.

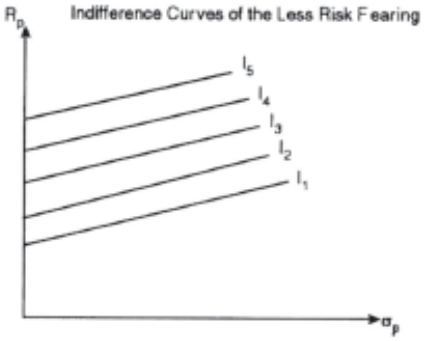
The curves ABC are three different slopes of utility curves. The upward sloping curve A shows increasing marginal utility. The straight line B shows constant utility, and curve C shows diminishing marginal utility. The constant utility, a linear function means doubling of returns would double the utility and it indicates risk neutral situation.

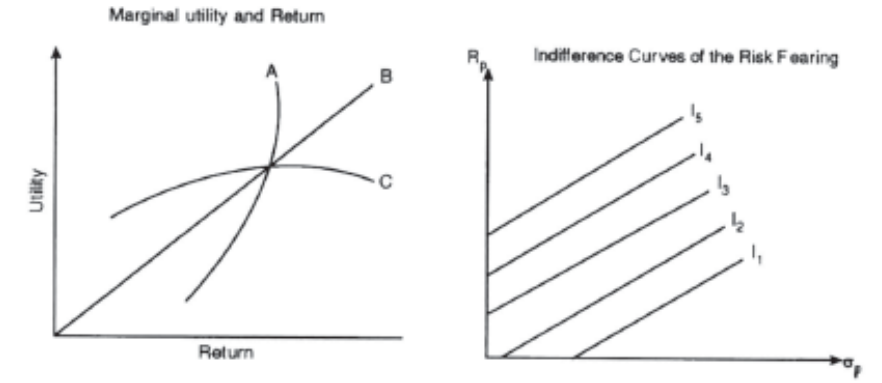
The increasing marginal utility suggests that the utility increases more than proportion to increase in return and shows the risk lover. The curve C shows risk averse investor. The utility he gains from additional return declines gradually. The figures show the utility curves of the different investors.


Marginal utility and Return
Utility
Return
A
B
C

Indifference Curves of the Risk Fearing
R_p
I_5
I_4
I_3
I_2
I_1
σ_p

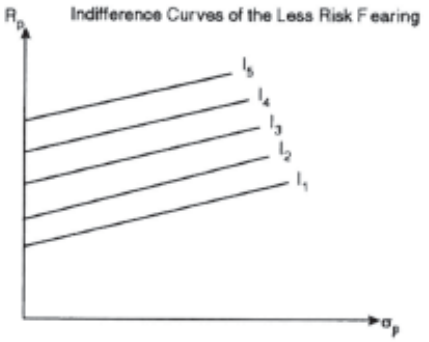

Indifference Curves of the Risk Loving
R_p
I_5
I_4
I_3
I_2
I_1
σ_p


Indifference Curves of the Less Risk Fearing
R_p
I_5
I_4
I_3
I_2
I_1
σ_p


Marginal utility and Return
Utility
Return
A
B
C

Indifference Curves of the Risk Fearing
R_p
I_5
I_4
I_3
I_2
I_1
σ_p

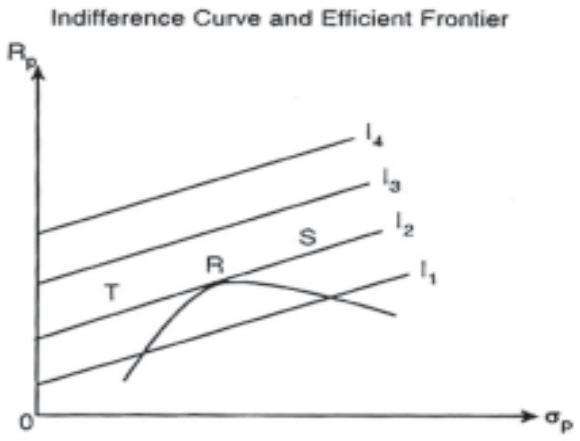

Indifference Curves of the Risk Loving
R_p
I_5
I_4
I_3
I_2
I_1
σ_p


Indifference Curves of the Less Risk Fearing
R_p
I_5
I_4
I_3
I_2
I_1
σ_p

Investors generally like to get more returns for additional risks assumed and the lines would be positively sloped. The risk lover's utility curves are negatively sloped and converge towards the origin. For the risk fearing, lower the risk of the portfolio, happier he would be. The degree of the slope of indifference curve indicates the degree of risk aversion. The conservative investor needs larger return to undertake small increase in risk (Figure) The aggressive investor would be willing to undertake greater risk for smaller return. Even though the investors dislike risk, their trade off between risk and return differs.

Indifference Map and the Efficient Frontier

Each investor has a series of indifference curves. His final choice out of the efficient set depends on his attitude towards risk. The figure shows the efficient frontier and the indifference map.



The utility of the investor or portfolio manager increases when he moves up the indifference map from I to 14'He can achieve higher expected return without an increase in risk. In the figure 122 touches the efficient frontier at point R. Even though the points I and S are in the I, curve, R is the only attainable portfolio which maximises the utility of the investor. Thus, the point at which the efficient frontier tangentially touches the highest indifference curve determines the most attractive portfolio for the investor.

Leveraged Portfolios

In the above model, the investor is assumed to have a certain amount

of money to make investment for a fixed period of time. There is no borrowing and lending opportunities. When the investor is not allowed to use the borrowed money, he is denied the opportunity of having financial leverage.

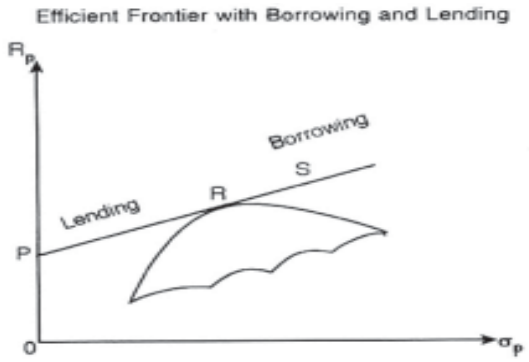
Again, the investor is assumed to be investing only on the risky assets. Riskiess assets are not included in the portfolio. To have a leveraged portfolio, investor has to consider not only risky assets but also risk free assets. Secondly, he should be able to borrow and lend money at a given rate of interest.

12.10 RISK FREE ASSET

The features of risk free asset are: (a) absence of default risk and interest risk and (b) full payment of principal and interest amount. The return from the risk free asset is certain and the standard deviation of the return is nil. The relationship between the rate of return of the risk free asset and risky asset is zero. These types of assets are usually fixed income securities. But fixed income securities issued by private institutions have the chance of default. If the fixed income securities are from the government, they do not possess the default risk and the return from them are guaranteed. Further, the government issues securities of different maturity period to match the length of investors holding period. The risk free assets may be government securities, treasury bills and time deposits in banks.

Inclusion of Risk Free Asset

Now, the risk free asset is introduced and the investor can invest part of his money on risk free asset and the remaining amount on the risky asset. It is also assumed that the investor would be able to borrow money at risk free rate of interest. When risk free asset is included in the portfolio, the feasible efficient set of the portfolios is altered. This can be explained in the Figure.



In the figure, OP is gained with zero risk and the return is earned through holding risk free asset. Now, the investor would attempt to maximise his expected return and risk relationship by purchasing various combinations of riskless asset and risky assets. He would be moving on the line connecting attainable portfolio R and risk free portfolio P i.e. the line PR. When he is on the PR, part of his money is invested in fixed income securities i.e. he has lent some amount of money and invested the rest in the risky asset within the point PR. He is depending upon his own funds. But, if he moves beyond the point R to S he would be borrowing money. Hence the portfolios located between the points RP are lending portfolios and beyond the point R consists of borrowing portfolios. Holding portfolio in PR segment with risk free securities would actually reduces risk more than the reduction in return.

12.11 SHARPE-SINGLE INDEX MODEL

Sharpe- Single Index Model

Casual observation of the stock prices over a period of time reveals that most of the stock prices move with the market index. When the Sensex increases, stock prices also tend to increase and vice-versa. This indicates that some underlying factors affect the market index as well as the stock prices. Stock prices are related to the market index and this relationship could be used to estimate the return on stock. Towards this purpose, the following equation can be used

where

R_i - expected return on security i

- intercept of the straight line or alpha co-efficient

- slope of straight line or beta co-efficient

R_m - the rate of return on market index

e_i - error term

According to the equation, the return of a stock can be divided into t components, the return due to the market and the return independent of the market. 13. indicates the sensitiveness of the stock return to the changes in the market return. For example 13 of 1.5 means that the stock returns is expected to increase by 1.5% when the market index return increases by 1% and vice-versa. Likewise, 13.of 0.5 expresses that the individual stock return would change by 0.5 per cent when there is a change of 1 per cent in the market return. 13 of 1 indicate that the market return and the security return are moving in tandem. The estimates of 13.and a are obtained from regression analysis.

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

The single index model is based on the assumption that stocks vary together because of the common movement in the stock market and there are no effects beyond the market (i.e. any fundamental factor effects) that account the stocks co-movement. The expected return, standard deviation and co-variance of the single index model represent the joint movement of securities. The mean return is

The variance of security's of return

The covariance of returns between securities i and is

$$\sigma_{ij} + \beta_i \beta_j \sigma^2_m$$

The variance of the security has t components namely, systematic risk or market risk and unsystematic risk or unique risk. The variance explained by the index is referred to systematic risk. The unexplained variance is called residual variance or unsystematic risk. Systematic risk = β_i^2 x variance of market index.

$$= \beta_i^2 \sigma_m^2$$

Unsystematic risk = Total variance — Systematic risk.

$e_i^2 = \sigma_i^2$ -systematic risk.

Thus, the total risk = Systematic risk + Unsystematic risk.

$' = \beta_i^2 \sigma_m^2 + e_i^2$

From this, the portfolio variance can be derived

σ_2 = variance of portfolio

= expected variance of index

= variation in security's return not related to the market index x_i = the portion of stock i in the portfolio

Likewise expected return on the portfolio also can be estimated. For each security α_1 and should be estimated. N

$\Sigma i^N = 1^x$

Portfolio return is the weighted average of the estimated return for each security in the portfolio. The f weights are the respective stocks' proportionsin the portfolio.

A portfolio's alpha value is a weighted average of the alpha values for its component securities using the F proportion of the investment in a security as weight.

$\Sigma i^N = 1^x$

- Value of the alpha for the portfolio

x_i - Proportion of the investment on security i - Value of alpha for security i N - The number of securities in the portfolio.

Similarly, a portfolio's beta value is the weighted average of the beta values of its component stocks using relative share of them in the portfolio as weights.

p i i

β_p is the portfolio beta.

12.12 SHARPE'S OPTIMAL PORTFOLIO

Sharpe's Optimal Portfolio

Sharpe had provided a model for the selection of appropriate securities in a portfolio.

The selection of any stock is directly related to its excess return-beta ratio.

Where

R_i = the expected return on stock i

R_f = the return on a riskless asset

= the expected change in the rate of return on stock i associated with one unit change in the market return

The excess return is the difference between the expected return on the stock and the riskless rate of interest such as the rate offered on the government security or treasury bill. The excess return to beta ratio measures the additional return on a security (excess of the riskless asset return) per unit of systematic risk or no diversifiable risk this ratio provides a relationship between potential risk and reward

$\frac{R_i - R_f}{\beta_i}$

Ranking of the stocks are done on the basis of their excess return to beta. Portfolio managers would like to include stocks with higher ratios. The selection of the stocks depends on a unique cut-off rate such that all stocks with higher ratios of R.-R / B are included and the stocks with lower ratios are left off. The cut-off point is denoted by C*.

The steps for finding out the stocks to be included in the optimal portfolio are given below

1. Find out the "excess return to beta" ratio for each stock under consideration.
2. Rank them from the highest tothe lowest.
3. Proceed to calculate C for all the stocks according to the ranked order using the following formula.

σ_{m^2} = variance of the market index

= variance of a stock's movement that is not associated with the movement of market index i.e. stock's unsystematic risk.

4. The cumulated values of C start declining after a particular C and that point is taken as the cut-off point and that stock ratio is the dut-off ratio C.

This is explained with the help of an example.

Data for finding out the optimal portfolio are given below:

Security Number	Mean Return R_i	Excess Return $R_i - R_f$	Beta	Unsystematic Risk	Excess Return to Beta
1	19	14	1.0	20	14
2	23	18	1.5	30	12
3	11	6	0.5	10	12
4	25	20	2.0	40	10
5	13	8	1.0	20	8
6	9	4	0.5	50	8
7	14	9	1.5	30	6

The riskless rate of interest is 5 per cent and the market variance is 10. Determine the cut-off point.

Security Number	$\frac{R_i - R_f}{\beta_i}$	$\frac{(R_i - R_f)x\beta_i}{\sigma e_i^2}$	$\sum \frac{N(R_i - R_f)\beta_i}{i=1\sigma e_i^2}$	$\frac{\beta_i^2}{\sigma e_i^2}$	$\frac{\beta_i^2}{\sigma e_i^2}$	c_i
1	14	0.7	0.7	0.05	0.05	4.67
2	12	0.9	1.6	0.075	0.125	7.11
3	12	0.3	1.9	0.025	0.15	7.60
4	10	1.0	2.9	0.1	0.25	8.29
5	8	0.4	3.3	0.05	0.3	8.25
6	8	0.04	3.34	0.005	0.305	8.25
7	6	0.45	3.79	0.075	0.38	7.90

Calculations are given below

For Security 1

$$C_1 = \frac{10x.7}{1+(10x.05)} = 4.67$$

Here 0.7 is got from column 4 and 0.05 from column 6. Since the preliminary calculations are over, it is easy to calculate the C.

$$C_2 = \frac{10x.1.6}{1+(10x.125)} = 7.11$$

$$C_3 = \frac{10x\ 1.9}{1+(10x.125)} = 7.11$$

$$C_4 = \frac{10x\ 2.9}{1+(10x.25)} = 8.2$$

$$C_5 = \frac{10\,x\ 3.3}{1+(10\,x.3)} = 8.25$$

$$C_6 = \frac{10\,x\ 3.34}{1+(10\,x.305)} = 8.25$$

$$C_7 = \frac{10\,x\ 3.79}{1+(10\,x.38)} = 7.90$$

The highest Ci.value is taken as the cutoff point i.e. C*. The stocks ranked above C* have high excess returns to beta than the cut-off C. and all the stocks ranked below C* have low excess returns to beta. Here, the cut-off rate is 8.29. Hence, the first four securities are selected. If the number of stocks is larger there is no need to calculate C_i values for all the stocks after

the ranking has been done. It can be calculated until the C* value is found and after calculating for one or two stocks below it, the calculations can be terminated.

The C_i can be stated with mathematically equivalent way.

$$C_i = \frac{\beta_{ip}(R_p - R_f)}{\beta_i}$$

β_{ip} - the expected change in the rate of return on stock i associated with 1 per cent change in the return on the optimal portfolio.

R_p - the expected return on the optimal portfolio

and R_p cannot be determined until the optimal portfolio is found. lb find out the optimal portfolio, the formula given previously should be used. Securities are added to the portfolio as long as

The above equation can be rearranged with the substitution of equation:

Now we have,

$$R_i - R_f > \beta_{ip}(R_p - R_f)$$

The right hand side is the expected excess return on a particular stock based on the expected performance of the optimum portfolio. The term on the left hand side is the expected excess return on the individual stock. Thus, if the portfolio manager believes that a particular stock will perform better than the expected return based on its relationship to optimal portfolio, he would add the stock to the portfolio.



CHECK YOUR PROGRESS

Q3: Define Utility Analysis

.....

.....

Q4: What are the problems of vast diversification.

.....

.....



12.13 LET US SUM UP

The unit describes the concpet of Markowitz Model.**Assumptions of** Markowitz Model is "The individual investor estimates risk on the basis of variability of returns i.e. the variance of returns. Investor's decision is solely based on the expected return and variance of returns only".Utility is the satisfaction the investor enjoys from the portfolio return.The increasing marginal utility suggests that the utility increases more than proportion to increase in return and shows the risk lover. The features of risk free asset are: (a) absence of default risk and interest risk and (b) full payment of principal and interest amount. Sharpe had provided a model for the selection of appropriate securities in a portfolio.



12.14 FURTHER READING

- M. Ranganathan and R. Madhumathi(2011); *Investment Analysis and Portfolio Management*, Pearson Education, New Delhi.
- Punithavathy Pandian(2016) *Security Analysis and Portfolio Management,* Vikas Publishing House Pvt. Ltd., New Delhi.
- Bharti V. Phathak(2014; *Indian Financial System,* Pearson Education, Delhi.
- Donald E. Fischer and Ronald J. Jordon(2011); *Security Analysis and Portfolio Management,* PHI.
- Prasanna Chandra(2010);*Investment Analysis and Portfolio Management,* TMH, Delhi.



12.15 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q1: Assumptions: The individual investor estimates risk on the basis of variability of returns i.e. the variance

ofreturns.Investor's decision is solely based on the expected return and variance of returns only.

Ans to Q2: Portfolio means the group of assets an investor owns.

Ans to Q3: Utility is the satisfaction the investor enjoys from the portfolio return. An ordinary investor is assumed to receive greater utility from higher return and vice-versa. The investor gets more satisfaction or more utility in X + 1 rupees than from X rupee.

Ans to Q4: Spreading the investment on too many assets will give rise to problems such as purchase of poor performers, information inadequacy, high research cost and transaction cost.



12.16 MODEL QUESTIONS

Q1: Explai the concept ofMarkowitz Model with examples

Q2: Discuss the relationship between securities and different degrees of correlation

Q3: Explain simple diversification

Q4: Write the problems of vast diversification

Q5: Explain Markowitz efficient frontier

Q6: What is Utility Analysis

Q7: Define Risk Free Assest

Q8: Explain Sharpe-Single Index Model

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UNIT 13: CAPITAL ASSET PRICING THEORY

UNIT STRUCTURE

13.1 Learning Objectives

13.2 Introduction

13.3 Capital Asset Pricing Theory: An Introduction

13.4 Security Market Line (SML)

13.5 Evaluation of Securities

13.6 Market Imperfection and SML

13.7 Empirical Tests of the CAPM

13.8 Present Validity of CAPM

13.9 Let Us Sum Up

13.11 Further Reading

13.12 Answers to Check Your Progress

13.13 Model Questions

13.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- define capital asset pricing theory
- describe the concept of Security Market Line
- outline the evaluation of Securities
- explain Market Imperfection and SML
- discuss Empirical Tests of the CAPM
- describe Present Validity of CAPM

13.2 INTRODUCTION

In this unit we are going to dicuss about capital asset pricing theory, the concept of Security Market Line,the evaluation of Securities

At the end of this you will get some idea about Market Imperfection and SML, Empirical Tests of the CAPM and Present Validity of CAPM.

13.3 CAPITAL ASSET PRICING THEORY(CAPM): AN INTRODUCTION

Investors are interested in knowing the systematic risk when they search for efficient portfolios. They would like to have assets with low beta co-efficient i.e. systematic risk. Investors would opt for high beta co-efficient only if they provide high rates of return. The risk averse nature of the investors is the underlying factor for this behavior. The capital asset pricing theory helps the investors to understand the risk and return relationship of the securities. It also explains how assets should be priced in the capital market.

The CAPM Theory

Markowitz, William Sharpe, John Lintner and Jan Mossin provided the basic structure for the CAPM model. It is a model of linear general equilibrium return. In the CAPM theory, the required rate return of an asset is having a linear relationship with asset's beta value i.e. undiversifiable or systematic risk.

Assumptions

1. An individual seller or buyer cannot affect the price of a stock. This assumption is the basic assumption of the perfectly competitive market.
2. Investors make their decisions only on the basis of the expected returns, standard deviations and co variances of all pairs of securities.
3. Investors are assumed to have homogenous expectations during the decision-making period.
4. The investor can lend or borrow any amount of funds at the riskless rate of interest. The riskless rate of interest is the rate of interest offered for the treasury bills or Government securities.
5. Assets are infinitely divisible. According to this assumption, investor could buy any quantity of share i.e. they can even buy ten rupees worth of Reliance Industry shares.
6. There is no transaction cost i.e. no cost involved in buying and selling of stocks.
7. There is no personal income tax. Hence, the investor is indifferent to the form of return either capital gain or dividend.

8. Unlimited quantum of short sales is allowed. Any amount of shares an individual can sell short.

Lending and Borrowing

Here, it is assumed that the investor could borrow or lend any amount money at riskless rate of interest. When this opportunity is given to the investors, they can mix risk free assets with the risky assets in a portfolio to obtain a desired rate of risk-return combination.

R_p = Portfolio return

X_f = the proportion of funds invested in risk free assets

$1- X_f$ = the proportion of funds invested in risky assets

R_f = Risk free rate of return

R_m = Return on risky assets

The expected return on the combination of risky and risk free combination is:

$$R_p = R_f X_f + R_m(1 – X_f)$$

This formula can be used to calculate the expected returns for different situations, like mixing ri assets with risky assets, investing only in the risky asset and mixing the borrowing with risky assets.

Now, let us assume that borrowing and lending rate to be 12.5% and the return from the risky assets to be 20%. There is a trade off between the expected return and risk. If an investor invests in risk free assets and risky assets, his risk may be less than what he invests in the risky asset alone. But if he borrows to invest in risky assets, his risk would increase more than he invests his own money in the risky assets. When he borrows to invest, we call it financial leverage. If he invests 50% in risk free assets and 50% in risky assets, his expected return of the portfolio would be

$$R_p = R_f X_f + R_m(1 – X_f)$$

$$= 12.5 \times .5 + 20(1 - .5)$$

$$= 6.25 + 10$$

$$= 16.25\%$$

If there is a zero investment in risk free asset and 100% in risky asset, the return is

$R_p = R_f X_f + R_m(1 - X_f)$

$= 0 + 20\%$

$= 20\%$

If - .5 in risk free asset and 1.5 in risky asset, the return is

$R_p = R_f X_f + R_m(1 - X_f)$

$= (l2.5 \times -.5) + 20x\ 1.5$

$= - 6.25 + 30$

$= 23.75$

The variance of the above mentioned portfolio can be calculated by using the equation.

The previous example can be taken for the calculation of the variance. The variance of the risk free asset is in. The variance of the risky asset is assumed to be 15. Since the variance of the risky asset is zero, the 1, rtfolio risk solely depends on the portion of investment on risky asset.

Proportion in risky asset ($1-X_f$)	Portfolio risk
0.5	1.0
1.5	7.5
1.5	22.5

The risk is more in the borrowing portfolio being 22.5% and the return is also high among the three alternatives. In the lending portfolio, the risk is 7.5% and the return is also the lowest. The risk premium is proportional to risk, where the risk premium of a portfolio is defined as the difference between $R_p - R_f$ i.e. the amount by which a risky rate of return exceeds the riskless rate of return.

Risk - Return Trade Off

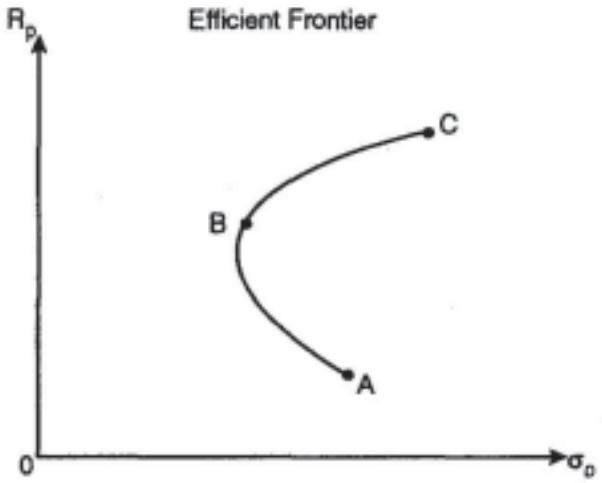
Portfolio Return R_p	Risk-free Return R_f	Risk Premium $R_p - R_f$	Portfolio Risk σ	Factor of Proportionality $(R_p - R_f)$
16.25	12.5	3.75	7.5	0.5
20.0	12.5	7.5	15.0	0.5
23.75	12.5	11.25	22.5	0.5

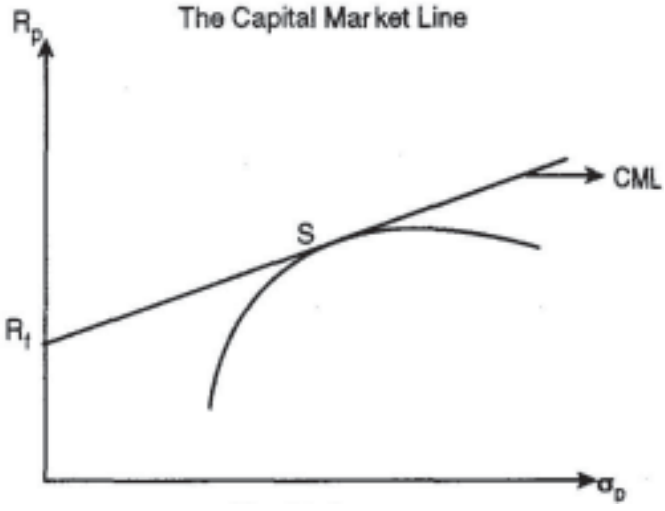
The risk-return proportionality ratio is a constant .5, indicating that one unit of risk premium is accompanied by 0.5 unit of risk.

The Concept

According to CAPM, all investors hold only the market portfolio and riskless securities. The market portfolio is a portfolio comprised of all stocks in the market. Each asset is held in proportion to its market value to the total value of all risky assets. For example, if Reliance Industry share represents 20% of all risky assets, then the market portfolio of the individual investor contains 20% of Reliance industry shares. At this stage, the investor has the ability to borrow or lend any amount of money at the riskiness rate of interest. The efficient frontier of the investor is given in fig 13.1.

fig 13.1.





The figure shows the efficient frontier of the investor. The investor prefers any point between B and C because, with the same level of risk they face on line BA, they are able to get superior profits. The ABC line shows the investor's, portfolio of risky assets. The investors can combine riskless asset either by lending or borrowing. This is shown in Figure.

The line R_fS represents all possible combination of riskless and risky asset. The 'S' portfolio does not represent any riskless asset but the line RS gives the combination of both. The portfolio along the path RS is called lending portfolio that is some money is invested in the riskless asset or may be deposited in the bank for a fixed rate of interest. If it crosses the point S. it becomes borrowing portfolio. Money is borrowed and invested in the risky asset. The straight line is called capital market line (CML). It gives the desirable set of investment opportunities between risk free and risky investments. The CML represents linear relationship between the required rates of return for efficient portfolios and their standard deviations.

$E(R_p)$ = portfolio's expected rate of return

R_m = expected return on market portfolio

= standard deviation of market portfolio

= standard deviation of the portfolio

For a portfolio on the capital market line, the expected rate of return in excess of the risk free rate is in proportion to the standard deviation of the market portfolio. The price of the risk is given by the slope of the line. The slope equals the premium for the market portfolio $R_m - R_f$ divided by the risk or standard deviation of the market portfolio. Thus, the expected return of an efficient portfolio is:

Expected return = Price of time + (Price of risk . Amount of risk)

Price of time is the risk free rate of return. Price of risk is the premium amount higher and above the risk free return.



CHECK YOUR PROGRESS

Q1: What is CAPM Theory

.....

.....

Q2: What is market portfolio

.....

.....

13.4 SECURITY MARKET LINE (SML)

The risk-return relationship of an efficient portfolio is measured by the capital market line. But, it does not show the risk-return trade off for other portfolios and individual securities. Inefficient portfolios lie below the capital market line and the risk-return relationship cannot be established with the help of the capital market line. Standard deviation includes the systematic and unsystematic risk. Unsystematic risk can be diversified and it is not related to the market. If the unsystematic risk is eliminated, then the matter of concern is systematic risk alone. This systematic risk could be measured by beta. The beta analysis is useful for individual securities arid portfolios whether efficient or inefficient.

$R_{mi} / \sigma R_{mf} = (R_{im} - Rf / \sigma_{m})Covi_{m} / \sigma_{m}$

When an additional security is added to the market portfolio, an additional risk is also added to it. The variance of a portfolio is equal to the weighted sum of the co-variances of the individual securities in the portfolio.

If we add an additional security to the market portfolio, its marginal contribution to the variance of the market is the covariance between the security's return and market portfolio's return. If the security i am included, the covariance between the security and the market measures the risk. Covariance can be standardized by dividing it by standard deviation of market portfolio coy . This shows the systematic risk of the security. Then, the expected return of the security i is given by the equation:

This equation can be rewritten as follows

The first term of the equation is nothing but the beta coefficient of the stock. The beta coefficient of the equation of SML is same as the beta of the market (single index) model. In equilibrium, all efficient and inefficient portfolios lie along the security market line. The SML line helps to determine the expected return for a given security beta. In other words, when betas are given, we can generate expected returns for the given securities. This is explained in fig 13.2.

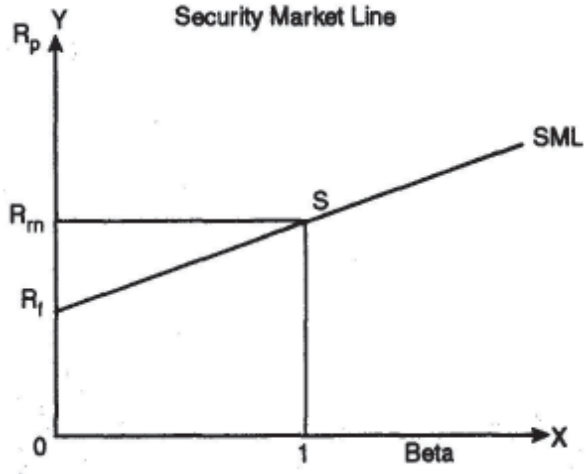


Fig: 13.2

If we assume the expected market risk premium to be 8% and the risk free rate of return tube 7%, we can calculate expected return for A, B and C securities using the formula:

$E(R_i) = R_f + ß_i[E(R_m)-R_f]$

If beta for ß = 1

If beta for = 1

= 7 + 1 (8)

= 15%

Security A

Beta = 1.10

E(R) = 7+1.10(8)

= 15.8

Security B

Beta = 1.20

E(R) = 7 + 1.20(8)

= 16.8 = 16.6

Security C

Beta = .7

E(R) = 7 + .7(8)

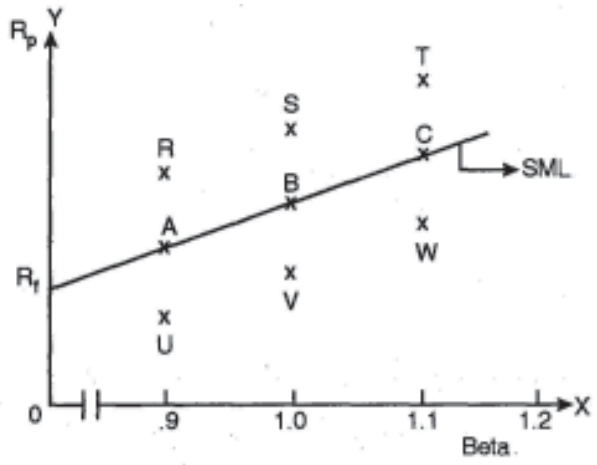
=12.6

The same can be found out easily from the figure too. All we have to do is, to mark the beta on the horizontal axis and draw a vertical line from the relevant point to touch the SML line. Then from the point of intersection, draw another horizontal line to touch the Y axis. The expected return could be very easily read from the Y axis. The securities A and B are aggressive securities, because their beta values are greater than one. When beta values are less than one, they are known as defensive securities. In our example, security C has the beta value less than one.

13.5 EVALUATION OF SECURITIES

Relative attractiveness of the security can be found out with the help of security market line. Stocks with high risk factor are expected to yield more return and vice-versa. But the investor would be interested in knowing whether the security is offering return more or less proportional to its risk.

Fig: 13.3 Evaluation of Securities with SML



The fig 13.3 provides an explanation for the evaluation. There are nine points in the diagram. A, B and C lie on the security market line, R, S and T above the SML and U, V and W below the SML. ARU have the same beta level of, 9. Likewise beta values of SBV = 1.00 and TCW = 1.10. The stocks above the SML yield higher returns for the same level of risk. They are underpriced compared to their beta value. With the simple rate of return formula, we can prove that they are undervalued.

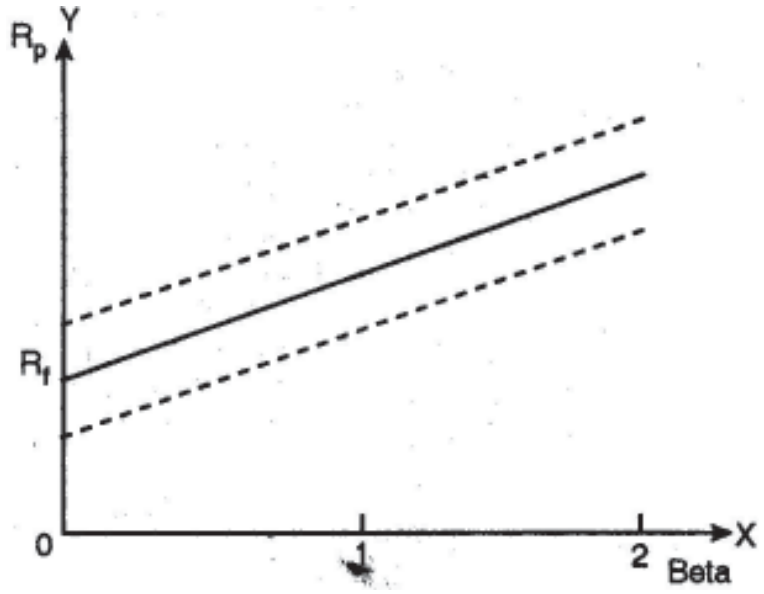
P_i is the present price P_0 - the purchase price and Div - Dividend. When the purchase price is low i.e. when the denominator value is low, the expected return could be high. Applying the same principle the stocks U, V and W can be classified as overvalued securities and are expected to yield lower returns than stocks of comparable risk. The denominator value may be high i.e. the purchase price may be high. The prices of these scripts may fall and lower the denominator. There by, they may increase the returns on securities.

The securities A, B and C are on the line. Therefore considered to be appropriately valued. They offer returns in proportion to their risk. They have average 4oclc performance, since they are neither undervalued nor overvalued.

13.6 MARKET IMPERFECTION AND SML

Information regarding the share price and market condition may not be immediately available to all investors. Imperfect information may affect the valuation of securities. In a market with perfect information, all securities should lie on SML. Market imperfections would lead to a band of SML rather than a single line. Market imperfections affect the width of the SML to a band. If imperfections are more, the width also would be larger. SML in imperfect market is given in fig 13.4.

Fig 13.4 SML in Imperfect Market



13.7 EMPIRICAL TESTS OF THE CAPM

In the CAPM, beta is used to estimate le systematic of the security and reflects the future volatility of the stock in relation to the market. Future volatility of the stock is estimated only through historical data. Historical data are used to plot the regression line or the characteristic line and calculate beta. If historical betas are stable over a period of time, they would be good proxy for their ex-ante or expected risk.

Robert A. Levy, Marshall B. Blume and others have studied the question of beta stability in depth. They calculated betas for both Individual securities and portfolios. Their study results have provided the following conclusions:

(1) The betas of individual stocks are unstable; hence the past betas for the individual securities are not good estimators of future risk.

(2) The betas of portfolios of ten or more randomly selected stocks are reasonably stable, hence the portfolio betas are good estimators of future portfolio volatility. This is because of the errors in the estimates of individual securities' betas tend to offset one another in a portfolio.

Various researchers have attempted to find out the validity of the model by calculating beta and realized rate of return. They attempted to test (1) whether the intercept is equal to i.e. risk free rate of interest or the interest rate offered for treasury bills (2) whether the line is linear and pass through the beta = 1 being the required rate of return of the market. In general, the studies have showed the following results.

(1) The studies generally showed a significant positive relationship between the expected return and t systematic risk. But the slope of the relationship is usually less than that of predicted by the CAPM.

(2) The risk and return relationship appears to be linear. Empirical studies give no evidence of significant curvature in the risk/return relationship,.

(3) The attempts of the researchers to assess the relative importance of the market and company risk have yielded definite results. The CAPM theory implies that unsystematic risk is not relevant, but unsystematic and systematic risks are positively related to security returns. Higher returns are needed to compensate both the risks. Most of the observed relationship reflects statistical problems rather than the true nature of capital market.

(4) According to Richard Roll, the ambiguity of the market portfolio leaves the CAPM untestable. The practice of using indices as proxies is loaded with problems. Different indices yield different betas for the same security.

(5) If the CAPM were completely valid, i4 should apply to all financial assets including bonds. But, when bonds are introduced into the analysis, they do not fall on the security market line.

13.8 PRESENT VALIDITY OF CAPM

The CAPM is greatly appealing at an intellectual level, logical and rational. The basic assumptions on which the model is built raise, some doubts in the minds of the investors. Yet, investment analysts have been more creative in adapting CAPM for their uses.

(1) The CAPM focuses on the market risk, makes the investors to think

about the riskiness of the assets in general. CAPM provides basic concepts which are truly of fundamental value.

(2) The CAPM has been useful in the selection of securities and portfolios. Securities with higher returns are considered to be undervalued and attractive for buy. The below normal expected return yielding securities are considered to be overvalued and Suitable for sale.

(3) In the CAPM, it has been assumed that investors consider only the market risk. Given the estimate of the risk free rate, the beta of the firm, stock and the required market rate of return, one can find out the expected returns for a firm's security. This expected return can be used as an estimate of the cost of retained earnings.

(4) Even though CAPM has been regarded as a useful tool to financial analysts, it has its own critics too. They point out, when the model is ex-ante, the inputs also should be ex-ante, i.e. based on the expectations of the future. Empirical tests and analyses have used ex-post i.e. past data only.

(5) The historical data regarding the market return, risk free rate of return and betas vary differently for different periods. The various methods used to estimate these inputs also affect the beta value. Since the inputs cannot be estimated precisely, the expected return found out through the CAPM model is also subjected to criticism 4.



CHECK YOUR PROGRESS

Q3: What does standard deviation includes.

.....

.....

Q4: How is historical data calculated.

.....

.....

Q5: What is the use of security market line

.....

.....



13.9 LET US SUM UP

- Markowitz, William Sharpe, John Lintner and Jan Mossin provided the basic structure for the CAPM model. It is a model of linear general equilibrium return. In the CAPM theory, the required rate return of an asset is having a linear relationship with asset's beta value i.e. undiversifiable or systematic risk.
- According to CAPM, all investors hold only the market portfolio and riskless securities. The market portfolio is a portfolio comprised of all stocks in the market. Each asset is held in proportion to its market value to the total value of all risky assets.
- Price of time is the risk free rate of return. Price of risk is the premium amount higher and above the risk free return.
- Relative attractiveness of the security can be found out with the help of security market line. Stocks with high risk factor are expected to yield more return and vice-versa.
- Market imperfections would lead to a band of SML rather than a single line. Market imperfections affect the width of the SML to a band. If imperfections are more, the width also would be larger.



13.10 FURTHER READING

- M. Ranganathan and R. Madhumathi(2005); *Investment Analysis and Portfolio Management,* Pearson Education, New Delhi.
- Punithavathy Pandian(2012); *Security Analysis and Portfolio Management,* Vikas Publishing House Pvt. Ltd., New Delhi.
- Bharti V. Phathak (2014); *Indian Financial System,* Pearson Education, Delhi.
- Donald E. Fischer and Ronald J. Jordon (2002): *Security Analysis and Portfolio Management*, Pearson Education India.
- Prasanna Chandra(2017); *Investment Analysis and Portfolio Management,* McGraw Hill Education, Delhi.



13.11 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No.1: Markowitz, William Sharpe, John Lintner and Jan Mossin provided the basic structure for the CAPM model. It is a model of linear general equilibrium return. In the CAPM theory, the required rate return of an asset is having a linear relationship with asset's beta value i.e. undiversifiable or systematic risk.

Ans to Q No.2: The market portfolio is a portfolio comprised of all stocks in the market.

Ans to Q No.3: Standard deviation includes the systematic and unsystematic risk.

Ans to Q No.4: Historical data are used to plot the regression line or the characteristic line and calculate beta.

Ans to Q No.5: Relative attractiveness of the security can be found out with the help of security market line.



13.13 MODEL QUESTIONS

Q 1: Discuss Capital Asset Pricing Theory

Q 2: Describe the Security Market Line

Q 3: How is Evaluation of Securities is done.

Q 4: What is Market Imperfection and SML

Q 5: Explain Empirical Tests of the CAPM

Q 6: What is Present Validity of CAPM

*** ***** ***

UNIT 14 : CAPITAL MARKET THEORY AND THE ARBITRAGE PRICING THEORY

UNIT STRUCTURE

14.1 Learning Objectives

14.2 Introduction

14.3 Capital Asset Pricing Model (CAPM)

14.4 Concepts of Risk-free Asset, Risk-free Lending and Risk-free Borrowing

14.5 Efficient Set with Risk Free Lending and Borrowing

- 14.5.1 Leveraged Portfolio
- 14.5.2 Market Portfolio
- 14.5.3 Capital Market Line

14.6 The CAPM

- 14.6.1 Assumptions
- 14.6.2 Security Market Line
- 14.6.3 Limitations

14.7 Arbitrage Pricing Theory (APT)

14.8 Let Us Sum Up

14.9 Further Reading

14.10 Answers to Check your Progress

14.11 Model Question

14.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- outline the basic tenets and assumptions of Capital Asset Pricing Model (CAPM) define risk free asset, risk free lending, risk free borrowing and leveraged portfolio
- discuss and illustrate the implications of leveraged portfolio for efficient set and Capital Market Line (CML)
- describe 'beta' measure of systematic risk and the Security Market Line (SML) that relates the expected return for an asset to its beta
- discuss the limitations of CAPM and describe alternative theory

namely Arbitrage Pricing Theory (APT) Structure.

14.2 INTRODUCTION

In this unit we are going to discuss the concepts of Capital Market Theory, Assumptions,Security Market Line and its limitations. This theory sets the environment in which securities analysis is preformed. Without a well-constructed view of modem capital markets, securities analysis may be a futile activity. A great debate, and great divide, separates the academics, with their efficient market hypothesis, and the practitioners, with their views of market inefficiency. Although the debate appears surreal and unimportant at times, its resolution is immensely critical for conducting effective securities analysis and investing successfully.

In this unit we will geta fair idea about Concepts of Risk-free Asset, Risk-free Lending and Risk-free Borrowing, Leveraged Portfolio,Market Portfolio, Capital Market Line and Arbitrage Pricing Theory (APT).

14.3 CAPITAL ASSET PRICING MODEL(CAPM)

The Capital Asset Pricing Model (CAPM) is commonly confused with portfolio theory. Portfolio theory is simply the use of statistical and mathematical programming techniques to derive optimal tradeoffs between risk and return. Under very restrictive assumptions (rarely found in financial markets), the CAPM is a highly specialized subset of portfolio theory. Even so, the CAPM has become very popular as it provides a logical, common sense tradeoff between risk and return.

In this unit, our endeavor will be to extend the portfolio theory described in the previous two units, to the capital market theory that is concerned with pricing risky assets. In particular, we would like to know if two assets differ with respect to their risk, how will they differ in terms of the price investors are willing to pay or the rate of return investors expect to get from them?

The major implication of the capital market theory is that the expected return of an asset will be related to a measure of risk for that asset, known

as 'beta'. The exact manner in which expected return and beta are related is specified by the Capital Asset Pricing Model or CAPM, which was developed in mid-1960s. The model has generally been attributed to Williams Sharpe, but similar independent derivations were, made to by John Linter and Jan Mossin. Consequently, the model is often referred to as Sharpe-Linter-Mossin (SLM) Capital Asset Pricing Model. Although the model has been extensively examined, modified and extended in the literature, the original SLM version of the CAPM still remains the central theme in capital market theory as well as in current practices of investment management.

14.4 CONCEPTS OF RISK-FREE ASSET, RISK-EREE LENDING AND BORROWING

Following the development of Markowitz portfolio model, institutional investors and others started realizing the need for considering the relationship between the stocks in constructing the portfolios. Many of these investors started using sophisticated mathematical models to derive optimal portfolio but always found it difficult to measure the same in view of large number of assets traded in the market. CAPM resolves this problem to an extent by considering investments in risk-free asset. As we will see in this Unit, giving investors these new opportunities will have major impact in the shape and allocation of the efficient set and subsequent portfolio selection. But before we proceed to discuss this aspect, let us get acquainted with the terms like 'risk-free asset', 'risk-free lending' and 'risk-free borrowing'.

Risk-free Asset: Risk-free asset is an asset, which has a certain future return. In other words, a risk-free asset is one for which there is no uncertainty regarding the future returns; that is, the investor knows exactly what the value of the asset will be at the end of the holding period. Thus, variance of returns of a risk-free asset is equal to zero. A good example of such asset is government bonds.

Whether all types of government bonds are risk-free asset? It is difficult to say because long-term government bonds are exposed to certain types of risk like interest rate risk and inflation risk. For instance, if the maturity

period of a government security is (say) 15 years, while the investment horizon (or the holding period) of an investor is (say) three-months, then the investor does not really know at what market price he will be able to sell the security at the end of his holding period. Any change in interest-rate structure during the holding period will-influence the market price of the security. To give an idea, upward revision of interest rate will have a tendency to lower the market price, such that yield-to-maturity at market-price-based acquisition of the security of given maturity period compares well with the yield-to-maturity of new issue with similar maturity period. This is an example of what is termed as 'interest-rate-risk'. Thus, normally, the short-term government securities like Treasury Bills are called risk-free securities. Can corporate debentures be treated as risk-free asset? Certainly not, because risk of default is associated with them in addition to interest rate risk and inflation risk. In fact, corporate bonds have more risk like liquidity risk. However, in relative term, they are better than equity on risk.

What is the co-movement of returns of risk-free asset and risky asset (or portfolio of risky assets)? Interestingly, it is always zero. We may recall that covariance between returns of two-assets 'i' and 'j' are given by

$\rho_{ij}, \sigma_i, \sigma_j$

$$\sigma_{ij} = \rho_{ij}\sigma_i\sigma_j$$

where are the correlation co-efficient and standard deviation of returns on assets i' and 'j' respectively. If one of the assets is risk-free asset, say asset 'i', then by definition returns on risk-free asset are certain such that the standard deviation ( ) is zero and hence the co-variance ( ) is also zero.

As we will see later, these two characteristics of risk-free asset, namely, (a) variance = 0; and (b) covariance of returns with any other asset = 0, are quite significant in determining the shape of efficient frontier.

Risk-Free Lending and Borrowing: Investing in a risk-free asset is frequently referred to as 'risk-free lending', since investment in such assets tantamount to giving loan directly to the government. An investor does not have to depend solely on his own wealth to decide how much to invest in

assets. She/he can borrow and invest, i.e., the investor can use financial leverage. However, investor will have to pay interest on borrowed funds and such borrowing is also assumed to have same risk-free interest rate and hence deemed as "risk-free borrowing". Though it may not be practical for an ordinary investor to borrow at risk-free interest rate, it is quiet possible for large funds to borrow at a rate close to risk-free rate.



CHECK YOUR PROGRESS

Q1:What do the following stand for:

a. CAPM ……...……

b. CML ……

c. SML……

d. SLM……

e. APT……

14.5 EFFICIENT SET WITH RISK-FREE LEADING AND BORROWING

The efficient frontier consists of only risky securities. What happens to the average rate of return and standard deviation of returns when a risk-free asset is combined with a portfolio of risky assets such as exists on the Markowitz efficient frontier?

The expected portfolio return (R_P is given by

$R_P = XR_f + (1- x)R_i$

where,

x = the proportion of the portfolio invested in a risk free asset;

R_f = risk-free rate of return; and

R_i = expected return on risky portfolio 'i' .

Recalling equation (10.2), variance of returns for two-asset portfolio is as follows:

$$\sigma^2 = [x^2\sigma^2_f] + [(1-x)^2\sigma^2_i] + [2x(1-x)\sigma_{if}] \quad \text{---- eq 14.1}$$

Where, σ^2_f and σ^2_i are the return variances of risk-free asset and risky portfolio respectively, and σ_{if} is the covariance of returns between risk-free asset and portfolio of risky assets i.

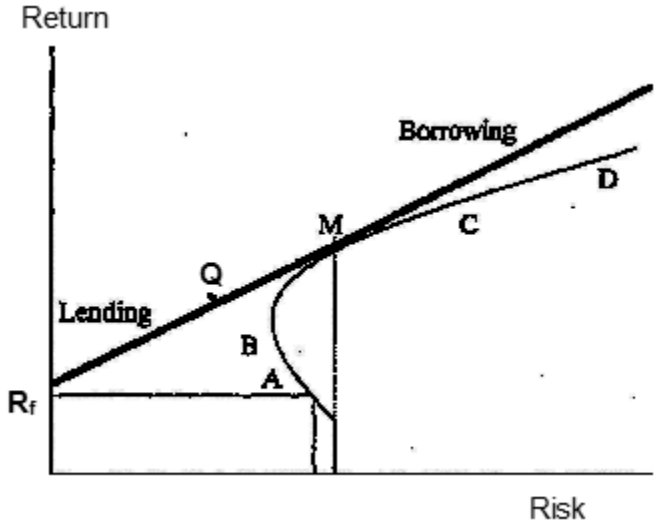
As we have noted earlier, for risk-free asset variance and covariance terms are Zero, i.e., = 0 and σ_{if} = 0; and so equation retains only the middle terns and reduces to

$$\sigma_p = (1-x)\sigma_i \qquad \text{---- eq 14.3}$$

As the equations (14.1) and (14.2) are both linear, the returns-risk graph for portfolio possibilities, combining the risk-free asset and risky portfolios on Markowitz efficient frontier, is represented by a straight line. Figure 14.1 illustrates the position.

Figure 14.1: Efficient Set of Portfolios with Risk-Free Asset

$\sigma^2_p = (1-x)^2\sigma^2_i$



The set of efficient portfolios marked in the curve A, B, M, C, and D are set of portfolios consisting of risky assets. Suppose there is a risk-free asset offering a return of R_f Now compare an investment in the portfolio of A (consisting of risky assets) and investment in risk-free security. Investment in risk-free security offers a return higher than A but without any risk. Thus, investment in risk-free security is superior to investments in A and in that process A become inefficient portfolio. A tangent line drawn from R_f through the curve A-B-M-C-D is now become efficient portfolio. You may note that only one portfolio marked 'M', which consists of risky assets falls under the

new efficient frontier. Such portfolio is called 'market portfolio' which consists of all risky assets. Investors can now earn any return they like on the efficient frontier by investing a part of money in M, and the rest in R_f For instance, an investor, who is willing to take maximum risk, will invest entire wealth in M whereas an investor, who dislike risk invest the entire wealth in R_f An investor with moderate risk preference will invest 50% in R_f and the balance 50% in M. An investor, who want to go beyond M has to borrow at risk-free rate of interest and invest the amount in M and capture the difference between M and R_f to increase the return.

14.5.1 Leveraged Portfolio

A portfolio that includes at least some securities that were bought with borrowed money. A leveraged portfolio is risky because the securities may result in a loss, which would leave the investor liable to repay the borrowed capital. However, if the securities result in a gain, the investor has essentially made a profit without using his/her own money.

In the foregoing analysis it has been tacitly assumed that investors holding portfolios by combining risk-free asset and risky portfolio M, do so with their own funds. This is not a realistic assumption. In the real world, investors often purchase assets with borrowed funds. We now explore the implications of borrowing.

Assume that an investor is, of course, ready to accept higher level of risk, i.e., the investor is willing to hold portfolio with expected standard deviation of returns greater than . One alternative would be to choose a portfolio of risky assets on

Markowitz efficient frontier beyond M, such as the one at point C. A second alternative is to borrow money (i.e., add financial leverage) at risk-free rate and invest the same in the risky asset portfolio at M. By doing so, the investor can move from point M to, say, point Q along the extension of R_f to M line. And as is evident from Figure 14.1, such portfolios as at Q dominate all portfolios below

the line, including the portfolio at C.

To illustrate the point, let us assume that investors can borrow, whatever amount he wants, at a risk-free rate. In other words, we are assuming that risk-free lending and risk-free borrowing rates are the same (we will see the implication of relaxing this assumption later). We may further note that investors would not desire to simultaneously invest in risk-free asset and borrow money at risk-free rate. Now, suppose that an investor borrows an amount equal to 50 per cent of his original wealth of, say, Rs. 10,000. So he has total of Rs. 15,000 which he proposes to invest in portfolio M. What is the proportion of fund being invested in M? It is given by

1 - x = 15,000/10,000= 1.5

However, the sum of proportions being invested in risk-free assets and M must still equal one, which means that

x =-5,000/10,000=-0.5

The negative sign indicates borrowing, on which there will be interest payment at R_f. Thus, restating equation (14.1), we have

$\sigma_p = [1-(-.5)]\sigma_m = 1.5\sigma_m$

R_P = -0.5R_f + 1.5R_m

Assuming that R_f = 8% and R_m = 20%, the return on the leveraged portfolio will be = - 0.5 (.08) + 1.5 (0.20) = 0.26 or 26 per cent which is significantly higher than R_m, the expected return of 20 per cent on risky portfolio M. Using equation (14.2), the standard deviation of returns from leveraged portfolio works out to

Thus, our investor could increase return along the line R_f - M - Q. Herein lies the advantage of owning a 'leveraged' portfolio. However, leveraging also involves a trade-off; the risk of a leveraged portfolio is always higher than that of tangency portfolio, M (in the instant case it is 1.5 times).

14.5.2 Market Portfolio

In this unit you will learn more about the portfolio. A market

portfolio is a theoretical bundle of investments that includes every type of asset available in the world financial market, with each asset weighted in proportion to its total presence in the market. The discussion may look a bit abstract but necessary to get complete understanding on capital market theory. The portfolio M represents 'optimal combination of risky assets' and is referred to as "market portfolio". It may be explained as follows.

If all investors have homogenous expectations and they all face the same risk-free lending and borrowing rate (R_f), each one of them will generate the same risk-return graph as depicted in figure 14.1. Everyone would obtain the same tangency portfolio M, and invest in this portfolio in conjunction with risk-free lending or borrowing to achieve a personally preferred overall combination of risk and return. An aggressive investor may prefer a leveraged portfolio, which would have a higher risk and return than portfolio M. In contrast, a conservative investor might prefer a lending portfolio, which would have lower risk and return than the portfolio M. The decision to hold a leveraged or lending portfolio is purely a "financial decision" on an investor's risk preference. It has nothing to do with the decision about holding the combination of risky asset (i.e., investment decision) corresponding to the portfolio M. In other words, the composition of risky portfolio M and its inclusion in every investor's portfolio is independent of his or her risk -return preference; this aspect is known as `separation theorem', introduced by James Tobin in 1958.

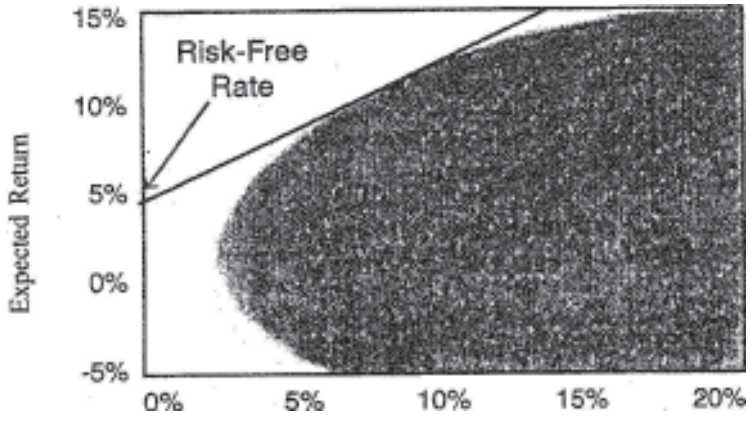
Another important feature of the portfolio M is that it represents a 'market portfolio - a portfolio that is comprised of all risky assets, where the proportion to be invested in each asset corresponds to its relative market value. Why must the portfolio M include some investment in every risky asset? If a risky asset was not in this portfolio, it would mean that nobody is investing in that asset; obviously, the market price of the asset must fall, which in turn would cause the expected return to rise, until it is being included in the portfolio M. In the market portfolio, the asset is held in the

proportion that the market value of that asset represents of the total market value of all risky assets. If, for example, there is a higher proportion of an asset than is justified by its market value, the excess demand for this asset will result in increase in its price until its value becomes consistent with the proportion. Thus, when all the price adjustments are over, i.e., market is brought into equilibrium, tangency portfolio M becomes the market portfolio. Besides, it is the most diversified portfolio, since it contains all the risky assets.

14.5.3 Capital Market Line (CML)

Capital market line (CML) is the tangent line drawn from the point of the risk-free asset to the feasible region for risky assets.With the identification of M as market portfolio, we may define the straight line from R_f through M, as 'capital market line' (CML). This line represents the risk premium as a result of taking on extra risk. James Tobin added the notion of leverage to Modern Portfolio Theory by incorporating into the analysis an asset, which pays a risk-free rate of return. By combining a risk-free asset with risky assets, it is possible to construct portfolios whose risk-return profiles are superior to those of portfolios on the efficient frontier. Consider the diagram below:

Figure 14.2: Capital Market Line



The capital market line is the tangent line to the efficient frontier

that passes through the risk free rate on the expected return axis.

The risk -free rate is assumed to be 5%, and a tangent line-called the capital market line-has been drawn to the efficient frontier passing through the risk-free rate. The point of tangency corresponds to a portfolio on the efficient frontier. That portfolio is called the "super efficient" portfolio. The Capital Asset Pricing Model demonstrates that, given certain simplifying assumptions, the super-efficient portfolio must be the market portfolio.

Using the risk-free asset, investors who hold the super-efficient portfolio may:

- Leverage their position by shorting the risk-free asset and investing the proceeds in additional holdings in the super-efficient portfolio, or
- Deleverage their position by selling some of their holdings in the super-efficient portfolio and investing the proceeds in the risk-free asset.

All types of investors, whether aggressive or conservative, will achieve their desired risk-return levels by combining market portfolio with risk-free lending or borrowing along the CML. Let us re-examine the equation (14.1) of the capital market line to make a few more observations at this stage. The term (rm - r_m) / , the slope of capital market line, can be thought of as the market price of risk for all efficient portfolios. It is extra return that can be gained by increasing the level of risk (standard deviation) on an efficient portfolio by one unit. Thus, the entire second term of equation (14.1) represents that element of expected portfolio return that compensates for the risk level accepted. The first term, risk-free rate (or the intercept of CML), is often referred to as the reward for waiting or the return required for delaying potential consumption for one period.

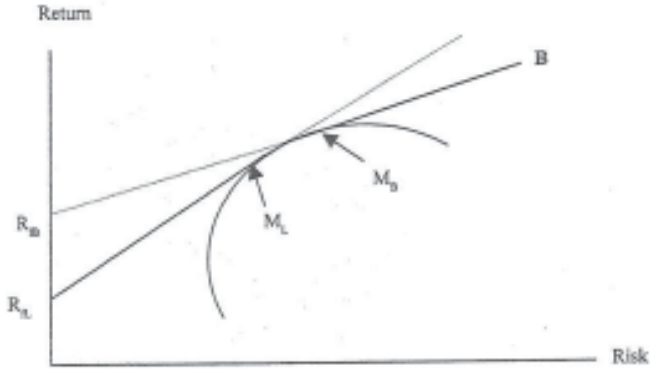
With these two terms, CML sets the expected return on an efficient portfolio as (Price of time) + [(Price of risk) x (Amount of risk)]

When Risk-Free Rates are different

In the foregoing discussion we assumed that risk-free rates of lending and borrowing are the same. We now relax this assumption, and consider that where the additional subscripts B and L refer to borrowing and lending respectively.

Figure 14.3 shows the modified efficient set; it consists of three distinct but connected segments, R_{fL} - M_L - M_B - B

Figure 14. 3: Efficient Set of Portfolios with different Risk-free rates



The construction of this efficient set can be explained as follows: If $R_{fL} = R_{fB}$, then the resulting efficient set will be given by the straight line from R_{fL} through M_L. On the other hand, if risk-free lending and borrowings rates are the same, but the rate is set at a higher level equal to R_{fB}, then the efficient set of portfolios will lie on the straight line from R_{fB} through M_B. We may note that M_B is at a higher level than M_L on Markowitz's efficient set, since it corresponds to a tangency point associated with higher risk-free rate, R_{fB}

Now, since the investor cannot borrow at R_{fL}, that part of the line emanating from R_{fL} that extends past M_L is not available to the investors (shown in Figure 14.3 by dotted lines) and can be removed from our consideration. Again, since the investors cannot invest in a risk-free asset that earns a rate equal to R_{fB}, that part of the line from R_{fB} and going through M_B, but lying to the left of M_B, is not available to the investors; and, hence, can be ignored. On the whole, R_{fL} - M_L - M_B - B becomes the relevant efficient set to investors who can lend at R_{fL} and borrow at R_{fB}

14.6 THE CAPITAL ASSET PRICING MODEL (CAPM)

In the previous unit we discussed about the Capital Asset Pricing Model.Let us now discuss this concept in detail in this section.

In this section, we turn to the basic Capital Asset Pricing Model developed by Sharpe, Linter and Mossin. We present here a descriptive model of how assets are priced.

The CAPM model describes the relationship between risk and expected return, and serves as a model for the pricing of risky securities. CAPM says that the expected return of a security or a portfolio equals the rate on a risk-free security plus a risk premium. If this expected return does not meet or beat required return then the investment should not be undertaken.

The CAPM builds upon the Markowitz portfolio model and capital market line. Obviously, it pre-supposes all the assumptions stated earlier at appropriate places (including those stated in the previous two Units). Besides, the model itself adds few more assumptions. So, let us begin our discussion of the CAPM by putting together all the assumptions of the model at one place.

14.6.1 Assumptions

1. Investors evaluate portfolios by looking at expected returns and standard deviations of those portfolios over a one-period horizon.
2. Investors, when given a choice, between two otherwise identical portfolios, will choose the one with higher expected return.
3. Investors, when given a choice, between two otherwise identical portfolios, will choose the one with the lower standard deviation or risk.
4. Individual assets are infinitely divisible, meaning that an investor can buy a fraction of a share if he or she so desires.
5. There is a risk-free rate at which an investor may either lend money or borrow money.
6. Taxes and transaction costs are irrelevant.

7. All investors have the same one-period horizon.
8. The risk-free rate is the same for all investors.
9. Information is freely and instantly available to all investors.
10. Investors have homogeneous expectations, meaning that they have the same perceptions in regard to the expected returns, standard deviations and covariance of returns between any two assets.

Needless to say, many of these assumptions are unrealistic, and one may very well wonder how useful a model can be that is based on them. But, then assumptions are necessary in building a model, and we should not be so much concerned about the assumptions as we should be about how well the model explains the relationships that exist in the real world. In fact, several authors have shown that many of the above assumptions can be relaxed with minor impact on the CAPM and no change in the overall concept of the model.

14.6.2 Security Market Line (SML)

The security market line (SML) is a line drawn on a chart that serves as a graphical representation of the capital asset pricing model (CAPM), which shows different levels of systematic, or market, risk of various marketable securities plotted against the expected return of the entire market at a given point in time.

Given the capital market line (CML) and the dominance of the market portfolio, the relevant risk measure for an individual risky asset is its covariance with the market portfolio ($Cov_{i,M}$), or what is known as its 'systematic risk'. When this covariance is standardized by the covariance for the market portfolio, we obtain the well-known 'beta' measure. of systematic risk and a security market line (SML) that relates the expected return for an asset to its beta. Under the CAPM, the postulated relationship is such that higher an asset's beta, the higher its expected return.

To understand the CAPM and computation of beta, let us examine the whole issue intuitively. If the concept of CML is clear, you will agree that it is not possible for any stock to offer a risk-return relationship below or above the CML. If it is below the CML, such stocks are known as overpriced stocks (meaning they offer lower return for a given level of risk and there is an alternative portfolio on the line of CML, which offer higher return) and investors will start selling the stock until its return increases to the level of CML. The same applies if there is a stock above CML in terms of risk and return and investors will buy such stocks by offering higher price until its return declines to CML. In CML, you can observe only two points namely R_f and M. Since M is an efficient portfolio, we assume that the risk associated with the M is the least. Further it is also a diversified portfolio and hence one can expect no unsystematic risk (Recall the discussion in Unit 9 on how diversification beyond a point fails to yield further results in reducing the risk) . Suppose a stock lies beyond M in the CML line and it means that the stock's risk is higher and hence offer higher return. Now, it is possible to quantify how much that the stock is riskier than M and such a measure is called beta of the stock. If the stock falls on the CML line, it's return (R_s) should satisfy the following equation.

where

The term β_s, representing covariance of returns between asset 's' and the market portfolio divided by return variance of market portfolio, is known as "beta co-efficient" or simply "beta" for asset. The above equation is the most often written form of the CAPM. If the beta and expected return of stocks are plotted, the line that shows the risk and return of all stocks in the market is called security market line (SLM). Let us now examine some properties of beta.

Beta is a means of measuring the volatility of a security or portfolio of securities in comparison with the market as a whole. Beta is calculated using regression analysis. Beta of 1 indicates

that the security's price will move with the market. Beta of greater than 1 indicates that the security's price will be more volatile than the market. Beta less than 1 means that it will be less volatile than the market.

Many Utilities stocks have a beta of less than 1. Conversely most high-tech stocks have a beta greater than one, they offer a higher rate of return but they are also very risky. For example, if a stock's beta is 1.2, it's 20% more volatile than the market. Beta is a good indicator of how risky a stock is. Beta is the sensitivity of a stock's returns in comparision to the returns on some market index (e.g., BSE Sensex, NSE-50 or BSE-100).

Beta values can be roughly characterized as follows:

1. less than 0

   Negative beta is possible but not likely. People thought gold should have negative betas but that hasn't been true.

2. equal to 0

   Cash under your mattress, assuming no inflation or any investments with a guaranteed constant return.

3. between 0 and 1

   Low-volatility investments (e.g., Utility stocks)

4. equal to 1

   Matching the index (e.g., any index fund offered by mutual funds)

5. greater than 1

   Anything more volatile than the index (e.g., small cap. funds)

6. much greater than 1 (tending toward infinity)

   Impossible, because the stock would be expected to go to zero on any market decline.

   Beta of 2-3 is probably as high as you will get.

   More interesting is the idea that securities may have different betas in up and down markets.

Here is an example showing the inner details of the beta calculation process: Suppose we collected end- of- the-month prices and any dividends for a stock and the BSE sensitive index for 61

months (0 to 60). We need n + 1 price observations to calculate n holding period returns, so since we would like to index the returns as 1 to 60, the prices are indexed 0 to 60. Also, professional beta services use monthly data over a five-year period.

Now, calculate monthly holding period returns using the prices and dividends. For example, the return for month 2 will be calculated as:

$R_2 = (P_2-P_1+D_2) / P_1$

Here R denotes return, P denotes price, and D denotes dividend.

The following table of monthly data may help in visualizing the process. (Monthly data is preferred in the profession because investors' horizons are said to be monthly.)

Sl. No.	Date	Price	Dividend *	Return
0	31/12/96	45.20	0.00	
1	31/01/97	47.00	0.00	0.0398
2	28/02/97	*46.75*	0.30	0.0011
....	.....	.....	.....	.....
59	30/11/01	46.75	0.30	0.0011
60	31/12/01	48.00	0.00	0.0267

Note: (*) Dividend refers to the dividend paid during the period. They are assumed to be paid on the date. For example, the dividend of 0.30 could have been paid between 01/02/97 and 28/02/97, but is assumed to be paid on 28.02.97.

So now we'll have a series of 60 returns on the stock and the index (1 to 61). Plot the returns on a graph and fit the best-fit line (visually or using least squares process). In Figure 14.4(in the next page), you can see the monthly return of BSE Sensex and ITC over 60 months period (January 1997 - December 2001). In Table 14.1, the beta of stocks forming part of BSE Sensex along with return and total risk measures are listed. You may observe that many new economy stocks like Satyam, Zee Tele have high beta whereas multinational companies like Nestle, Castrol, HLL, Colgate have shown low beta. You may also observe that returns of the new

economy stocks were also high compared to other low beta stocks. You may have to periodically revise the beta values since the risk of the stock changes over time based on changes in the economy and industry characteristics.

Table 14.1: Return, Variance, SD and Beta of BSE Sensex Stocks

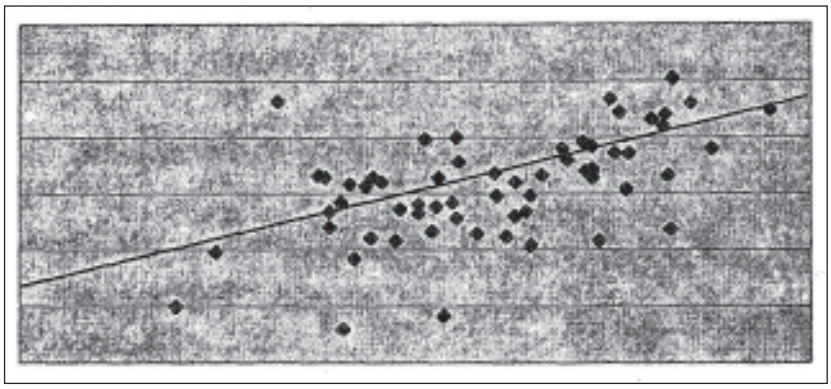
Stock	Return	Variance	SD	Beta
BSE Sensex	0.10	16.99	4.12	1.00
Satyam	2.25	132.18	11.50	1.70
Infosys	1.67	97.61	9.88	1.44
Zee Tele	1.65	138.74	11.78	1.39
MTNL	0.08	61.20	7.82	1.25
L&T	0.18	50.86	7.13	1.18
BHEL	0.10	59.48	7.71	1.17
Telco	-0.18	66.10	8.13	1.16
RIL	0.47	58.62	7.66	1.15
ACC	0.34	60.15	7.76	1.13
ICICI	0.33	80.74	8.99	1.10
NET	0.64	101.07	10.05	1.10
SBI	0.14	47.16	6.87	1.08
M&M.	-0.24	61.47	7.84	1.07
Tisco	-0.02	49.57	7.04	1.03
ITC	0.53	45.90	6.78	0.92
Ranbaxy	0.56	44.92	6.70	0.90
Grasim	0.16	73.30	8.56	0.88
BSES	0.20	45.36	6.74	0.82
Dr. Reddy	1.17	53.77	.7.33	0.82
GA Cement	0.38	39.25	.6.26	0.78
Cipla	1.00	55.28	7.44	0.77
RPL	0.59	44.55	6.67	0.73
Glaxo	0.23	34.16	5.84	0.70
HPCL	0.29	60.29	7.76	0.68

Hindalco	0.19	41.01	6.40	0.67
HLL	0.53	29.88	5.47	0.67
Colgate	0.03	26.21	5.12	0.65
Bajaj Auto	-0.14	33.87	5.82	0.60
Castrol	0.08	22.78	4.77	0.53
Nestle	0.48	29.28	5.41	0.51

Note: Returns represent weekly return of the stock for a period of 1997-2001

If you had a portfolio of beta 1.2, and decided to add a stock with beta 1.5, then you know that you are slightly increasing the riskiness (and average return) of your portfolio. This conclusion is reached by merely comparing two numbers (1.2 and 1.5). That parsimony of computation is the major contribution of the notion of "beta". Conversely if you got cold feet about the variability of your beta = 1.2 portfolio, you could augment it with a few companies with beta less than 1. If you had wished to figure such conclusions without the notion of beta, you would have had to deal with large covariance matrices and nontrivial computations.

Figure 14.4: Monthly Return of BSE Sensex vs. ITC (1997 - 2001)



Hence, beta is the relevant measure of risk for an asset; it measures what is termed as 'systematic or market risk'. It can be shown that the 'total risk' of the asset, as measured by variance of its return, is of the following form

(eq-14.3)

where σ^2_{ei}, is the variance of return for the asset that is not related to the market portfolio. It is also said to measure 'unsystematic or unique risk'. We know that unique or unsystematic risk can be eliminated *in* a completely diversified portfolio such as the market portfolio. So, unsystematic risk is not relevant to investors, and they should not expect to receive added returns for assuming this risk. It is only in the case of assets with greater market risk or betas that investors should expect higher return.

Second, beta of a portfolio is simply a weighted average of the betas of its component assets (n) where the proportions invested in the assets (x_i) are the weights. Thus, portfolio beta (β_p) is given by

$$\beta_p = \sum_{i=1}^{n} x_i \beta_i$$

$$\sigma^2_i = \beta^2_i \sigma^2_m + \sigma^2_{ei}$$

we may illustrate this point by taking a stock portfolio comprising seven stocks with their betas and portfolio proportions given as follows:

(1)	(2)	(3)	(4)
Company	Beta	PORTFOLIO PROPORTIONS	WEIGHTED BETA
A	1.50	11.7	.175
B	1.36	22.2	.302
C	1.37	15.7	.215
D	1.07	5.3	.056
E	1.17	26.2	.306
F	1.73	13.9	.240
G	1.09	5.1	.055
		100.0	1.349

The beta of this stock portfolio is 1.35, which is obtained by summing up the multiproduct of (2) and (3) above and shown under (4). It is easy to see the central role played by the beta in the

determination of expected return and risk for stocks as well as portfolio and thus in stock selection and portfolio creation and revision.

14.6.3 Limitations

You may be now interested in knowing whether security returns is in fact directly related to beta, as the CAPM asserts. Research results suggest that the CAPM does not reflect the world well at least when tested using ex-post data. Critics have pointed out that the inadequacy of the model is due to its austerity. The market, in principle includes all stocks, a variety of other financial instruments, and even non-marketable assets such as an individual's investment in education; to which no market index like the SP 500 Index in US or Bombay Stock Exchange National Index (or any other index used to represent the market) can be a perfect proxy. And when we measure market risk using an imperfect proxy, we may obtain a quite imperfect estimate of market sensitivity. Secondly, the CAPM asserts that only a single number- market return - is required to measure risk. The actual returns depend upon a variety of anticipated an unanticipated events. Thus, while systematic factors are the major sources of risk in portfolio return, different portfolios have different sensitivities to these factors. It is the recognition of this phenomenon which lies at the core of an alternative-pricing model called Arbitrage Pricing Theory (APT). Let us briefly discuss APT in the following section.

14.7 ARBITRAGE PRICING THEORY (APT)

Arbitrage pricing theory (APT) is a well-known method of estimating the price of an asset. The theory assumes an asset's return is dependent on various macroeconomic, market and security-specific factors.APT is an alternative to the capital asset pricing model (CAPM). Stephen Ross developed the theory in 1976.Arbitrage pricing theory (APT) is a multi-factor asset pricing model based on the idea that an asset's returns can be predicted using the linear relationship between the asset's expected return and a number of macroeconomic variables that capture systematic risk. It is a

useful tool for analyzing portfolios from a value investing perspective, in order to identify securities that may be temporarily mispriced.

At the core of APT is the recognition that several systematic factors affect security returns. It is possible to see that the actual return, R, on any security or portfolio may be broken down into three constituent parts, as follows:

$$R = E + b\,f + e$$

where:

E = expected return on the security

b = security's sensitivity to change in the systematic factor

f = the actual return on the systematic factor

e = returns on the unsystematic factors

The above Equation merely states that the actual return equals the expected return, plus factor sensitivity times factor movement, plus residual risk. The subtler rationale and mathematics of APT are left out here. The empirical work suggests that a three or four - factor model adequately captures the influence of systematic factors on stock - market returns. The APT Equation may thus be expanded to :

$$R = E + (b_1)(f_1) + (b_2)(f_2) + (b_3)(f_3) + (b_4)(f_4) + e$$

Each of the four middle terms in this equation is the product of the returns on a particular economic factor and the given stock's sensitivity to that factor. What are these factors and separating unanticipated from anticipated factor movements in the measurement of sensitivities is perhaps the biggest problem in APT. Some of the factors empirically found to be useful in measuring risk are:

- Changes in expected inflation, unanticipated changes in inflation, industrial production, default-risk premium and term structure of interest rates (Roll & Ross, J FE, Mar 77)
- Default risk, term structure of interest rates, inflation, long term expected growth rate of profits for the economy, and residual market risk (Berry, FAJ, Mar-Apr 88)

It may be noted that CAPM and APT are different variants of the true equilibrium pricing model. Both are, therefore, useful in supplying intuition into the way security prices and equilibrium returns are established.



CHECK YOUR PROGRESS

Q2: Define Leveraged Portfolio.

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Q3: Define Capital Market line.

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Q4: Define Market Portfolio.

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.....

Q5: Define Security Market line.

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.....



14.8 LET US SUM UP

In this Unit, we have discussed the basic levels and assumptions of Capital Asset Pricing Model (CAPM). The Concepts of risk free asset, risk free lending, risk free borrowing, leveraged portfolio, market Portfolio, Capital Market Line (CML), Security Market Line (SML) and beta have been explained and illustrated at length. This Unit also pinpoints the limitations CAPM and introduces arbitrage pricing theory (APT) and concludes that till concrete research results become available to the contrary, both CAPM and APT could be regarded useful, at least intuitively, to guide investors and portfolio managers for pricing the risky assets like equities.



14.9 FURTHER READING

- Fischer, Donald E, and Ronald J. Jordon (1995), *Security Analysis and Portfolio Management, 6th* ed., PHI, New Delhi
- Nancy, Efficient? Chaotic? *What is the New Finance?* Harvard Business Review, March-April, 1993.M. Ranganathan and R.

Madhumathi(2005); *Investment Analysis and Portfolio Management,* Pearson Education, New Delhi.

- Punithavathy Pandian(2012); *Security Analysis and Portfolio Management,* Vikas Publishing House Pvt. Ltd., New Delhi.
- Bharti V. Phathak (2014); *Indian Financial System,* Pearson Education, Delhi.
- Donald E. Fischer and Ronald J. Jordon (2002): *Security Analysis and Portfolio Management*, Pearson Education India.
- Prasanna Chandra(2017); *Investment Analysis and Portfolio Management,* McGraw Hill Education, Delhi.



14.10 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q1: a. CAPM -Capital Asset Pricing Model
b. CML -Capital Market Line
c. SML-Security Market Line
d. SLM- Sharpe-Linter-Mossin Capital Asset Pricing Model
e. APT- Arbitrage Pricing Theory

Ans to Q2: A portfolio that includes at least some securities that were bought with borrowed money. A leveraged portfolio is risky because the securities may result in a loss, which would leave the investor liable to repay the borrowed capital. However, if the securities result in a gain, the investor has essentially made a profit without using his/her own money.

Ans to Q3: Capital market line (CML) is the tangent line drawn from the point of the risk-free asset to the feasible region for risky assets.

Ans to Q4: A market portfolio is a theoretical bundle of investments that includes every type of asset available in the world financial market, with each asset weighted in proportion to its total presence in the market.

Ans to Q5: The security market line (SML) is a line drawn on a chart that serves as a graphical representation of the capital asset pricing model (CAPM), which shows different levels of systematic, or

market, risk of various marketable securities plotted against the expected return of the entire market at a given point in time.



14.11 MODEL QUESTIONS

1) Define risk free asset. List out two risk free assets.
2) Compare and contrast Capital Market Line (CML) and Security Market Line (SML).
3) What are the basic assumptions underlying Capital Asset Pricing Model?
4) Define efficient frontier. What happens to the Capital Market Line and the choice of an optimal portfolio if borrowing rate is allowed to exceed the lending rate?
5) Define leveraged portfolio and bring out its implications for capital market line.
6) Compare and contrast CAPM and APT. Which of the two is a better model for pricing risky assets and why?
7) Assume the SML is given as $R_i = 0.05 + .06\beta$ and the estimated below on two stocks are = .04 and = 1.5. What must be the expected return on two securities in order for one to feel that they are a good purchase?
8) What specifically should a 'true believer' in the CAPM do with her money if she seeks to hold a portfolio with a beta of 1.5?
9) The following data are available to you as a portfolio manager:
    a) Draw a security market line. In terms of the security market line, which of the securities listed above are undervalued? Why?
    b) Assuming that a portfolio is constructed using equal proportions of the five stocks listed above, calculate the expected return and risk of such a portfolio.

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UNIT 15 : MUTUAL FUNDS

UNIT STRUCTURE

15.1 Learning Objectives

15.2 Introduction

15.3 Mutual Fund:An Introduction

15.3 Importnace Mutual Funds

15.4 Schemes of Mutual Funds

- 15.4.1 Operational Classification
- 15.4.2 Return-Based Classification
- 15.4.3 Investment-Base Classification
- 15.4.4 Sector- based Classification
- 15.4.5 Leverage-Based Classification
- 15.4.6 Other Funds

15.5 Mutual Funds in India

15.6 Constitution of Mutual Fund

- 15.6.1 Sponsors
- 15.6.2 Trustees
- 15.6.3 Custodians
- 15.6.4 Assets Management Company (AMC)

15.7 Operational Efficiency of Mutual Funds

15.8 Making Mutual funds Investor Friendly

15.9 Technology And Mutual Funds In India.

15.10 Let Us Sum Up

15.11 Further Reading

15.12 Answers to Chcek Your Progress

15.13 Model Questions

15.1 LEARNING OBJECTIVES

After going through this unit, you will be able to :

- discuss the concept and philosophy of mutual funds
- explain the organization of mutual funds in India

- conversant with the managing of mutual funds
- explain the performance measures of mutual funds in India and
- highlight how SEBI has made mutual funds investor friendly.

15.2 INTRODUCTION

In this unit we shall discuss about meaning and importance Mutual Funds,Schemes of Mutual Funds.Mutual Fund is an important segment of the financial system.

At the end of this unit we will get a fair idea about Mutual Funds in India, Constitution of Mutual Fund, Managing a Mutual Funds,and Technology And Mutual Funds In India**.**

15.3 MUTUAL FUND: AN INTRODUCTION

Mutual Fund is a non-fund based special type of institution which acts as an investment conduit. It is essentially a mechanism of pooling together the savings of a large number of investors for collective investments with an avowed objective of attractive yields and appreciation in their value. A Mutual Fund is a Financial Service Organisation that receives money from shareholders, invests it, earns returns on it, attempts to make it grow and agrees to pay the shareholder cash on demand for the current value of his investment. A Mutual fund offers investors a proportionate claim on portfolio of assets that fluctuates in value with the value of the assets that make up the intermediaries portfolio. It is rather difficult to give a comprehensive concept of a mutual fund. What is a mutual fund is better understood by the functions it performs and role it plays. It is a non-depository financial intermediary. Mutual funds are mobiliser of savings, particularly from the small and household sectors, for investments in stock and money markets. Mutual funds mobilise funds by selling their own shares also known as *units*. When an investor owns a unit in mutual funds he owns a proportional share of the securities portfolio held by a mutual fund. In other words, share of a mutual fund actually represents a part share in many securities that it has

purchased. Mutual fund share/unit certificate combines the convenience and satisfaction of owning shares in many industries. Thus, mutual funds are primarily investment intermediaries which pool investors' funds to acquire individual investments and pass on the returns thereof to fund investors.

The idea of mutual fund had its formal origin in Belgium (Societe Generale de Belgiue, 1822) as an investment company to finance investments in national industries associated with high risks. In 1860s this movement started in England. In 1868, the Foreign and Colonial Government Trust was established to spread risks for investors over a large number of securities. In U.S.A., the idea took root in the beginning of the 20th Century. Three investment companies were organised: Massachusetts Investors Trust, State Street Investment Corporation and U.S. and Foreign Securities Corporations. In Canada, during 1920s many close ended investment companies were organised. The first mutual fund in Canada to issue its share to general public was the Canadian Investment Fund in 1932. Subsequently hundreds of mutual funds emerged and expanded their wings in many countries in Europe, the Far East and Latin America. In recent years mutual funds in Japan and Far East countries have been showing excellent performance probably as a result of growth and performances of the economies of these countries and their capital market. Countries in Pacific area like Hong-Kong, Thailand, Singapore and Korea have also entered this field in a long way. Mauritius and Netherlands are emerging as tax heavens for offshore mutual funds. Thus, mutual fund culture is now global now in scope.

15.4 IMPORTANCE OF MUTUAL FUND

Mutual funds can survive and thrive only if they can live up to the hopes and trust of their individual members. These hopes and trust echo the peculiarities which support the emergence and growth of such institution irrespective of the nature of economy where these are to operate. Mutual funds come to the rescue of those people who do not excel at stock market due to certain mistakes they commit which can be minimised with mutual

funds. Such mistakes can be viz., lack of sound investment strategies, unreasonable expectations of making money, untimely decisions of investing of disinvesting, acting on the advise given by others, putting all their eggs in one basket, i.e. failure to diversify.

Mutual funds are characterised by many advantages that they share with other forms of investments and what they possess uniquely themselves. The primary objectives of an investment proposal would fit into one or combination of the two broad categories i.e. income and Capital gains. How mutual fund is expected to be over and above an individual in achieving these two said, objectives, is what attracts investors to opt for mutual funds. Mutual fund route offer several *important benefits*. Some of these are:

- Making investments is not a full time assignment of investors. So they can hardly have a professional attitude toward 'their investment. When investor buys mutual fund scheme, an essential benefit one acquires is *professional management* of the money he puts in the fund.
- A sound investment policy is based on the principle of diversification which is the idea of *not putting all the eggs in one basket.* By investing in many companies the mutual funds can protect themselves from unexpected drop in value of some shares. The small investor cannot achieve wide diversification on his own because of many reasons, mainly funds at his disposal. Mutual funds on the other hand, pool funds of lakhs of investors and thus can participate in a large basket of shares of many different companies, thus *high value diversification*.
- A distinct advantage of a mutual fund over other investments is that there is always a market for its units/shares. Moreover, Securities and Exchange Board of India(SEBI) requires that mutual funds in India have to ensure liquidity. Mutual fund units of some schemes can be sold in the share market as SEBI has made it obligatory for close ended schemes to list themselves on stock exchanges. For open ended scheme investor can always look for *easy liquidity* by approaching the fund for repurchase at Net Asset Value (NAV) of the scheme.
- Risk in investment is as to recovery of the principal amount and return

on it. Mutual fund investments on both fronts provide a comfortable situation for investors. The expert supervision, diversification and liquidity of units ensured in mutual funds *minimise the risk*. Investors are no longer expected to come to grief by falling prey to misleading and motivating headline leads and tips, if they invest in mutual funds.

- Besides depending on the expert supervision of funds managers, legislation in a country (like SEBI in India and Securities Exchange Commission (SEC) in USA). also provides for the *safety of investments*. Mutual funds have to broadly follow the laid down provisions for their regulation. These agencies act as watchdogs and attempt wholeheartedly to safeguard investor interests.
- Mutual funds provide investors flexible investment opportunities. Mutual fund family allows investors to *switch over* from one fund to another e.g. investors can switch from income scheme to growth scheme or vice-versa or say from close ended scheme to open ended schemes as the investors opt.
- Many schemes of mutual funds provide *tax shelter*. In India for equity linked schemes of mutual funds, under section 88, tax rebate up to twenty per cent of investment made in specified schemes of mutual funds(up to Rs.10,000) is available. Income from mutual funds dividends is exempted from tax at present. Such provisions vary from country to country and time to time.
- Mutual funds having large investible funds at their disposal avail economies of scale. The brokerage fee or trading commission 'may be reduced substantially. *Lower operating costs* obviously increases the income available for investors.
- There is always one segment of society which hesitates to put their money in capital market. Mutual funds prove to be an effective mechanism for planners of the economy to convince such segment to put their money to market since mutual funds relieves them of emotional stress involved in trading of securities hence *effective mode of fund mobilization*. .

Investing in securities through mutual funds has many advantages

over organising a personnel portfolio. Other advantages include the option to reinvest dividends, strong possibility of capital appreciation, regular returns, etc.. Mutual funds are also relevant in national interest. The test of their economic efficiency as financial intermediary lies in the extent to which they are able to mobilise additional savings and channelising to more productive sector of the economy.

15.4 SCHEMES OF MUTUAL FUNDS

Schemes of mutual funds refer to the products they offer to investors. Investors are to choose out of such schemes as per their objectives of earnings. Mutual funds adopt different strategies to achieve these objectives and accordingly offer different schemes of investments as per the need of investors. Schemes can be grouped as under:

15.4.1 Operational Classification

Open Ended Schemes: Such schemes accept funds from investors by offering its units on a continuing basis. Such fund even stands ready to buy back its securities at any time. It implies that the capitalisation of the fund is constantly changing as investors sell or buy their shares or units (shares in USA, unit in India). Further, these shares or units are normally not traded on the stock exchange. Open ended schemes have comparatively better liquidity despite the fact that these are not listed. The reason is that investor can any time approach mutual fund for sale of such units. No intermediaries are required. Moreover, the realisable amount is certain since repurchase is at a price based on declared net asset value. No minute to minute fluctuations in rates haunt the investors. In such funds, option to reinvest its dividend is also available.

Close Ended Schemes: Such schemes have a definite period after which their units are redeemed. Unlike open-ended funds, these funds have fixed capitalisation, i.e. their corpus normally does not change throughout their tenure. While open ended funds are repurchased or sold directly by mutual funds on the basis of NAV,

the close ended fund units trade among the investors in the secondary market since these are to be quoted on stock exchanges. Their price is determined on the basis of demand and supply in the market. Their liquidity depends on the efficiency and understanding of the engaged broker. Their price is free to deviate from the NAV, i.e. there is every possibility that market price may be above or below its NAV.

From management point of view, managing close ended scheme is comparatively easy since fund managers can evolve and adopt long term investment strategies depending on the life of the scheme. Need for liquidity arises after comparatively longer period, i.e. normally at the time of redemption.

There is a variant of close ended scheme known as *Interval Scheme.* It is basically a close ended scheme with a peculiar feature that every year for a specific period (interval) it is made open. Prior to and after such specific interval the scheme operates as close ended. During the said period mutual fund is ready to buy or sell the units directly from or to the investors.

In India as per SEBI (MF) Regulations, every mutual fund is free to launch any or both types of schemes including interval scheme. In the USA, UK and Canada close ended funds are popular as investment companies/ trust whereas open ended funds are known as mutual funds. Such distinction is not made in Indian context. In those countries mutual funds are more popular than investment companies. Till 1994 mid, in India close ended funds were popular but later on investors' preference for open ended funds forced mutual funds to change their market product.

15.4.2 Return-Based Classification

To meet the diversified needs of investors, the mutual fund schemes are designed accordingly. Basically, all investments are made to earn a good returns. Returns expected are in the form of regular dividends or capital appreciation or a combination of these

two. In the light of this fact, mutual fund schemes can also be classified into three categories on the basis of returns.

***Income Funds*:** For Investors who are more curious for regular returns, Income Funds are floated. Their object is to maximise current income. Investment is made in fixed income securities like bonds debentures. Such funds distribute periodically the income earned by them. These funds can further be splitted up into *two categories* i.e. those that target *constant income* at relatively low risk and those that attempt to achieve the *maximum income possible*, even with the use of leverage. Obviously the higher the expected return, the higher the potential risk of the investment.

***Growth Funds*:** Such funds aim at appreciation in the value of the underlying investments through capital appreciation. Such funds invest in growth oriented securities i.e. in shares of companies which can appreciate in long run. Growth funds are also known as Nest eggs or Long haul investments. An investor who selects such fund should be able to assume a higher than normal degree of risk.

***Conservative Fund*:** The funds with a philosophy of all things to all issue offer document announcing objectives as: (1) to provide a reasonable rate of return. (2) to protect the value of investment and, (3) to achieve capital appreciation consistent with the fulfillment of the first two objectives. Such funds which offer a blend of all these features are known as conservative fund. These are also known as *middle of the road funds*. Such funds divide their portfolio in common stocks and bonds in a way to achieve the desired objectives. Such funds have been most popular and appeal "to the investors who want both growth and income.

15.4.3 Investment-Base Classification

Mutual funds may also be classified on the basis of securities in which they invest. Basically, it is renaming the sub-categories of return-base classification.

Equity Fund: Such funds, as the name implies, invest most

of their investible funds in *equity shares of companies* and undertake the risk associated with the investment in equity shares. Such funds are clearly expected to outdo other funds in a rising market, because these have almost all their capital in equity. A special type of equity fund is known as 'Index Fund' or 'Never beat market fund'. These are known as *Index funds* since these funds transact only those scrips which are included in any specific index e.g. the scrips which constitute the BSE-30 Sensex or 100 shares National index. Due to the overall poor performance of managed funds this type of fund has emerged. The fund consists of a portfolio designed to reflect the composition of some broad based market index and it is done by holding securities in the, same proportion as the index itself. The portfolio of the index fund is constructed in exactly the same proportion with respect to rupees involved. The value of such index linked funds will go up whenever the market index goes up and conversely, it will come down when the market index comes down. Such fund is not to beat a specific index but is to match that index. These funds have comparatively lower operating costs.

Bond Fund: Such funds have their portfolio consisted of *bonds, debentures*, etc. This type of fund is expected to be very secure with a steady income but with little or no chance of capital appreciation. Obviously risk is low in such funds. In this category we may come across the funds called *Liquid funds* which specialise in investing short-term money market instruments. The emphasis is on liquidity and is associated with lower risks and low returns.

***Balanced Fund*:** The funds which have in their portfolio a reasonable *mix of equity and bonds* are known as balanced funds. Such funds will put *more* emphasis on equity share investments when the outlook is bright and will tend to switch to debentures when the future is expected to be poor for shares majority of funds fall in this category, of course, their mix- proportion varies.

***Fund of funds (FOF)*:** It is a mutual fund scheme that invests in other mutual funds schemes instead of investing in securities.

Such schemes are prevalent in international markets. These schemes can have different investment patterns and investment strategies as disclosed in offer documents. The investors may invest their funds in those FOF schemes which meet their investment objectives instead of investing in different schemes of a mutual fund and keeping track of their NAVs. Such FOF schemes may invest in other sector specific schemes or those schemes which have more weightage of certain stocks and can exit from those schemes when growth prospects of those sectors are not good. The investors putting their money in one sector specific scheme may not be able to decide when to exit.

15.4.4 Sector-based Classification

There are number of funds that direct investing in. a specified sector of an economy. While such funds do have the disadvantage of low diversification by putting all their eggs in one basket, the policy of specialising has the advantage of developing in the fund managers an intensive knowledge of the specific sector in which they are investing. The specialised sectors can be (i) gold and silver, (ii) real estate, (iii) specific industry say oil and gas companies, (iv) off-shore investments, etc.

15.4.5 Leverage-Based Classification

Some mutual funds broad base their investible funds by borrowings from the market and then make investments thereby making leverage benefits available to the mutual fund investors. Such funds are known as *'leveraged funds'*. It depends on the regulating provisions in a country whether borrowings are allowed or not. Normally leverage funds use short sale, which allows the management of the fund to avail the advantage of declining markets in order to realise gains in the portfolio. Leverage funds also use options specifically *call options*.

15.4.6 Other Funds

There are some other types of schemes which do not fit into the above given classifications. Some of such funds are mentioned here. There are *'load funds'* and *'no-load funds'*. In load funds, the mutual funds charge a fee over and above the net asset value from the purchaser. In No load funds no load-fee is charged because little sales efforts are made to promote the fund's sales except through direct advertising. Mutual funds schemes can also be designed to offer some tax exemption. Besides these, there are *money market mutual funds* which interact only in money market. *Off-shore mutual funds (also known as regional or country funds)* are the funds mobilising funds abroad for deployment in local market. Many mutual funds abroad have floated property funds, art funds, commodity funds, energy funds, etc.

One point needs to be viewed that irrespective of classification of schemes, every scheme will be either an open ended scheme or a close ended scheme.



ACTIVITY 1

1) Contact some mutual fund investors and ask them why do they invest in mutual fund

.....

.....

2) Consult any financial newspaper and list *five* mutual fund schemes in operations in India under each of the following categories of schemes:

Growth: .....

Income: .....

Balanced: .....

Sector based: .....



CHECK YOUR PROGRESS

Q1: Define Mutual Fund

.....

.....

Q2: State any two benefits Mutual fund

.....

.....

Q3: Define Growth Fund

.....

.....

15.5 MUTUAL FUNDS IN INDIA

In India mutual fund concept took root only in the nineteen sixties, after a century old history elsewhere in the world. Reacting to the need for a more active mobilisation of household savings to provide investible resources to industry, the idea of first mutual fund in India i.e. UTI born out of the far sighted vision of Sri T. T. Krishnamachari, the then Finance Minister. UTI in 1964 started with a unit scheme popular as “US-64”. Since Unit Trust of India was the result of a special enactment, no other open end mutual fund activities could emerge because of restrictive conditions of Indian Companies Act, 1956. Of course, close end investment companies existed for in-house investments as well as portfolio investment for a long time. But their activities were again on restricted scale.

In 1987 the monopoly of UTI came to an end when Government of India by amending Banking Regulation Act enabled commercial banks in Public sector to set up mutual funds as their subsidiaries. First of all State Bank of India got a nod from RBI. Next to follow was Canara Bank. It was the Abid Hussain Committee’s unequivocal support to the concept that could be accepted as something of a landmark. It called for a greater number of mutual fund players. LIC and GIC also entered the field of mutual funds. During 1987-92, nine mutual funds came to be set up with invertible resources Rs. 37000 crores. This .amount was only 4563 crores up to June 1987. Major share was of UTI.

In pre-1992 period, Indian mutual funds had certain peculiarities. These are:

- Mutual funds in our country till this period were public sector banks and financial institutions.
- Another distinguishing feature was that majority of mutual funds have been floated by commercial banks and financial institutions which gave the impression in the minds of investors that responsibility of funds lies with the respective banks thus, their investment is secured.
- One feature which distinguished mutual funds in India from their counterparts in Europe was that the latter normally do not have an in built promise of minimum return. The experience of UTI showed that its schemes with assured returns had tremendous success.
- Disclosure practices of mutual funds were far away from international standards despite the specific provisions in the regulatory framework.
- One of the important features of mutual fund success in raising respectable quantum of fund, was the associated tax concessions.
- The launching of mutual funds by commercial banks during 1986-87 was in the peculiar circumstance of the absence of any regulatory framework for conduct of their affairs.

Unit Trust of India Act regulated only the affairs of UTI. Banking Companies Act guided commercial banking activities of banks. Indian Trust Act, under which new mutual funds were registered, was too general to take care of mutual fund characteristics. Thus a need for regulating mutual funds was felt. SEBI came out with Mutual Fund Regulation in 1993 under which all mutual funds, except UTI were to be registered and governed. . Private sector was thrown open for this industry. With the entry of private sector funds in 1993, a new era started in the Indian mutual fund industry, giving the Indian investors a wider choice of fund families. The 1993 SEBI (Mutual Fund) Regulations were substituted by a more comprehensive and revised Mutual Fund Regulations in 1996.

The industry now functions under the SEBI (Mutual Fund) Regulations 1996. The number of mutual fund houses went on increasing, with many foreign mutual funds setting up funds in India and also the industry

has witnessed several mergers and acquisitions. As at the end of January 2003, there were 33 mutual funds with total assets of Rs. 1,21,805 crores. The Unit Trust of India with Rs.44,541 crores of assets under management was way ahead of other mutual funds.

In February 2003, following the repeal of the Unit Trust of India Act 1963 UTI was bifurcated into two separate entities. One is the *Specified Undertaking of the Unit Trust of India* with assets under management of Rs.29,835 crores as at the end of January 2003, representing broadly, the assets of US 64 scheme, assured return and certain other schemes. The Specified Undertaking of Unit Trust of India, functioning under an administrator and under the rules framed by Government of India and does not come under the purview of the Mutual Fund Regulations. The second is the *UTI Mutual Fund Ltd,* sponsored by SBI, PNB, BOB and LIC. It is registered with SEBI and functions under the Mutual Fund Regulations. With the bifurcation of the erstwhile UTI and with recent mergers taking place among different private sector funds, the mutual fund industry has entered its current phase of consolidation and growth. As on 31st March 2004 the vital statistics for this industry was as shown in Tables 1 and 2 which highlight the fact that about 35 percent of the funds are as open ended and about 50 percent funds are in income schemes. This statistics also show that only 20 percent of the funds are with public sector funds and 80 percent are with private sector.

Mutual Fund Data Of March 2014 **(Rs. in Crores)**

ASSETS UNDER MANAGEMENT AS ON 31st MARCH, 2014

(Rs. in Crores)

Table 15.1	Open End	Close End	Assured return	**Total**
Income	608540	16700	-	**625240**
Growth	221540	14590	-	**236130**
Balanced	32960	78400	-	**40800**
Liquid/Money	417040	-	-	**417040**
Market Gilt	60260	-	-	**60260**

ELSS	4890	11800	-	**16690**
Total	**1345230**	**50930**	**-**	**1396160**

Table 15.2: ASSETS UNDER MANAGEMENT AS ON 31st March, 2014

Sr. No.	Name of the Asset Management Company	Asset Under Management (Rs. in Crores)
A	BANK SPONSORED	
	BOB Asset Management Co. Ltd.	4540
	Canbank Investment Management Services Ltd.	16980
	PNB Asset Management Co. Ltd.	1140
	SBI Funds Management Ltd.	52020
	UTI Asset Management Company Pvt. Ltd.	206170
	Total A	**280850**
B	INSTITUTIONS	
	GIC Asset Management Co. Ltd.	2340
	IL & FS Asset Management Co. Ltd.	20960
	Jeevan Bima Sahayog Asset Management Co. Ltd.	42090
	Total B	**65390**
C1	PRIVATE SECTOR	
	(i) INDIAN	
	Benchmark Asset Management Co. Pvt. Ltd.	710
	Cholamandalam Asset Management Co. Ltd.	11250
	Escorts Asset Management Ltd.	1560
	Sahara Asset Management Co. Pvt. Ltd.	3490
	J.M.Capital Management Pvt. Ltd.	36440
	Kotak Mahindra Asset Management Co. Ltd.	52900
	Reliance Capital Asset Management Ltd.	72410
	Sundaram Asset Management Company Ltd.	20090
	Total C(i)	**198850**
C2	(ii) FOREIGN	

	Principal Asset Management Co. Pvt. Ltd.	36330
	Total C(ii)	**36330**
C3	(iii) JOINT VENTURES-PREDOMINANTLY INDIAN	
	Birla Sun Life Asset Management Co. Ltd.	88730
	Credit Capital Asset Management Co. Ltd.	1440
	DSP Merrill Lynch Fund Managers Ltd.	51270
	HDFC Asset Management Co. Ltd.	149850
	Tata TD Asset Management Private Ltd.	40140
	Total C(iii)	**331430**
C4	JOINT VENTURES - PREDOMINANTLY FOREIGN	
	Alliance Capital Asset Management (India) Pvt.Ltd.	20910
	Deutsche Asset Management (India) Pvt. Ltd.	20730
	HSBC Asset Management (India) Private Ltd.	45280
	ING Investment Management (India) Pvt. Ltd.	15530
	Morgan Stanley Investment Management Pvt. Ltd.	13610
	Prudential ICICI Asset Management Co. Ltd.	140570
	Standard Chartered Asset Mgmt Co. Pvt. Ltd.	72870
	Sun F & C Asset Management (India) Pvt. Ltd.	1940
	Franklin Templeton Asset Management (India)	
	Pvt. Ltd.	151870
	Total C4(iv)	**483310**
	Total C (i + ii +iii +iv)	**1049920**
	Total (A + B + C)	**1396160**
	(**Source:** web site of AMFI www.amfiindia.com)	

15.6 CONSTITUTION OF MUTUAL FUNDS

In USA and UK, mutual funds and the unit trusts are governed by the Investment Act of 1940 in USA and by the Prevention of Frauds Act in UK. There are normally three agencies to manage the show of mutual funds: first the Investment Adviser, second the agency collecting savings from prospective investors for a commission; and the third is a trustee. which is

either a banking or insurance company. The investment adviser is accountable to the trustees for its operations and ultimately to the Securities Exchange Commission (SEC) in USA or to the Securities Investment Board (SIB) in UK. For comparison, constitution of mutual fund as operating in USA and India are explained here:

In USA

A mutual fund is organized either as a corporation or a business trust. Individuals and institutions invest in a mutual fund by purchasing shares issued by the fund. It is through these sales of shares that a mutual fund raises the cash used to invest in its portfolio of stocks, bonds, and other securities. A mutual fund is typically externally managed: it is not an operating company with employees in the traditional sense. Instead, a fund relies upon third parties, either affiliated organizations or independent contractors, to carry out its business activities, such as investing in securities.

Board of directors Oversees the fund's activities, including approval of the contract with the management company and certain other service providers.

Investment adviser Manages the fund's portfolio according to the objectives and policies described in the fund's prospectus.

Administrators

Administrative services may be provided to a fund by an affiliate of the fund, such as the investment adviser, or by an unaffiliated third party. Administrative services include overseeing the performance of other companies that provide services to the fund and ensuring that the fund's operations comply with legal requirements. Typically, a fund administrator pays for office costs and personnel, provides general accounting services, and may also prepare and file SEC, tax, shareholder, and other reports.

Principal Underwriters

Most mutual funds continuously offer new shares to the public at a price based on the current value of fund net assets plus any sales charges. Mutual funds usually distribute their shares through principal underwriters. Principal underwriters are regulated as broker, dealers and are subject to NASD rules governing mutual fund sales practices.

Custodians

Mutual funds are required by law to protect their portfolio securities by placing them with a custodian. Nearly all mutual funds use qualified bank custodians. The SEC requires mutual fund custodians to segregate mutual fund portfolio securities from other bank assets.

Transfer Agents

A transfer agent is employed by a mutual fund to maintain records of shareholder accounts, calculate and disburse dividends, and prepare and mail shareholder account statements, federal income tax information, and other shareholder notices. Some transfer agents prepare and mail statements confirming shareholder transactions and account balances, and maintain customer service departments to respond to shareholder inquiries In India

SEBI, in its regulations contemplated a four-tier system for managing the affairs of Indian mutual funds ensuring arm's length distance between the sponsor and the fund. Since mutual fund is a specialised type of financial institution which acts as investment conduit for investors at large especially the small investors, the authorities are concerned about the investors' safeguards. Accordingly SEBI regulations are drafted to give a specific direction to the constitution and management of mutual funds. These provisions are designed to safeguard investors, check speculative activities of mutual funds and ensuring financial discipline through transparency and fair play. Regarding constitution, SEBI (Mutual Fund) Regulations require a *four tier system* to organise mutual fund, these being *Sponsor, Trustee, Assets Management Company and Custodian.*

15.6.1 Sponsors

It refers to any body corporate which initiates the launching of a mutual fund. It is this agency which of its own, if eligible, or in collaboration with other body corporate complies the formalities of establishing a mutual fund. The sponsor should have a sound track record and experience in the relevant field of financial services for a minimum period of 5 years. SEBI ensures that sponsors should

have professional competence, financial soundness and general reputation of fairness and integrity in business transactions. Every mutual fund shall be registered under the said regulations and it is the sponsor who files an application (format is prescribed) with fee to SEBI. Sponsor is also to contribute at least 40 per cent of the net worth (Rs. 4 crore) of the Asset Management Company. It is the sponsors who identify and appoint the trustees and AMC. Sponsors are to appoint a board of trustees as well as to get incorporated the AMC. It is the duty of sponsors to submit to SEBI the trust deed and draft of memorandum and Articles of Association of AMC. Once MF is registered, the sponsors technically go in background.

15.6.2 Trustees

A mutual fund is to be constituted as a Trust under Indian Trust Act and trustees are to look after the trust. A trustee is a person who holds the property of the mutual fund in trust for the benefit of the unit holders. A company is appointed as a trustee to manage the mutual fund with approval of SEBI. To ensure fair dealings, at least 75 per cent of the trustees are to be independent of the sponsors. Trustees take into their custody, or under their control all the property of the schemes of mutual fund. It is the duty of the trustees to provide information to unit holders as well as to SEBI about the mutual fund schemes. Trustees are to appoint Asset Management Company (AMC) to float the schemes. The trustees are to evolve Investment Management Agreement to be entered into with AMC. It is trustee's duty to observe and ensure that AMC is managing schemes in accordance with the trust deed. Trustees can dismiss the appointed AMC. It is the responsibility of trustees to supervise the collection of any income due to be paid to the scheme. Trustees for their services are paid trusteeship fee which is to be specified in the trust deed. Trustees are to present annual report to the investors.

Mutual fund is basically a principal - agent problem where the principle is unit holder who hires an agent i.e. mutual fund

(trustees) and the principal tries to ensure and expects that actions of the agent are in the best interest of the former. Mutual funds by nature are custodians of the money of investors (specially the small investors who do not excel in investment activities) entrusting their savings in the belief that the former have better expertise and skills for investing than of their own. The task of keeping up this trust is by no means easy. This makes mutual funds different from other businesses and their well-being and health reflects the health of investment climate. Mutual fund is created by a sponsor as a trust under I*ndian Trust Act 1882,* and registered under SEBI. A trustee is appointed who holds the property of the mutual fund in trust for the benefit of the unit holders. Once the mutual fund trust is formed, the role of sponsor virtually becomes nil as it is the trust which now interacts with SEBI.

SEBI regulations desire appointing a trustee either as individuals, comprising a board of trustee, or a trustee company. Traditionally mutual funds have been operating with a board of trustees but some new entrants in this field have opted for a company to be appointed as a trustee to manage the mutual fund. The main reason why a trustee company is preferred over a board of trustees is that in their individual capacity, board of trustees have an unlimited liability. Consequently, their personal property may be at stake if a scheme fails. Where as for trustee company board of directors have limited liability.

Trustees, are regulated by a Trust- Deed which is to be submitted to SEBI. The trustees are to manage the Mutual Fund in accordance with the laws, regulations, directions and guidelines issued by SEBI, the stock exchanges and other governmental and regulatory agencies. They are to hold in safe custody and preserve the mutual fund's property. Trustees are to report on operations to SEBI and the Unit holders. They are to ensure that AMC has been diligent in conducting the affairs. The trustees' working has been made subject to a code of conduct.

To ensure fair dealings, mutual fund regulations require that one cannot be a trustee or a director of a trustee company in more than one mutual fund. Further, at least *two- third* of the trustees are to be *independent* of the sponsors. These *independent trustees,* of course, *enjoy multi trusteeship.* Asset management company or its directors or employees shall not act as trustees of any MF. Trustees should be persons with experience in financial services. Every trustee should be a person of ability, integrity and standing. Trustees appoint Asset Management Company (AMC) to float the schemes in consultation with sponsors. The trustees are to evolve *Investment Management Agreement* (IMA) to be entered into with AMC. It is trustee's duty to observe and ensure that AMC is managing schemes in accordance with the trust deed.

Trustees can dismiss the AMC. It is the responsibility of trustees to supervise the collection of any income due to be paid to the scheme. Trustees for their services are paid trusteeship fee which is to be specified in the trust deed. Trustees are to present annual report to the investors. They can call a meeting of the unit holders if a requisition is filed. Rights and obligations of the trustees under SEBI (Mutual fund) Regulations along with **due diligence** (general and specific) are as under:

RIGHTS AND OBLIGATIONS OF THE TRUSTEES ‘

1) The trustees and the asset management company shall with the prior approval of the Board enter into an investment management agreement.
2) The investment management agreement shall contain such clause as are mentioned in the regulations and such other clauses as are necessary for the purpose of making investments.
3) The trustees shall have a right to obtain from the asset management company such information as is considered necessary by the trustees.
4) The trustees shall ensure before the launch of any scheme

that the asset management company has:

a) systems in place for its back office, dealing room and accounting;

b) appointed all key personnel including fund manager(s) for the scheme (s) and submitted their bio-data which shall contain 'the educational qualifications, past experience in the securities market with the trustees, within 15 days of their appointment.

c) appointed auditors to audit its accounts.

d) appointed a compliance officer who shall be responsible for monitoring the compliance of the Act, rules and regulations, notifications, guidelines, instructions, etc. issued by the Board or the Central Government and for redressal of investors' grievances.

e) appointed registrars and laid down parameters for their supervision.

f) prepared a compliance manual and designed internal control mechanisms including internal audit systems

g) specified norms for empanelment of brokers and marketing agents.

(4A) The compliance officer shall immediately and independently report to the Board any non-compliance observed by him.

(5) The trustees shall ensure that an asset management company has been diligent in em paneling the brokers in monitoring securities transactions with brokers and avoiding undue concentration of business with any broker.

(6) The trustees shall ensure that the asset management company has not given any undue or unfair advantage to any associates or dealt with any of the associates of the asset management company in any manner detrimental to interest of the unit-holder.

(7) The trustees shall ensure that the transactions entered into by the asset management company are in accordance with these

regulations and the scheme.

(8) The trustees shall ensure that the asset management company has been managing (the mutual fund schemes independently of other activities and have taken adequate steps to that the interest of investors of one scheme,are not being compromised with those of any other scheme or of other activities of the asset management company.

(9) The trustees shall ensure that all the activities of the asset management company are in accordance with the provisions of these regulations.

(10) Where the trustees have reason to believe that the conduct of business of the mutual fund is not in accordance with these regulations and the scheme they shall forthwith take such remedial steps as are necessary by them and shall immediately inform the Board of the violation and the action taken by them.

(11) Each trustee shall file the details of his transactions of dealing in securities with the Mutual Fund on a quarterly basis.

(12) The trustees shall be accountable for, and be the custodian of, the funds and property of the respective schemes and shall hold the same in trust for the benefit of the unit-holders in accordance with these regulations and the provisions of trust deed.

(13) The trustees shall take steps to ensure that the transactions of the mutual fund are in accordance with the provisions of th_ trust deed.

(14) The trustees shall be responsible for the calculation of any income due to be paid to the mutual' fund and also of any income received in the mutual fund for the holders of the units of any scheme in accordance with these regulations and the trust deed.

(15) The trustees shall obtain the consent of the unit-holders

a) whenever required to do so by the Board in the interest of the unit holders; or

b) whenever required to do so on the requisition made by three-fourths of the unit-holders of any scheme; or

c) when the majority of the trustees decide to wind up or prematurely redeem the units; or (15A) The trustees shall ensure that no change in the fundamental attributes of any scheme trust or fees and expenses payable or any other change which would modify the scheme and affects the interest of unit-holders shall be carried out.

(16) The trustees shall call for the details of transactions in securities by the key personnel of the asset management company in his own name or on behalf of the asset management company and shall report to the Board; as and when required.

(17) The trustees shall quarterly review all transactions carried out between the mutual funds, asset management company and its associates.

(18) The trustees shall quarterly review the net worth of the asset management company and in , case of any shortfall, ensure that the asset management company make up for the shortfall.

(19) The trustees shall periodically review all service contracts such as custody arrangements, transfer agency of the securities and satisfy itself that such contracts are executed in the interest of the unit-holders.

(20) The trustees shall ensure that there is no conflict of Interest between the manner of deployment of its net worth by the asset management company and the interest-of the unit-holders.

(21) The trustees shall periodically review the investor complaints received and the redressal of the same by the asset management company.

(22) The trustees shall abide by the **Code of Conduct**.

(23) The trustees shall furnish to the Board on a half-yearly basis.

a) a report on the activities of the mutual fund:

b) a certificate stating that the trustees have satisfied themselves that there have been no instances of self-

dealing or front running,

c) a certificate to the effect that the asset management company has been managing the scheme independently of any other activities.

(24) The independent trustees shall give their comwents on the report received from the asset management company regarding the investments by the mutual fund in the securities of group companies of the sponsor.

(25) Trustees shall exercise **due diligence** as under:

A. General Due Diligence:

i. The Trustees shall be discerning in the appointment of the directors on the Board of the asset management company.

ii. Trustees shall review the desirability of continuance of the asset management company if substantial irregularities are observed in any of the schemes and shall not allow the asset management company to float new schemes.

iii. The trustee shall ensure that the trust property is properly protected, held and administered by proper persons and by a proper number of such persons.

iv. The trustee shall ensure that all service providers are holding appropriate registrations from the Board or concerned regulatory authority.

v. The Trustees shall arrange for test checks of service contracts.

vi. Trustees shall immediately report to Board of any special developments In the mutual fund.

i) Obtain internal audit reports at regular intervals from independent auditors appointed by the Trustees;

ii) obtain compliance certificate at regular intervals from the asset management company;

iii) hold meeting of trustee more frequently: .

iv) consider the reports of the independent auditor and compliance reports of asset management company at the meetings of trustees for appropriate action;

v) maintain records of the decisions of the Trustees at their meetings and of the minutes of the meetings;

vi) prescribe and adhere to a code of ethics by the Trustees, asset management company and its personnel;.

vii) communicate in writing to the asset management company of the deficiencies and checking on the rectification of deficiencies.

(28) The trustees shall not be held liable for acts done in good faith if they have exercised adequate due diligence honestly.

(29) The independent directors of the trustees or asset management company shall pay specific attention to the following as may be applicable. Namely:

i) the Investment Management Agreement and the compensation paid under the agreement;

ii) service contracts with affiliates - whether the asset management company has charged higher fees than outside contracts for the same services *j*

iii) selection of the asset management company's independent directors:

iv) securities transactions involving affiliates to the extent such transactions are permitted. v) selecting and nominating individuals to fill independent directors vacancies;

vi) code of ethics must be' designed to prevent fraudulent deceptive or manipulative practice by insiders in connection with personal securities transactions;

vii) the reasonableness of fees paid to sponsors, asset management company and any other for services provided;

viii) principal underwriting contracts and their renewals;

ix) any service contract with the associates of the asset management company.

15.6.3 Custodians

Custodian is an agency for the handling and safekeeping funds, cash and securities.In a mutual fund depending on its size there is substantial work involved in managing the scrips bought from and sold in the market. Their safe custody and ready availability is to be ensured. SEBI requires that each mutual fund shall have a custodian who is not in any way associated with the Asset Management Company. Such custodian cannot act as sponsor or trustee of any mutual fund. Further, custodian is not permitted to act as a custodian to more than one mutual fund without the prior approval of SEBI. A custodian's main assignment is safekeeping of the securities or participation in any clearing system on behalf of the client to effect deliveries of the securities. The custodian, depending on terms of agreement, also collects income/dividends on the securities. Some of other associated assignments of custodians are:

- Ensuring delivery of scrips only on receipt of payment and payment only upon receipt of scrips.
- Regular reconciliation of assets to accounting records.
- Timely resolution on discrepancies and failures.
- Securities are properly registered or recorded.

Depending on the volume there can be co-custodian(s) for a mutual fund. These custodians are entitled to receive custodianship fee, based on the average weekly value of net assets or sale and purchases of securities along with per certificate custody charges.

15.6.4 Assets Management Company (AMC)

AMC is an agency which evolve policies for investments and disinvestment of the corpus of schemes of a mutual fund.The sponsor or the trustees appoint an AMC, also known as 'Investment

Manager', to manage the affairs of the mutual fund. It is the AMC which operates all the schemes of the fund. Any AMC cannot act as a trustee of any other mutual fund. AMC can act as an AMC of only one mutual fund. AMC is not permitted to undertake any business activity except activities in the nature of management and advisory services to off shore funds, pension funds, provident funds, venture capital funds, management of insurance funds, financial consultancy and exchange of research on commercial basis, if these activities are not in conflict with the activities of the mutual fund. It can also operate as an underwriter provided it gets registered under SEBI (Merchant Bankers) Regulations. SEBI regulations in this matter are as under:

The asset management company shall

1) not act as a trustee of any mutual fund;
2) not undertake any other business activities expect activities in the nature of portfolio management services management and advisory services to offshore funds. person funds, provident funds, venture capital fund, management of insurance funds. Financial consultancy and exchange of research on commercial basis if any of such activities are not in conflict with the activities of the mutual funds. (Asset management company shall meet capital adequacy requirements, if any, separately for each such activity and obtain separate approval, if necessary under the relevant regulations.)
3) not investment in any of its schemes unless full disclosure of its intention to invest has been made in the offer documents an asset management company shall not be entitled to charge any fees on its investment in that scheme.

SEBI desires that assets management company should have a sound track record (good net worth, dividend paying capacity and profitability, etc.), general reputation and fairness in transaction. The directors of AMC should be expert in relevant fields like portfolio management, investment analysis and financial administration

because any AMC is basically involved in these three activities. An AMC is expected to operate independently. SEBI regulations require that at least fifty per cent of the directors should be those who do not have any association with sponsor or trustees, Its Chairman should be an independent person. To ensure stake of sponsors in the AMC, it is required that atleast 40 per' cent of its net worth is contributed by the former, AMC, itself should be financially sound and should have a net worth of at least Rs. 10 crores. These all provisons are to ensure good governance of mutual funds in India.

Working Mechanism Of AMC

The major strength of any AMC lies in its investment function. Investment function is a specialised function which, depending an operational strategies .of AMCs, can further be divided into specialised categories. The Investment Department operates with the following set up:

***Fund Manager*:** Asset Management Companies manage the investment .of funds through a fund manager. The basic function of a fund Manager is to decide about which, when, how much and at what rate securities are to be sold .or bought. To a great extent the success of any scheme depends on the caliber of the fund manager.

Far many mutual funds especially in bank sponsored funds, the entire investment exercise is not left to one individual. They have created committees to handle their investments. One such mutual fund has created two committees. First is 'Investment Committee' which is a broad based committee having even nominees of the sponsor. It decides about the primary market investments.

The second is a Market Operation Committee having the assignment of disinvestments and interacting with secondary market. It is normally an in-house committee. These committees also make their judgments on the basis of data provided by the research wing.

' ***Research and Planning Cell*:** It performs a very sensitive and technical assignment. Depending on the operational policies, such unit can be created by AMC on its own or research findings

can be hired from outside agencies. The research can be with respect to securities as well as prospective investors. The fund manager can contribute to the bottom line *of* mutual fund by spotting significant changes in securities ahead of the crowd. In India' at present many funds depend on outsiders. Such outsiders need not be technical analyst, even brokers provide tips to mutual funds. Such a strategy saves a lot of funds to be invested in research infrastructure. The new mutual funds with small corpus can hardly afford to have their own data base. But there are mutual funds following the philosophy your expertise is your original research.

***Dealer*:** To execute the sale and purchase transactions in capital or money market, a separate section may be created under the charge of a person called dealer having deep understanding of stock market operations. Sometimes, this division is under the charge of marketing division of AMC. Dealer is to comply with all formalities of sale and purchase. through brokers. Such brokers are to be approved by Board of Directors (B.O.D.) of AMC. It is B.O.D. which lays down the guidelines for allocation of business to different brokers.

Functions Of AMC

It is not required that AMC performs all its functions on its own. It can hire services of outside agencies as per its requirements Some of the common functions performed by mutual funds are listed below:

a. One of the main functions of mutual fund is receiving and processing the application forms of investors, issuing unit certificates, sending refund orders, recording all transfers of units and maintaining all such records, repurchasing the units, redemption .of units, issuing dividend .or income warrants. If the volume of work is huge and needs specialized expertise, mutual funds may engage the services of *Registrars and Transfer Agents* . For such services they are entitled to a fee which is in proportion to the number of unit-holders and number

of transactions, etc. Such fee is charged by AMC from the mutual fund and is paid to the agents.

b. computing the net asset value per unit .of the scheme, maintaining its books and records, maintaining compliance with the schemes investment limitations as well as the SEBI Regulations and other regulations, preparing and distributing reports on the scheme .of the unit holders and SEBI and maintaining the performance of mutual funds custodians, recording all accounting transactions maintaining their records etc. is another group of activities under taken which can be termed as *Fund Accounting.* Again depending on the size of the fund, its age and number of expected transactions *Fund Accounting* may be assigned to specialised agencies.. In India, in the absence of rigorous accounting norms, this service hardly availed .of .outsiders but in times to came outside agencies will be required.

c. Activities of intermediaries such as advertising agency, printers, collection centres and marketing the services are to be coordinated. Mutual funds as per their judgment instead of performing these activities generally engage *Lead Managers* . They get fees on the basis .of funds mobilised. They are normally engaged by AMCs for extensive campaign about the scheme to attract the investors. They are also called marketing associates. Outside agencies engaged for such assignment have to comply with the advertising code specified by SEBI for MFs. They assist AMC to approach potential investors through meetings, exhibitions, contacts, advertising, publicity, sales promotion etc.

d. AMCs have to design their investment strategies on a continuous basis. If they can not cop up with workload *Investment Advisors* may be appointed by AMC. Investment advisors analyse the market and as per the needs of AMC provide advice. For their professional advice on funds

investment, they are entitled to receive compensation normally based on the average weekly value of the funds net assets. Majority of Indian Mutual Funds have their own market analysts who design their investment strategies.

e. A lot of legal exercise is undertaken during the planning and execution of different schemes. A group .of advocates and solicitors may be appointed as legal advisors. Their fee is no way associated with net assets of the fund but actual fee is paid to them as decided. Assets Management Company is also required to have an auditor, who is not an auditor of the mutual fund, to undertake independent inspection and verification of its accounting activities.



ACTIVITY 2

a) Get hold of offer document of any mutual fund scheme and study:

i) Features of its AMC,

ii) Its Custodian Service Agreement.

iii) Duties of its Trustees.

b) Collect offer documents of five mutual funds and list their sponsors, trusts, AMCs and Custodians

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15.7 OPERATIONAL EFFICIENCY OF MUTUAL FUNDS

Performance of a mutual fund should be measured against its stated objectives. If the fund's goal is to produce maximum current income, it will be the main factor for evaluation. If the objective is obtaining capital gains without emphasis on dividend income, then this will be the important factor to be measured. Traditionally, the performance of a mutual fund is measured in India by summing the effect of two different things (1) changes in the net

asset value (NAV) or market value, and (2) the amount of income dividends paid. This information is usually provided annually as an index of performance. This index may be compared to stock averages, or to an index of performance of other mutual funds. The periodic disclosures, annual reports and the prospectus of the mutual funds provide performance information in varying degrees of detail.

Let us discuss some such parameters:

1. Net Asset Value (NAV): NAV of a scheme indicates the intrinsic value of a unit under the scheme. It is the value which the unit holder can hope to get, if the scheme is wound up at the moment and all assets and liabilities are liquidated.

NAV per unit = (1 - 2) /3

Where:

1 is Total market value of investment portfolio, total written down value of fixed assets and the cost value of other current assets.

2 is Current liabilities

3 is Number of outstanding units in that scheme.

NAV depends upon the valuation of the portfolio of the mutual fund. Higher valuation inflates NAV and under valuation lowers the NAV. NAV is relevant in the context of a particular date. Mutual funds in past have been playing with NAV figure favouring one set of investors and putting others at loss just by virtue of valuation practices. Thus, valuation criterion of the investment portfolio has been spelled out by SEBI in 1996 regulations .NAV is to be calculated every day for open ended scheme and at least once a week for close ended scheme.

2. Load: Load is the charge levied on those who purchase units of a scheme after the initial issue of the scheme. It can be back-end load or front-end load. Initial expenses incurred by a scheme is referred to as load of the scheme. If a scheme bears this load it is known as load scheme. It has been mentioned earlier SEBI permits every scheme to write off a maximum of 6 per cent of its corpus as initial expenses thus load can be up to 6 per cent only. On account of this load (say whole 6 per cent is load) Rs. 100 invested in a scheme give Rs. 94 to the fund manager to invest. As a

result mutual fund units generally quote below par on listing. In a no load scheme this load is borne by the AMC and is not charged to the scheme. Thus, the entire amount mobilised gets invested in the scheme and is reflected in higher NAV. Hence 'no-load' schemes are gaining popularity.

3. Disclosures: Operational efficiency can also be disclosed through half yearly results and annual report. SEBI has spelled out for mutual funds the formats of Annual Report, Half-yearly financial results Report, Balance Sheet, Revenue Account (You may consult the Regulations). Distribution of annual reports of Scheme is obligatory. MFs are to disclose their portfolio to increase transparency in their operations. Investors are disclosed historical per unit statistics for three years by MFs. Facts regarding gross income per unit, per unit ratio of expenses to average net asset by percentage, per unit gross income to average net asset by percentage, etc., are also to be disclosed as desired by SEBI. .

4. Returns: Mutual funds primarily serve the investors by providing returns on the investment by the latter. Returns are earned in form of

(a) appreciation in value of investments made by mutual funds and

(b) dividend or interest received on the investment made. Such returns of mutual funds are subject to expenses incurred, by them. SEBI, to protect interest of investors, desires through its regulations that such expenses incurred should be reasonable. These expenses can be trusteeship fee, management fee, adn1inistrative expenses, fund accounting fee, custodian fee, initial charges, etc.

SEBI has laid down limits on certain specific expenses and besides that an over all limit on expenses are fixed. AMC can charge management fee up to 1.25 per cent of weekly average net asset if such assets are up to Rs. 100 crore in, a year and one per cent if these assets exceed Rs. 100 crore. This limit is increased up to additional one per cent if AMC is managing a no load scheme. Further, AMC cannot charge from mutual fund initial expenses of launching a scheme exceeding 6 per cent. SEBI, still further requires that over all expenses excluding expenses of issue or redemption shall not exceed 2.5 per cent on first Rs. 100 crore of average weekly net assets, 2.25 per cent on next Rs. 300 crores, 2 per cent on next Rs. 300 crores and 1.75 per cent on balance of the assets.

All these limits prescribed by SEBI are the maximum that a mutual funds can charge but practice in India had 'been that they charge these as such assuming these to be the minimum limit. Investors when are not provided sufficient returns, they blame AMC for charging fee and expenses irrespective of returns to them. But one should not forget that if AMC continues to charge maximum permissible fee without providing reasonable returns to investors, investors may not subscribe to their schemes in future. SEBI has permitted MFs to assure returns to investors provided AMC stands guarantee to it on its own or its sponsor.

A common way of measuring the performance of a mutual fund management is by comparing the yields of the mutual fund, i.e. the managed portfolio, with the. market or with a random portfolio. The portfolio yield is also calculated like the holding period yield where; NAVx is net asset value per share at the end of year x ,Dx is the total of all distributions per unit during the year x and NAVx-1 is net asset value per share at the end of the previous year, then the portfolio yield is :

$$\frac{NAVx + Dx}{NAVx - 1} - 1$$

For instance, if NAVx isRs. 110/- Dx is Rs. 15, and NAVx-1 is Rs. 100.

the yield will be: $\frac{110 + 15}{100} - 1 = 25\%$

The so calculated yields of the mutual fund portfolio and unmanaged portfolio are then compared.

The one which has the higher yield will be deemed to be the better managed portfolio. Generally, the average investment returns increase as risk increases. Equities yield more than the bonds as they are riskier. Because of this, mutual funds with portfolios of equities should yield more than portfolios of bonds. Portfolio risk may be measured by the average beta and alpha of the portfolio. The recent trend in the measurement' of mutual fund performance is towards risk adjusted performance

While measuring the efficiency and reliability of a mutual fund's performance several models were conceived considering both risk and return. In some models characteristic regression lines of the portfolios are estimated with equations. Dr Michael C. Jensen modified the characteristic

regression line to make it useful as a one parameter of investment performance measure. The basic random variables in Jensen's model are risk premiums. In Jensen's characteristic line, the **alpha** intercept is a regression estimate of the excess returns from a particular asset. This alpha estimates the excess returns averaged over the sample period used to estimate the characteristic line regression.

4. **Beta:** Beta is the beta coefficient arid is an index of systematic risk used for ranking the systematic risk of different assets. Beta measures how much the price of a given security is expected to rise and decline in case of rise or decline in the security market. Alpha measures whether the returns on the security are expected to be better or worse than the average security. Whenever portfolio performance is sought to be measured on a risk adjusted basis portfolio beta and alpha values are calculated. Then, a theoretical portfolio having beta and alpha characteristics close to those of the real portfolio is created. The performance of the real portfolio is compared to the theoretical portfolio. Since the risk characteristics of both are same, it the real portfolio returns exceed those of such theoretical portfolio, it can be assumed that the fund had performed well relative to its risk level.



ACTIVITY 4

a) For any mutual fund scheme collect the following and study their contents:

Annual Repots

Half yearly Report

Balance sheet

Revenue account

b) Consulting the financial newspapers, compile NAV of two open - ended schemes over a period of two years at half monthly intervals and comment on their performance over two years.

c) Collect application form of any mutual fund scheme and study the contents of *Memorandum containing Key Information'*



CHECK YOUR PROGRESS

Q4: What are the parameters of performance of a mutual fund are measured.

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Q5: How 'returns' are earned.

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Q6: Define Load.

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15.8 MAKING MUTUAL FUNDS INVESTOR FRIENDLY

An investor who invests in a mutual fund faces three important types of risks, viz., portfolio risk, organisational risk and management process risk.

The portfolio risk takes place due to inexperience, lack of judgment and farsightedness of the investment manager. Investors, specially small investors, come to join mutual funds to get benefit of diversification of portfolio. SEBI requires mutual fund to spread the risk by portfolio diversification. For this it has been specified that no mutual fund under all its schemes taken together should invest more than 10 per cent of its funds in the shares or debentures or other securities of a single company and no mutual fund under all its scheme taken together should invest more than 15 per cent of its funds in the shares and debentures of any specific industry, except that a declaration to this effect has been made in the offer letter.

The organisational risk arises due to internal and external reasons associated with the organisation. The prominent among the internal reasons are, frauds committed by employees, theft or misappropriation of investors' funds and uncalled for portfolio manipulation, etc. The organisational risk also arises due to external and uncontrollable factors like a stock market crash sending a shiver down the spines of the investors. Such a situation

may render an investment management firm insolvent, making the investors to suffer huge losses. The Securities Exchange Board of India (Mutual Fund) Regulations, 1993 was the first attempt to bring mutual funds under a regulatory framework and to give direction to their functioning. The new guidelines were laid down for authorisation and licensing of mutual funds and each of their schemes. The structure evolved for mutual funds has an attractive feature of arm's length concept to ensure fairness to investors.

The management process risk emanates from errors in the execution of transactions, delays in settlements and losses due to counter party default or speculation. To save investors from speculation, Mutual fund has to take delivery in the case of purchase and give delivery in the case of scrips sold and in no case shall engage in any speculation in the form of short selling, carry forward transactions or badla finance. The scrips purchased shall be transferred to the funds name and scheme also. To lower down the income of schemes AMCs may charge excessive expenses to the scheme. SEBI has laid down the limits for different expense to protect investors against such practices (See SEBI Regulations).

When a scheme is launched an *Offer Document* is issued by mutual fund. It provides essential information about the scheme in a way that benefit investors in making decision about subscribing the issue. To ensure that sufficient information is provided in simple language, SEBI has designed a *Standard Offer Document* .

It prescribes the minimum disclosure requirements to be contained in the offer document of any mutual fund scheme. In addition, an abridged offer document i.e. the memorandum containing key information, which must accompany all scheme application forms in terms of sub regulation (4) of regulation 29 of the Regulations, has been standardised. Both these documents have strengthened the disclosure standards in the offer documents fund schemes, thereby enabling the investors to take informed investment decisions. The standard offer document and memorandum mandate the following disclosures :

- submission of the Due Diligence Certificate by the AMC to the SEBI and reproduction of its contents in the offer document.
- standard as well as scheme specific risk factors.

- in the case of assured return schemes, past history of the mutual fund in meeting assurances under such schemes as well as the resources available to the guarantors on the basis of which guarantee is being provided for the new scheme.
- fundamental attributes of the scheme.
- details of the trustees/members of the Board of Directors of the trustee company/AMC as well as a note on the activities of the sponsor and its financial performance for the last three fiscal year.
- transactions with associates undertaken by the mutual fund for the last three years.
- year-wise disclosure of past performance of all schemes launched during the last three fiscal years on the basis of historical per unit statistics including annualised return for all schemes (excluding redeemed schemes).
- all cases of penalties awarded by an financial regulatory body, any pending material litigation proceedings, criminal cases or economic offence cases and any enquiry/adjudication proceedings under the SEBI Act and the regulations made there under, that are in progress against the sponsor or any of its associates including the AMC/Trustee Company/Board of Trustees or any of the directors or key personnel (specifically the fund managers) of the AMC. (For details see SEBI Regulations for Mutual funds *or* visit internet site of SEBI, http:\\www.sebi.gov). Every investor can ask for its copy.

SEBI has, further, laid down Advertisement Code so that advertisement should be truthful, fair and clear. Target is that investors are not mislead and are protected against false promises.

SEBI has ensured safeguard measures for investors. More and more transparency is desired. Unit Certificates are to be issued to investors with in six weeks from the date of closure of subscription list. SEBI desires that if some units are submitted for transfer, such transfer is to be executed with in 30 days. Dividend warrants against the scheme are to be dispatched with in 42 days of the declaration of the divided. SEBI also desires that with in 10 working days from date of redemption, repurchase proceeds should be dispatched.

If any substantial changes are made in basic features of a scheme, investors are given full liberty by SEBI to exit the scheme. SEBI has laid down several provisions to enable the investors to take informed decisions, in form of pre-launch and post-launch disclosure by a mutual fund. SEBI has a right to call for any information regarding the operation of the mutual funds, any of the scheme of the mutual fund, asset management company, custodian, sponsor or any other person associated with the mutual fund..

SEBI lays down accounting policies to be complied with by mutual funds and the format and contents of the financial statements and other reports. SEBI can impose monetary penalty of different amounts for different types of violations. The violations that invite penalties include violations of terms and conditions pertaining to registration, compliance of listing conditions, dispatch of unit certificates in the manner provided, refund of application money and investment of money collected under a scheme in the manner or within the period prescribed in the regulations etc. SEBI regularly conducts inspections of mutual funds to ensure that their operating policies are not against the interest of investors. SEBI has been putting ban on defaulting AMC to issue new schemes.

A suitable regulatory structure is the one which is backed by legislative action and supported by industry practices. It is because the legislative regulation, as is prevalent in USA, is likely to instill more public confidence as compared to the self-regulation being practiced in UK. Whatever be the structure of statutory regulation, it is always desirable to supplement it with some kind of self regulatory organization (SRO). Association of Mutual Funds in India (AMFI), mutual fund SRO

in India, is doing a great job to evolve investor friendly practices in Indian mutual funds. It is undertaking investor awareness programmes. Mutual funds have to revise their product profile, marketing strategy, investment management systems and disclosure practices. They should design innovative schemes not only for the conventional risk averse types of investors but also for the emerging risk taking type of investors.

Agent-oriented network for marketing also needs a change since agents work only for their commission and have no commitment for mutual fund. In this direction AMFI has taken an appreciable step by designing a

professional test which all mutual fund agents are to qualify. The investment strategy which is very conservative and committee type of decision making process also need to be reoriented. The opportunities opened by RBI for mutual funds to invest in markets abroad is to be tried in right perspective.They are to attain maturity to be global players.

15.9 TECHNOLOGY AND MUTUAL FUNDS IN INDIA

Mutual Funds world over are getting to be highly engineering process oriented. Technology is helping mutual funds to contain costs and develop new products using artificial intelligence and expert systems. Customer services are improving day by day with introduction of internet connectivity of mutual funds. All processes are faster and more accurate. Computer simulated training is being imparted to employees of mutual funds. UTI is managing its schemes through its network of 72 locations and registrar offices with a WAN based network using a V-sat hub. It is claimed that UTI has a 1 : 1 ratio of PCs to employees and has begun selectively using interactive-voice response system too. Mutual fund are striving to exploit fully the potential of electronic media . They are using electronic clearing system to directly crediting bank account of their investor with return on their investment. Funds accounting is totally computerized. Concept of call centres is gaining popularity. Investors sitting at their places can track performance of their investment in mutual fund through internet. AMFI has almost made compulsory to provide specified information about scheme and AMCs of respective mutual funds on AMFI website . SEBI gets proposal for new schemes of mutual funds as a soft copy also which is put on SEBI website for the convenience of investors.



15.10 LET US SUM UP

The basic purpose of mutual fund is to facilitate the investment process, specially of small investors besides acting as a mobilizing agent. To meet the varied needs of investors, different products/ schemes are offered. At initial stage mutual fund industry took the investors for granted but as

investors became disillusioned, mutual funds started mending their ways. Their day-today working is regulated by SEBI regulations which have been revised as and when need was felt to ensure better service and protection to investors. NAV is the basic parameter to comment on efficiency of mutual funds. Primarily mutual funds should strive for better performance as an institutional investor as compared to performance what one average individual can attain. Efforts should be made by them to minimise the operating expenses to maximise the returns. Governance of mutual funds is a continuous challenge for the industry and AMFI.



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15.12 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q1: Mutual Fund is a non-fund based special type of institution which acts as an investment conduit.

Ans to Q2: A distinct advantage of a mutual fund over other investments is that there is always a market for its units/shares. Mutual funds provide investors flexible investment opportunities.Many schemes of mutual funds provide tax shelter.

Ans to Q3: Growth Funds aim at appreciation in the value of the underlying investments through capital appreciation.

Ans to Q4: The parameters of performance of a mutual fund are measured are: NAV,Load, Disclosures, Returns and Beta.

Ans to Q5: Returns are earned in form of

(a) appreciation in value of investments made by mutual funds and

(b) dividend or interest received on the investment made.

Ans to Q6: Load is the charge levied on those who purchase units of a scheme after the initial issue of the scheme.



15.13 MODEL QUESTION

1) Discuss the features of different types of schemes which a mutual fund normally launches.
2) SEBI (MF) Regulations ensured diversification of portfolio. Identify the specific provisions for this and their need.
3) 'SEBI (MF) Regulations have made trustees more responsible.'. Discuss.
4) What provisions do you think are there in SEBI regulations to protect the interest of investors.
5) Write a critical note on the growth of mutual funds in India.
6) Explain:
   Net Asset Value
   Close-ended Scheme
   Asset Management Company.

*** ***** ***



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