LOVELY PROFESSIONAL UNIVERSITY

SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

Edited By
Dr. Mahesh Kumar Sarva

Printed by
EXCEL BOOKS PRIVATE LIMITED
A-45, Naraina, Phase-I,
New Delhi-110028
for

Lovely Professional University
Phagwara

SYLLABUS

Security Analysis and Portfolio Management

Objectives: This course aims to provide a basic knowledge of the theories and practices of modern portfolio choice and investment decision. The course will acquaint students with some fundamental concepts such as risk diversification, portfolio selection, capital asset pricing model etc. The students are also expected to be able to apply certain techniques to evaluate and analyse risk and return characteristics of securities such as individual stocks, mutual funds, and government and corporate bonds.

S. No.	Description
1.	Introduction to Security Analysis
2.	Fundamental Analysis(Economic Analysis, Industry Analysis, Company Analysis)
3.	Equity valuation models (balance sheet valuation, dividend discount model, free cash flow models, earnings)
4.	Technical Analysis (Charting techniques & technical indicators), Efficient Market Theory
5.	Introduction to Portfolio Management, Portfolio Analysis
6	Capital Asset Pricing Theory (CML & SML)
7	Arbitrage Pricing Theory
8	Models (Markowitz risk-return optimization Single Index Model, Two factor and multi factor models)
9	Portfolio Performance Evaluation
10	Portfolio Revision

CONTENT

Unit 1:	Introduction to Capital Market *Mahesh Kumar Sarva, Lovely Professional University*	1
Unit 2:	Risk and Return *Mahesh Kumar Sarva, Lovely Professional University*	58
Unit 3:	Introduction to Security Analysis *Mahesh Kumar Sarva, Lovely Professional University*	93
Unit 4:	Fundamental Analysis *Mahesh Kumar Sarva, Lovely Professional University*	109
Unit 5:	Equity Valuation Models *Mahesh Kumar Sarva, Lovely Professional University*	148
Unit 6:	Technical Analysis *Dilfraz Singh, Lovely Professional University*	165
Unit 7:	Efficient Market Theory *Neha Khosla, Lovely Professional University*	196
Unit 8;	Derivatives *Dilfraz Singh, Lovely Professional University*	217
Unit 9:	Portfolio Management *Tanima Dutta, Lovely Professional University*	243
Unit 10:	Portfolio Analysis *Dilfraz Singh, Lovely Professional University*	257
Unit 11:	Capital Market Theory *Tanima Dutta, Lovely Professional University*	268
Unit 12:	Models *Neha Khosla, Lovely Professional University*	297
Unit 13:	Portfolio Performance Evaluation *Tanima Dutta, Lovely Professional University*	314
Unit 14:	Portfolio Revision *Dilfraz Singh, Lovely Professional University*	332

Unit 1: Introduction to Capital Market

Notes

CONTENTS

Objectives

Introduction

1.1 Capital Market

1.2 New Issue Market

1.2.1 Functions of New Issue Market

1.2.2 Methods of Floating New Issues

1.2.3 Non-voting Shares

1.2.4 Bought Out Deal

1.3 Stock Exchanges

1.3.1 Stock Market in India

1.3.2 Stock Market Indices

1.3.3 Role and Stock Exchange Functions

1.3.4 Membership, Organization and Management

1.3.5 Trading System

1.3.6 Stock Market Information System

1.3.7 Principal Weaknesses of Indian Stock Market

1.3.8 Directions to Reform the Functioning of Stock Exchanges

1.3.9 National Stock Exchange of India Ltd.

1.3.10 Over the Counter Exchange of India (OTCEI)

1.3.11 Inter-connected Stock Exchange of India

1.3.12 Demutualisation of Stock Exchanges

1.4 Investment Alternatives

1.5 Dematerialization

1.6 Summary

1.7 Keywords

1.8 Self Assessment

1.9 Review Questions

1.10 Further Readings

Notes

Objectives

After studying this unit, you will be able to:

- Define Capital market
- Explain introduction to new issue market
- Discuss functions of new issues market
- Describe methods of floating new issues
- Explain Stock Exchanges
- State reforms in Indian Stock Exchanges

Introduction

In every economic system, some units which may be individual or institutions are surplus-generating, others are deficit-generating. Surplus-generating units are called savers while deficit-generators are called spenders. In our country, at spectral level, households are surplus-generating while corporate and government are deficit generating. This is, however, true only at an aggregate level. You would definitely come across individual households who are deficit generating and corporate bodies who are surplus generating at some point of time. The question that arises here is: What do the surplus-generating units do with their surpluses or savings? You can now imagine that they have only two alternatives before them. They can either invest or hold their savings in the form of liquid cash. Holding liquid cash is required to meet transactionary, or precautionary or speculative needs. The surplus-generating units could invest in different forms. They could invest in physical assets viz. land and buildings, plant and machinery or in precious metals viz. gold and silver, or in financial assets viz. shares and debentures, units of the Unit Trade India, treasury bills, commercial paper etc.

A capital market is a market for securities (both debt and equity), where business enterprises (companies) and governments can raise long-term funds. It is defined as a market in which money is lent for periods longer than a year, as the raising of short-term funds takes place on other markets (e.g., the money market).

1.1 Capital Market

The market where investment funds like bonds, equities and mortgages are traded is known as the capital market. The primal role of the capital market is to channelize investments from investors who have surplus funds to the ones who are running a deficit. The capital market offers both long-term and overnight funds. The capital market is the market for securities, where companies and governments can raise long-term funds. It is a market in which money is lent for periods longer than a year.

There are a number of capital market instruments used for market trade, including equity instruments, credit market instruments, insurance instruments, foreign exchange instruments, hybrid instruments and derivative instruments. These are used by the investors to make a profit out of their respective markets.

All of these are called capital market instruments because these are responsible for generating funds for companies, corporations, and sometimes national governments.

This market is also known as securities market because long-term funds are raised through trade on debt and equity securities.

Notes

These activities may be conducted by both companies and governments.

Capital Market consists of primary market and secondary market. In primary market newly issued bonds and stocks are exchanged and in secondary market buying and selling of already existing bonds and stocks take place.

Caution Many people divide the Capital Market into Bond Market and Stock Market.

Bond Market provides financing by bond issuance and bond trading.

Stock Market provides financing by shares or stock issuance and by share trading.

As a whole, Capital Market facilitates raising of capital through the trading of long-term financial assets.

1.2 New Issue Market

The New Issue Market or NIM is also called the primary capital market. The securities which are introduced in the market are sold for first time to the general public in this market. This market is also known as the long-term debt market as the fund raised from this market provides long-term capital.

Corporate entities may raise capital in the primary market by way of an initial public offer, rights issue or private placement. An Initial Public Offer (IPO) is the selling of securities to the public in the primary market. This Initial Public Offering can be made through the fixed price method, book-building method or a combination of both.

In case the issuer chooses to issue securities through the book-building route, then as per SEBI guidelines, an issuer company can issue securities in the following manner:

1. 100% of the net offer to the public through the book-building route.
2. 75% of the net offer to the public through the book-building process and 25% through the fixed price portion.

The industrial securities markets in India consist of new issue market and stock exchange. The new issue market deals with the new securities, which were not previously available to the investing public, i.e. the securities that are offered to the investing public for the first time. The market, therefore, makes available a new block of securities for public subscription. The other words, new issue market deals with the raising of fresh capital by companies either for cash or for consideration other than cash.

The new issue market encompasses all institution dealing in fresh claim. The forms in which these claims are created are equity shares, preference shares, debentures, rights issues, deposits etc. All financial institutions, which contribute, underwrite and directly subscribe to the securities, are part of new issue markets.

1.2.1 Functions of New Issue Market

The main function of new issue market is to facilitate transfer resources from savers to the users. The savers are individuals, commercial banks, insurance company etc. the users are public limited companies and the government. The new issue market plays an important role in mobilizing the funds from the savers and transferring them to borrowers for production purposes, an important requisite of economic growth. It is not only a platform for raising finance to

Notes

establish new enterprises, but also for expansion/diversification/modernizations of existing units. On this basis, the new market can be classified as:

1. A market where firms go to the public for the first time through Initial Public Offering (IPO).
2. A market where firms which are already trade raise additional capital through Seasoned Equity Offering (SEO).

The main function of new issue market can be divided into three service functions:

1. Origination
2. Underwriting
3. Distribution

1. ***Origination:*** Origination refers to the work of investigation, analysis and processing of new project proposals. Origination starts before an issue is actually floated in the market. There are two aspects in these functions:

   (a) A careful study of the technical, economic and financial viability to ensure soundness of the project. This is a preliminary investigation undertaken by the sponsors of the issue.

   (b) Advisory services which improve the quality of capital issues and ensure its success. The advisory services include:

      (i) Type of issue this refers to the kind of securities to be issued whether equity share, preference share, debenture or convertible debenture.

      (ii) Magnitude of issue

      (iii) Time of floating an issue

      (iv) Pricing of an issue - whether shares are to be issued at per or at premium

      (v) Methods of issue

      (vi) Technique of selling the securities

   The function of origination is carried out by merchant bankers, who may be commercial banks, all Indian financial institutions, or private firms. Initially, specialized division of commercial banks provided this service. At present, financial institutions and private firms also perform this service. Though this service is highly important, the success of the issue depends, to a large extent, on the efficiency of the market.

   The origination itself does not guarantee the success of the issue. Underwriting, a specialized service is required in this regard.

2. ***Underwriting:*** Underwriting is an agreement whereby the underwriter promises to subscribe to a specified number of shares or debentures or a specified amount of stock in the event of public not subscribing to the issue. If the issue is fully subscribed then there is no liability for the underwriter. If a part of share issues remain unsold, the underwriter will buy these shares. Thus underwriting is a guarantee for the marketability of shares.

   Method of Underwriting

   An underwriting agreement may take any of the following three forms:

   (a) *Standing behind the issue*: Under this method, the underwriter guarantees the sale of a specified number of shares within a specified period. If the public do not subscribe to the specified amount of issue, the underwriter buys the balance in the issue.

Notes

(b) *Outright purchase:* The underwriter, in this method, makes outright purchase of shares and resells them to the investors.

(c) *Consortium method:* Underwriter is jointly done by a group of underwriters in this method. The underwriters form syndicate for this purpose. This method is adopted for large issue.

Advantages of Underwriting

Underwriting assumes great significance as it offers the following advantages to the issuing company.

(a) The issuing company is relieved from the risk of finding buyers for the issue offered to the public. The company is assured of raising adequate capital.

(b) The company is assured of getting minimum subscription within the stipulated time, a statutory time, a statutory obligation to be fulfilled by the issuing company.

(c) Underwriters undertake the burden of highly specialized function of distributing securities.

(d) Provide expect advice with regard to timing of security issue, the pricing of issue, the size and type of securities to be issued etc.

(e) Public confidence on the issue enhances when underwritten by reputed underwriters.

Notes The underwriters in India may be classified into two categories:

1. Institutional underwriters
2. Non-institutional underwriters.

The institutional underwriters are:

(a) Life Insurance Corporation of India (LIC)

(b) Unit Trust of India (UTI)

(c) Industrial Development Bank of India (IDBI)

(d) Industrial Credit and Investment Corporation of India (ICICI)

(e) Commercial Banks and General Insurance Companies.

The pattern of underwriting of the above institutional underwriters differs vastly in India. LIC and UTI have purchased industrial securities from the new issue market with a view to hold them on their own portfolio. They have a preference for underwriting shares in large and well-established firms. The development banks have given special attention to the issues in backward states and industries in the priority list. The thrust of the development is towards states and industries in the priority list. The thrust of the development banks is also towards small and new issues, which do not have adequate support from other institutions. General insurance companies have shown preference in underwriting the securities of fairly new issues.

The non-institutional underwriters are brokers. They guarantee shares only with a view to earn commission from the company floating the issue. They are known to off-load the shares later to make a profit. The brokers work profit motive in underwriting industrial securities. After the elimination of forward trading, stock exchange brokers have begun to take an underwritten to the total private capital issue varying between 72 to 97%.

Notes

3. ***Distribution:*** Distribution is the function of sale of securities to ultimate investors. Brokers and agents who maintain regular and direct contact with the ultimate investors, perform this service.

1.2.2 Methods of Floating New Issues

The various methods which are used in the floating of securities in the new issue market are:

1. Public issues
2. Offer for sale
3. Placement
4. Rights issues

Let us understand them one by one.

1. ***Public issues:*** Under this method, the issuing company directly offers to the general public/ institutions a fixed number of shares at a stated price through a document called prospects. This is the most common method followed by join stock companies to raise capital through the issues of securities.

   (a) Name of the company

   (b) Address of the registered office of the company

   (c) Existing and proposed activities

   (d) Location of the industry

   (e) Names of directors

   (f) Authorized and proposed issue capital to the public

   (g) Dates of opening and closing the subscription list

   (h) Minimum subscription

   (i) Names of brokers/underwriters/bankers/managers and registrars to the issue.

   (j) A statement by the company that it will apply to stock exchange for quotations of its shares.

   According to the Companies Act, 1956 every application form must be accompanied by a prospects. Now, it is no longer necessary to furnish a copy of the prospectus along with every application forms as per the Companies Amendment Act, 1988. Now, an abridged prospectus is being annexed to every share application form.

   Merits of Issue through Prospectus

   (a) Sale through prospectus has the advantage of inviting a large section of the investing public through advertisement.

   (b) It is a direct method and no intermediaries are involved in it.

   (c) Shares, under this method, are allotted to a large section of investors on a non-discriminatory basis. This procedure helps in wide dispersion of shares and to avoid concentration of wealth in few hands.

Notes

Demerits

(a) It is an expensive method. The company has to incur expenses on printing of prospects, advertisement, banks commission, underwriting commission, legal charges, stamp duty listing fee and registration charges.

(b) This method is suitable only for large issues.

2. ***Offer for sale:*** The method of offer for sale consists in outright sale of securities through the intermediary of issue houses or share brokers. In other words, the shares are not offered to the public directly. This method consists of two stages: the first stage is a direct sale by the issuing company to the issue house and brokers at an agreed price. In the second stage, the intermediaries resell the above securities to the ultimate investors. The issue houses or stockbrokers purchase the securities at a negotiated price and resell at a higher price. The difference in the purchase and sale price is called turn or spread.

One chief advantage of this method is that the company is relieved from the problem of printing and advertisement of prospectus and making allotment of shares. Offer for sale is not common in India. This method is used generally in two instances:

(a) Offer by a foreign company of a part of it to Indian investors

(b) Promoters diluting their stake to comply with requirements of stock exchange at the time of listing of shares.

Follow on Public Offering (FPO)

When an existing listed company either makes a fresh issue of securities to the public or makes an offer for sale of securities to the public for the first time, through an offer document, such issues are called as 'Follow on Public Offering'. Such public issue of securities or offer for sale to public is required to satisfy the stock exchange listing obligations along with SEBI guidelines.

Rights Issue (RI): When a listed company proposes to issue securities to its existing shareholders, whose names appear in the register of members on record date, in the proportion to their existing holding, through an offer document, such issues are called 'Rights Issue'. This mode of raising capital is the best suited when the dilution of controlling interest is not intended.

Preferential Issue: A preferential issue is an issue of equity shares or of convertible securities by listed companies to a select group of persons, which is neither a rights issue nor a public issue. The issuer company has to comply with the provisions of the Companies Act, as well as SEBI's DIP guidelines with reference to preferential issues as contained in Chapter XIII.

A company that makes any public or rights issue or an offer for sale can issue shares only in a dematerialised form. A company shall not make a public or rights issue of shares unless all the existing partly paid shares have been fully paid-up or forfeited. A company, which is making public issue of securities, shall make an application to the stock exchange for listing of those shares.

Eligibility Norms for Public Issue: SEBI has laid down the eligibility norms for entities accessing the primary market through public issues. The entry norms for companies making initial public offer or follow-on public offer, are summarised as follows:

Entry Norm I

The company shall meet the following requirements:

(a) Net tangible assets of at least ₹ 3 crores for three full years.

Notes

(b) Distributable profits in at least three years.

(c) Net worth of at least ₹ 1 crore in three years.

(d) If change in name, at least 50% revenue for preceding 1 year should be from the new activity.

(e) The issue size does not exceed five times the pre-issue net worth.

To provide sufficient flexibility and also to ensure that genuine companies do not suffer on account of rigidity of the parameters, SEBI has provided two other alternative routes to company not satisfying any of the above conditions, for accessing the primary market.

Entry Norm II

(a) Issue shall be through book-building route, with at least 50% to be mandatorily allotted to the Qualified Institutional Buyers (QIBs).

(b) The minimum post-issue face value capital shall be ₹ 10 crores or there shall be a compulsory market-making for at least two years.

OR

Entry Norm III

(a) The 'project' is appraised and participated to the extent of 15% by FIs/Scheduled commercial banks of which at least 10% comes from the appraiser(s).

(b) The minimum post-issue face value capital shall be ₹ 10 crores or there shall be a compulsory market-making for at least 2 years.

In addition to satisfying the aforesaid eligibility norms, the company shall also satisfy the criteria of having at least 1000 prospective allottees in its issue.

Did u know? **Green Shoe Option**

Green Shoe Option denotes 'an option of allocating shares in excess of the shares included in the public issue'. It is an option allowing the issuing company to issue additional shares when the demand is high for the shares when the flotation is on. SEBI guidelines allow the issuing company to accept over subscription, subject to a ceiling, say 15% of the offer made to public. In certain cases, the Green Shoe Option can be even more than 15%. It is extensively used in international IPOs to stabilise the post-listing price of new issued shares. The concept has been introduced in the Indian capital market and is used in initial public offerings through book-building process. SEBI has allowed the use of the option with a view to boost the investors' confidence and to put a check for speculative practices causing short-term volatility in post listing price. The Green Shoe Option facility would bring in price stability of initial public offerings.

Kinds of Offer Documents

An offer document means 'prospectus' in case of a public issue or an offer for sale and 'letter of offer' in case of rights issue, which is required to be filed with the Registrar of Companies (ROC) and Stock Exchanges. An offer document covers all the relevant information to help an investor in making wise investment decisions.

(a) *Draft Prospectus:* A company, before making any public issue of securities, shall file a draft prospectus with SEBI, through an eligible merchant banker, at least 21 days prior to the filing of prospectus with the Registrar of Companies. If any specific

Notes

changes are suggested by SEBI within the said 21 days, the issuing company or the lead merchant banker shall carryout such changes in the draft prospectus before filing the prospectus with ROC.

(b) *Draft Letter of Offer:* A listed company, before making any rights issue for an amount exceeding ₹ 50 lakhs (including premium) shall file a draft letter of offer with SEBI, at least 21 days prior to the filing of the letter of offer with regional stock exchange and shall carry changes as suggested by SEBI before the filing of the draft letter of offer with regional stock exchange.

(c) *Prospectus:* A company issuing shares to public must issue a 'prospectus'. The prospectus is an 'invitation' to offer. It is an invitation to the public to take shares or debentures in the company or deposit money in the company. Section 2(36) of the Companies Act, 1956 defines a prospectus as "any document described or issued as a prospectus and includes any notice, circular, advertisement or other document inviting deposits from the public or inviting offers from the public for the subscription or purchase of any shares in, or debentures of, a body corporate." Section 56 of the Companies Act provides that every prospectus must disclose matters specified in Schedule II.

(d) *Abridged Prospectus:* Section 2(1) of the Companies Act, 1956 defines abridged prospectus as "a memorandum containing such salient features of a prospectus as may be prescribed." Abridged prospectus means the memorandum as prescribed in Form 2A under sub-section (3) of Section 56 of the Companies Act. It contains all the salient features of a prospectus. A company cannot supply application forms for shares or debentures unless the form is accompanied by abridged prospectus.

(e) *Shelf Prospectus:* Sometimes, securities are issued in stages spread over a period of time, particularly in respect of infrastructure projects where the size of issue is large, as huge funds have to be collected. In such cases, filing of prospectus each time will be very expensive. In such cases, Section 60A of the Companies Act 1956 allows a prospectus called 'Shelf Prospectus' to be filed with Registrar of Companies. At subsequent stages only 'Information Memorandum' is required to be filed. The shelf prospectus shall be valid for a period of 1 year from the date of opening of first issue of securities under that prospectus.

(f) *Information Memorandum:* The Information Memorandum shall contain all material facts relating to new charges created, changes in the financial position as have accrued between the first offer, previous offer and the succeeding offer. The Information Memorandum shall be filed with a period of three months prior to making of second or subsequent offer of securities under Shelf Prospectus. The Information Memorandum shall be issued to the public along with the Shelf Prospectus filed at the first stage of offer. Where an update of Information Memorandum is filed every time an offer of securities is made, such memorandum, together with the Shelf Prospectus shall constitute the Prospectus.

(g) *Red-herring Prospectus:* A prospectus is said to be a red-herring prospectus if it is one that contains all information as per the contents of the prospectus, but does not have information on price of securities offered and number of securities (quantum) offered through such document. Thus, a red-herring prospectus lacks price and quantity of the securities offered. This is used in book-building issues only. In the case of book-built issues, it is a process of price discovery and the price cannot be determined until the bidding process is completed. Hence, such details are not shown in red-herring prospectus filed with ROC in terms of the provisions of the Companies Act. Only upon completion of the bidding process are the details of the final price

Notes

included in the offer document. The offer document filed thereafter with ROC is called a 'prospectus'.

Promoters

A 'promoter' has been defined as a person or group of persons who are instrumental in formation of the company, who enable the company to start its commercial operations by bringing in the necessary funds required for the concern. The promoters are in the overall control of the company, whose names are mentioned in the offer document. Any director or officer discharging their functions in their professional capacity cannot be termed as promoter. The meaning of the term 'promoter' is wide enough to cover the following relationships:

(a) 'Promoter group' includes promoter, an immediate relative of the promoter (i.e. any spouse of that person, or any parent, brother, sister or child of the person or of the spouse).

(b) In case, promoter is a company, a subsidiary or holding company of that company.

(c) Any company in which the promoter holds 10% or more of the equity capital or which holds 10% or more of the equity capital of the promoter.

(d) Any company in which a group of individuals or companies or combinations thereof who holds 20% or more of the equity capital in that company also holds 20% or more of the equity capital in that company also holds 20% or more of the equity capital of the issuer company.

(e) In case, the promoter is an individual, any company in which 10% or more of the share capital is held by the promoter or an immediate relative of the promoter or a firm or HUF in which the promoter or any one or more of his immediate relative is a member.

Promoters' Contribution

Promoters' contribution in any public issue shall be in accordance with the following provisions under SEBI's DIP Guidelines:

(a) *Unlisted companies:* In the public issue, the promoters shall contribute not less than 20% of the post issue capital.

(b) *Offers for sale:* The promoters' share holding after offer for sale shall not be less than 20% of post issue capital.

(c) *Listed companies:* The promoters' shall participate either to the extent of 20% of the proposed issue or ensure post-issue shareholding to the extent of 20% of the post-issue capital.

(d) *Composite issues of listed companies:* The promoters' contribution shall at the option of the promoters be either 20% of the proposed public issue or 20% of the post issue capital. Rights issue component of the composite issue shall be excluded while calculating the post issue capital.

Free Pricing of Issues

In the post-liberalisation era, the companies are free to make any issue of capital in the form they like and they can freely price the issues. The companies eligible to make public issue can freely price their equity shares or any security convertible at a later date into equity shares as stipulated in Chapter III of SEBI (Disclosure and Investor Protection) Guidelines, 2000. As per the guidelines, the issuer can fix-up issue price in consultation of

Notes

with merchant banker, subject to giving full disclosures of the parameters which have considered while deciding the issue price. The basis of issue price is disclosed in the offer document where the issuer discloses in detail about the qualitative and quantitative factors justifying the issue price.

Price Band

The issuer company can mention a price band of 20% (cap in the price band should not be more than 20% of the floor price) in the offer document filed with SEBI and actual price can be determined at a later date before filing the offer document with ROC.

Differential Pricing of an issue where one category is offered at a price different from the other category is called 'differential pricing'. "The SEBI (Disclosure and Investor Protection) Guidelines, 2000 allows the differential pricing only if the securities to applicants in the firm allotment category is at a price higher than the price at which the net offer to the public means the offer made to the Indian public, and does not include firm allotments or reservations or promoters' contribution."

Task Think about the advantages and disadvantages of the pricing and enlist each of them.

Lock-in Period

'Lock- in' indicates the freeze on transfer of shares. SEBI (Disclosure and Investor Protection) Guidelines, 2000 have stipulated lock-in requirement as to specified percentage of shares subscribed by promoters with a view to avoid unscrupulous floating of securities and to ensure the promoters involved in the issue continue have controlling a interest in the company, which can be subjected to legal compliances. The lock-in requirement provisions of the said guidelines are summarised below:

Lock-in of Minimum Specified Promoters Contribution in Public Issues

(a) In case of any issue of capital to the public the minimum promoter contribution shall be locked in for a period of three years.

(b) The lock-in shall start from the date of allotment in the proposed public issue and the last date of the lock-in shall be reckoned as three years from the date of commencement of commercial production or the date of allotment in the public issue, whichever is later.

(c) "The date of commencement of commercial production" means the last date of the month in which commercial production in a manufacturing company is expected to commence as stated in the offer document.

Lock-in of Excess Promoters' Contribution

(a) In case of public issue by unlisted company, if the promoter's contribution in the proposed issue exceeds the required minimum contribution, such excess contribution shall also be locked-in for a period of one year.

(b) In case of public issue by a listed company, participation by promoters in proposed public issue in excess of the required minimum percentage shall also be locked-in for a period of one year.

(c) In case the promoter meets a shortfall in the firm allotment category, such subscription shall be locked-in for a period of one year.

Notes

(d) The securities forming part of promoters' contribution and issued last to the promoters shall be locked-in first for the specified period.

(e) The securities issued to the financial institutions appearing as promoters, if issued last, shall not be locked-in before the shares allotted to the other promoters.

Lock-in of Pre-issue Share Capital of an Unlisted Company

(a) The entire pre-issue share capital, other than that locked in as promoters' contribution, shall be locked-in for a period of one year from the date of commencement of commercial production or the date of allotment in the public issue, whichever is later.

(b) The above provision is not applicable to the pre-issue share capital held by venture capital funds and foreign venture capital investors.

(c) The above provision is also not applicable if shares are held for a period of at least one year at the time of filing draft offer document with SEBI and being offered to the public through offer for sale.

Notes

E-IPO

The companies are now allowed to issue capital to the public through the on-line system of the stock exchanges. For making such on-line issues, the companies should comply with the provisions contained in Chapter 11A of SEBI (Disclosure and Investor Protection) Guidelines, 2000. The appointment of various intermediaries by the issuer includes a prerequisite that such members/registrars have the required facilities to accommodate such an on-line issue process.

Qualified Institutional Buyers (QIBs)

Qualified Institutional Buyers are those institutional investors who are generally perceived to possess expertise and the financial muscle to evaluate and invest in the capital market. As per the SEBI guidelines, QIBs shall mean the following:

(a) Public Financial Institution as defined in Section 4A of the Companies Act, 1956

(b) Scheduled Commercial Banks

(c) Mutual Funds

(d) Foreign Institutional Investors registered with SEBI

(e) Multilateral and bilateral development financial institutions

(f) Venture capital funds registered with SEBI

(g) Foreign venture capital investors registered with SEBI

(h) State Industrial Development Corporations

(i) Insurance companies registered with the Insurance Regulatory and Development Authority (IRDA)

(j) Provident Funds with a minimum corpus of ₹ 25 crores

(k) Pension Funds with minimum corpus of ₹ 25 crores.

Notes

These entities are not required to register with SEBI as QIBs. Any entities falling under the categories specified above are considered as QIBs for the purpose of participating in primary issuance process.

3. ***Placement:*** Under this method, the issue houses or brokers buy the securities outright with the intention of placing them with their clients afterwards. Here, the brokers act as almost wholesalers selling them in retail to the public. The brokers would make profit in the process of reselling to the public. The issue houses or brokers maintain their own list of client and through customer contact sell the securities.

   Placement has the following advantages:

   (a) Timing of issue is important for successful floatation of shares. In a depressed market conditions when the issues are not likely to draw public response though prospectus, placement method is a useful method of floatation of shares.

   (b) This method is suitable when small companies issue their shares.

   The main disadvantage of this method is that the securities are not widely distributed to a large section of investors. A selected group of small investors are able to buy a large number of shares and get majority holding in a company.

   This method of private placement is used to a limited extent in India. The promoters sell the shares to their friends, relatives and well-wishers to get minimum subscription which is a precondition for issue of shares to the public.

Did u know? What has been the reason behind, the high rate of growth of private placements has been higher than public issues as well as right issues during the last few years in India?

1. ***Accessibility:*** Whether it is a public limited company, or a private limited company, or whether it is listed company or an unlisted one, it can easily access the private placement market. It can accommodate issues of smaller size, whereas public issue does not permit issue below a certain minimum size.

2. ***Flexibility:*** There is a greater flexibility in working out the terms of issue. A private placement results in the sale of securities by a company to one or few investors. In case of private placement, there is no need for a formal prospectus as well as underwriting arrangements. Generally, the terms of the issue are negotiated between the company (issuing securities) and the investors. When a nun-convertible debenture issue is privately placed, a discount may be given to institutional investor to make the issue attractive.

3. ***Speed:*** The time required, for completing a public issue is generally 6 months or more because of several formalities that have to be gone through. On the other hand, a private placement requires lesser time.

4. ***Lower Issue Cost:*** A public issue entails several statutory and non-statutory expenses associated with underwriting, brokerages etc. The sum of these costs used to work out even up to 10 percent of issue. For a company going for a private placement it is substantially less.

Book-building – About Book-building

Book-building is basically a capital issuance process used in Initial Public Offer (IPO), aiding price and demand discovery. It is a process used for marketing a public offer of equity shares of a company. It is a mechanism wherein, during the period for which the

Notes

book for the IPO is open, bids are collected from investors at various prices, which are above or equal to the floor price. The process aims at tapping both wholesale and retail investors. The offer/issue price is then determined after the bid closing date based on certain evaluation criteria.

Process:

(a) The issuer who is planning an IPO nominates a lead merchant banker as a 'book runner'.

(b) The issuer specifies the number of securities to be issued and the price band for orders.

(c) The issuer also appoints syndicate members with whom orders can be placed by the investors.

(d) Investors place their order with a syndicate member who inputs the orders into the 'electronic book'. This process is called 'bidding' and is similar to open auction.

(e) A book should remain open for a minimum of five days.

(f) Bids cannot be entered less than the floor price.

(g) The bidder can revise bids before the issue closes.

(h) On the close of the book-building period, the book runner evaluates the bids on the basis of the evaluation criteria which may include:

   (i) Price aggression

   (ii) Investor quality

   (iii) Earliness of bids, etc.

(i) The book runner and the company conclude the final price at which it is willing to issue the stock and allocation of securities.

(j) Generally, the number of shares is fixed; the issue size gets frozen based on the price per share discovered through the book-building process.

(k) Allocation of securities is made to the successful bidders.

(l) Book-building is a good concept and represents a capital market that is in the process of maturing.

Notes Rules governing book-building are covered in Chapter XI of the Securities and Exchange Board of India (Disclosure and Investor Protection) Guidelines 2000.

BSE's Book-building System

(a) BSE offers the book-building services through the book-building software that runs on the BSE private network.

(b) This system is one of the largest electronic book-building networks anywhere spanning over 350 Indian cities through over 7,000 Trader Work Stations via eased lines, VSATs and Campus LANS.

Notes

(c) The syndicate member brokers operate the software through book-runners of the issue and through this book, the syndicate member brokers on behalf of themselves or their clients' place orders.

(d) Bids are placed electronically through syndicate members and the information is collected on line real-time until the bid date ends.

(e) In order to maintain transparency, the software provides visual graphs displaying price v/s quantity on the terminals.

Differences between shares offered through book-building and offer of shares through normal public issue:

Features	Fixed Price Process	Book-building Process
Pricing	The price at which the securities are offered/allotted is known in advance to the investor.	The price at which securities will be offered/allotted is not known in advance to the investor. Only an indicative price range is known.
Demand	Demand for the securities offered is known only after the closure of the issue.	Demand for the securities offered can be known everyday as the book is built.
Payment	Payment if made at the time of subscription whereas refund is given after allocation.	Payment only after allocation.

Safety Net

Safety net is a scheme under which a person or a company (generally a finance company) undertakes to buy shares issued and allotted in a new issue from the allottees at a stipulated price. This is an agreement in relation to an issue of equity shares. The main feature of the safety net is to provide the equity investors safety of their investments from fall of the share price below the issue price. This facility will be generally provided in a bear market environment. Closely-held companies that are going to issue snares to the public for the first time may also provide safety net facility to the investors in their shares where the investors have no benchmark price to go by and therefore the safety net would provide them a sort of confidence regarding safety of their investment into equity shares. The safety net scheme generally puts provision for buying back the shares at a price lower than the issue price, and the difference will be the premium to the buyer for the risk taken in purchase of shares back from the investors.

Stockinvest

In case of oversubscription of issue, there have been inordinate delays in refund of excess application money and large amounts of investors' funds remain locked up in companies for long periods, affecting the liquidity of the investing public. To overcome the said problem a new instrument called 'stockinvest' is introduced. The stockinvest is a non-negotiable bank instrument issued by the bank in different denominations. The investor who has a savings or current account with the bank will obtain the stockinvest in required denominations and will have to enclose it with the share/debenture application. The face of the instrument provides for space for the investor to indicate the name of the issues, the number and amount of shares/debentures applied for and the signature of the investor. The stockinvests issued by the bank will be signed by it and the date of issue will also be indicated on the instruments. Simultaneously with the issue of stockinvest, the bank will mark a lien for the amounts of stockinvest issued in the deposit account of the investor. On full or partial allotment of shares to the investor, the Registrar, to issue, will fill the columns of stockinvest indicating the entitlement for allotment of shares/debentures, in terms of number, amount and application number and send it for clearing.

Notes

The investor's bank account would get debited only after the shares/debentures allotted. In respect of unsuccessful applicants, the funds continue to remain in their account and earn interest if the account is a savings or a term deposit. The excess application money of partly successful applicants also, will remain in their accounts. There will be lien on the funds for a maximum of four months period. The stockinvest is intended to be utilised only by the account holders and it should not be handed over to any third party for use. In case the cancelled/partly utilised stockinvest is not received by an investor from the Registrar, lien will be lifted by the issuing branch upon expiry of four months from the date of issue against an indemnity bond from the investor.

4. ***Rights Issues:*** If an existing company intends to raise additional funds, it can do so by borrowing or by issuing new shares. One of the most common methods for a public company to use is to offer existing shareholders the opportunity to subscribe further shares. This mode of raising finance is called 'Rights Issues'. The existing shareholders have right to entitlement of further shares in proportion to their existing shareholding. The rights of entitlement of a shareholder, who does not want to buy the right shares, can be sold to someone else. The price of rights shares will be generally fixed above the nominal value, but below the market price of the shares. The issue of quoted shares at below the nominal value is not allowed, and it would be rare for this to happen for unquoted shares. Section 81 of the Companies Act provides for the further issue of shares to be first offered to the existing members of the company, such shares are known as 'right shares' and the right of the members to be so offered is called the 'right of pre-emption.'

Section 81 of the Companies Act, 1956 deals with the provisions relating to rights issues.

(a) Any company

(i) Which has completed two years after its incorporation or

(ii) Which has completed one year from the first allotment of shares after its incorporation

(b) Whichever is earlier, if it proposes to increase its subscribed capital by allotment of further shares, then the subsequent provisions shall apply.

(c) Those further shares shall be first be offered to the existing shareholders in proportion to the shares held by them in the paid up capital, on the date of such offer.

(d) At least 15 days notice shall be given from the date of offer. The notice shall specify the number of shares offered and the limiting time of the offer.

(e) The notice shall mention that if the offer is not accepted within the time of offer, will be deemed to have been declined.

(f) Unless the articles of the company otherwise mention, such offer has the right of renunciation.

(g) The notice of offer shall contain a statement a renunciation.

(h) If it is declined to accept the offer, the board of directors may dispose of those shares in such manner, as they deem most beneficial to the company.

Reasons for a Rights Issue

The main reasons of making a rights issue by a company are as follows:

(a) In times of inflation, the replacement costs of assets will be high; unless the company can retain cash from substantial profits, the only alternative is to raise cash from a fresh issue of shares.

Notes

(b) For funding expansion projects, a company may make a rights issue.

(c) If a company has a proportion of interest-bearing loan capital, it can suffer from a squeeze on profits. The company can improve its capital structure position by obtaining extra share capital.

(d) At a time when the share prices were relatively high, companies found it easy to persuade their shareholders to subscribe cash for new issues with a view to expansion by takeover.

Advantages of Rights Issue

To Companies: The company benefits from lower issue costs, in that administration and underwriting costs are lower and the issue is made at the discretion of the directors rather than via a general meeting of the company. This is because issues of equity through the stock exchange will alter the balance of ownership.

To the shareholders: The main attraction of the rights issue for current shareholders is that they are able to maintain their original proportion of share ownership. Furthermore, any transfer of wealth away from them due to an equity issue being under-priced, is avoided.

In order to make a rights issue the company, when making the offer, must detail the reasons for the issue, the terms of the offer, the capital structure of the company at the time of issue, the future prospects for the company, and forecasts of future dividends. The Board of Directors sets the number of shares needed to be bought under the pre-emptive right by the existing shareholders in proportion to their existing shares held. The ratio is determined using a simple calculation.

$$N = \frac{\text{Number of outstanding shares}}{\text{Number of new shares to be offered}}$$

Where, N = Number of rights needed to buy one new share

Long-dated Rights

The long-dated rights are a dilutive anti-takeover device in which rights are automatically distributed to existing stockholders during hostile takeover. These 'poison pills' are automatically exercised when during a hostile takeover, a company or an investor acquires a certain percentage of shares, thereby diluting the takeover.

Case Study

TOUAX Success of Rights Issue

TOUAX is a French company and is currently Europe's no. 1 in shipping containers and river barges, and no. 2 in modular buildings and freight railcars. The Group provides operating leases to customers around the world, both on its own account and for third-party investors.

On June 24, 2009, TOUAX announced that its capital increased by waiving preferential subscription rights but with priority for existing shareholders, launched on 18 th June 2009 for a total of E17,851,519.76 (gross) through the issue of 936,596 new shares which were subscribed in the entirety. Following partial application of the extension clause, 952,747 shares were placed or 101.72% of the issue; total proceeds were E18,159,357.82.

Contd...

Notes

This rights issue has enabled the Group to strengthen its financial structure, to position itself with advantage for possible acquisitions of tangible stock, and to grasp opportunities thrown up by the crisis (purchase of shipping containers, modular buildings, river barges and railcars, for hiring out on mainly long-term leases). 370,062 new shares allotted under absolute entitlement were subscribed or 39.51% of the total number of new shares on issue. Another 555,685 shares were applied for subject to cutting back in the event of over-subscription, and orders for these were all filled. Another 27,000 shares had been applied for by the general public, and following partial application of the extension clause it proved possible to fill orders for all of these.

As the result of the rights issue, TOUAX is well placed to respond to the boom in corporate outsourcing of non-core assets, and every day provides over 5,000 customers with quick and flexible leasing solutions. TOUAX is now listed on Euronext in Paris - NYSE Euronext Compartment C (ISIN Code FR0000033003), and features in the SBF 250 Index.

Questions

1. After analyzing the case, do you think all the companies that can afford, should opt for rights issue to improve their financial status?
2. What do analyse as the two main advantages of the rights issue?
3. What do think can be the risks posed by rights issue?

1.2.3 Non-voting Shares

Non-voting Shares (NVS) are an innovative instrument for raising funds, although prevalent in many developed countries for years. The non-voting shares are closely akin to preference shares that do not carry any voting rights nor is the dividend payable pre-determined. However, unlike preference capital, non-voting shares do not carry a pre-determined dividend. The payoff to the investor for the assumption of higher risk levels and the compensation for loss of control is the high rate of dividends payable to them. Companies that are shy of exposure over leveraged companies, new companies and closely held companies can find NVS useful. It may find favour with small investors, non-resident Indians, overseas corporate bodies, mutual funds etc. The investor gains in terms of higher dividends, purchase at advantageous low price, liquidity and capital appreciation.

Advantages

Various advantages envisaged for corporate entities and investors could be as follows:

1. Promoters of companies are likely to find favour with this instrument since it protects their controlling interest. The promoting groups of many companies generally do not expand as fast as they would like to because of their inability to raise large equity resources without losing control of the company. With the introduction of this new instrument, the promoters would be able to undertake large projects and implement them, thus giving boost to industrialisation. The availability of NVS would simultaneously reduce the existing management's fears of a hostile takeover.
2. A large number of average investors who hardly exercise their voting rights, especially in the case of companies, with a good dividend track record, or otherwise would find non-voting shares of well-managed companies and companies having reputed promoters an attractive instrument of savings. Additional dividend may also be offered as compensation.
3. Non-resident Indians/eligible corporate bodies in excess of the portfolio investment limits prescribed for them can also use NVS for investment. In view of the constraints of raising

Notes

funds from domestic sources and larger requirement of finance, NRIs can be motivated to invest in Indian companies through the mechanism of this instrument.

4. The mobilisation of funds through this instrument would also help companies to reduce their debt-equity ratio and thereby enhance their financial health and profitability. It will give them more leverage.
5. Increased borrowing power may be granted to companies.
6. It will give a new financial tool to the managements who do not want to shed their control or voting rights, as it enables the promoters to retain control over management while expanding equity base.
7. Lower cost of capital for companies.

Disadvantages

1. Foreign institutional investors and overseas corporate bodies may not be much interested in NVS because in case of liquidation, non-voting shareholders will not enjoy the same rights as equity shareholders do.
2. NVS on one side provide attraction to the issues, but this is an expensive option. The shares remain a permanent liability and may become voting shares by default. Investors have no power to challenge management. They will face reduced earning per share; further, there is no guarantee of dividend payment.
3. Investors may fall prey to the not so consistent profit-making companies and there may not be an adequate exit route available to investors in case of poor performing companies.
4. The creation of new class of equity i.e. NVS will certainly have an adverse impact on the earnings of the other members who own equity shares with voting right. Since, the non-voting shareholders will be offered higher rate of return, to that extent the distributable surplus available for the remaining shareholders will be reduced and thus it is not in the interest of the other shareholders, particularly those belonging to non-management group.
5. Since the quantum to be distributed as dividend will be higher in the case of NVS, the profits will also get reduced to that extent and correspondingly, transfer to reserves may go down. It will lessen the possibilities of augmented reserves and consequently the changes of issue of bonus shares may also get reduced.

Example: Wipro Ltd. has 1,00,000 equity shares outstanding and it plans to issue 20,000 new shares, then the number of rights needed to buy each new share is 5 (i.e., 1,00,000/20,000).

An investor who owns 4,000 shares (4 per cent) of the company's shares would have enough rights to buy 800 (i.e. 4,000/5) of the new shares. Upon subscribing to the new issue, the investor would own 4,800 shares, or 4% of the total 1,20,000 shares now outstanding. The investor's proportionate ownership is maintained.

1.2.4 Bought Out Deal

Bought Out Deal (BOD) is a process of investment by a sponsor or a syndicate of investors/ sponsors directly in a company. Such direct investment is being made with an understanding between the company and the sponsor to go for public offering in a mutually agreed time. Bought out deal, as the very name suggests, is a type of wholesale of equities by a company. A company allots shares in full or in lots to sponsors at a price negotiated between the company

Notes

and the sponsor(s). After a particular period of agreed upon between the sponsor and the company the shares are issued to the public by the sponsor with a premium. The holding cost of such shares by the sponsor may either be reimbursed by the company, or the sponsor may absorb the profit in part or full as per the agreement, arising out of the public offering at a premium. After the public offering, the shares are listed in one or more stock exchanges.

Advantages

Bought out deal is not only advantageous to the company going for it, but also it is advantageous to the sponsors and common investors.

1. The company has the advantage of using the fund immediately without waiting as in the case of direct public issue. In case of BOD, the company instantly obtains funds and is able to focus its attention on project implementation without worrying about the source of investment. Bought out deals are ideally suited for circumstances when money needs to be arranged quickly, without which the project may suffer. Lowering or eliminating issue cost from the preliminary expenses is another advantage to the company.
2. The time taken to raise money in the capital market by a company can be as much as six months and this time is very high for a company in a stage of infancy. The waste of time at the initial stage can be avoided by going for BOD.
3. In case of a new and untried product it is easier to convince an investment banker for an investment in the company rather than the general public. Thus, BOD is an innovative method of financing for such companies.
4. When the market sentiment is low and the secondary market is undergoing a bear phase, a company may not like to come to the market with a public issue. In such a case, BOD is a superior process to obtain funds for the company.
5. The merchant bankers also gain handsomely from a BOD. The merchant banks expect a return of around 30% from a BOD whereas private financing institutions expect a return of 40% to 60% from a BOD. The gains can be tremendous, provided the sponsors select proper issues and price it attractively to the investors.
6. The investors also gain from the BOD in a way that they get good issues where some merchant banker has already invested in it. The common investors do not have enough scope and information for proper evaluation of a company. The merchant bankers are professionals and can make proper appraisal of a company.

Drawbacks

A BOD may also be disadvantageous to a merchant banker as well to the promoter.

1. There is a fear of loss of control of management because the sponsor is a holder of a large chunk of equities at one time. The sponsor may also influence the policy decision, which may affect the functioning of the company.
2. The investment banker who has to off-load the equities in the primary market at a later date is entitled to ask for a higher price for the risk taken by him. But this price may scare away the common investors.
3. If a company does not perform as per the expectations of sponsor, or if the promoter does not cooperate with the sponsor later, the sponsor may have a tough time and may finds that its entire investment has been eroded.

Notes

4. If a merchant banker does not make proper analysis of the company, it may face a lot of problems with the BOD. Unless it evaluates all the risks associated with the project, there is every chance that the sponsor may burn its fingers.

Limitations

The book-building system has various limitations, some of which are summarised as follows:

1. Book-building is appropriate for mega issues only. In the case of small issues, the companies can adjust the attributes of the offer according to the preferences of the potential investors. It may not be possible in big issues, since the risk-return preference of the investors cannot be estimated easily.
2. The issuer company should be fundamentally strong and well-known to the investors.
3. The book-building system works very efficiently in matured market conditions. In such circumstances, the investors are aware of various parameters affecting the market price of the securities. But such conditions are not commonly found in practice.
4. There is a possibility of price rigging on listing as promoters may try to bail out syndicate members.

1.3 Stock Exchanges

A stock exchange is a corporation or mutual organization which provides "trading" facilities for stock brokers and traders, to trade stocks and other securities. Stock exchanges also provide facilities for the issue and redemption of securities as well as other financial instruments and capital events including the payment of income and dividends. The securities traded on a stock exchange include: shares issued by companies, unit trusts, derivatives, pooled investment products and bonds. To be able to trade a security on a certain stock exchange, it has to be listed there. Trade on an exchange is by members only. The initial offering of stocks and bonds to investors is by definition done in the primary market and subsequent trading is done in the secondary market. A stock exchange is often the most important component of a stock market.

1.3.1 Stock Market in India

From scattered and small beginnings in the 19th Century, India's stock market has risen to great heights. In 1990, we had 19 stock exchanges in the country. There were around 6,000 listed companies and the invested population stood around 15 million. You might be interested in knowing more about the growth stock market in India. What functions does it perform? What is the form of organization of stock exchanges in India? How are these administered? What is the trading system followed on these exchanges? We shall adding to these and other questions in the following sub-section.

Organizations and institutions, whether they are economic, social or political, are products of history events and exigencies. The continually replace and/or reform the existing organizations, so as to make them relevant and operational in contemporary situations. It is, therefore, useful to briefly acquaint ourselves origin and growth of the stock market in India.

1800-1865: The East India Company and few commercial banks floated shares sporadically, through a recognized brokers. The year 1850 marked a watershed. A wave of company flotations took over the market the number of brokers spurted to 60. The backbone of industrial growth and the resulting boom in share marked the general personality of the financial world, (Premchand Rouchand).

Notes

Stock market created a unique history: The entire market was gripped by what is known as "share fever". The American Civil War created cotton famine. Indian cotton manufacturers exploited this situation and exported large quantities of cotton. The resulting increase in export earnings opened opportunities for share investments. New companies started to come up. Excessive speculation and reckless buying became the order. This mania lasted up to 1865. It marks end of the first phase in Indian stock exchange history. With the cessation of the Civil War, demand for Indian cotton slumped abruptly. Shares became worthless of paper. To be exact, on July 1, 1865 all shares ceased to exist because all time bargains which were matured could be fulfilled.

We find another distinct phase during 1866-1900. The mania effect haunted the stock exchange during these 25 years. Above everything else, it led to foundation of a regular market for securities. Since the market was established in Bombay, it soon became and still is the leading and the most organized stock exchange in India. A number of stock brokers who geared up themselves, set up a voluntary organization in 1887, called Native Share and Stockbrokers Associations. The brokers drew up codes of conduct for brokerage business and mobilized private funds for industrial growth. It also mobilized funds for government securities (gilt-edged securities), especially of the Bombay Port Trust and the Bombay Municipality. A similar organization was started at Ahmedabad in 1894.

Political development gave a big fillip to share investment. The Swadeshi Movement led by Mahatma Gandhi encouraged indigenous trading and the business class to start industrial enterprises. As a result, Calcutta became another major centre of share trading. The trading was prompted by the coal boom of 1904-1908. Thus the third stock exchange was started by Calcutta stock brokers. During inter-war years demand of industrial goods kept increasing due to British involvement in the World Wars. Existing enterprises in steel and cotton textiles, woollen textiles, tea and engineering goods expanded and new ventures were floated. Yet another stock exchange was started at Madras in 1920.

The period 1935-1965 can be considered as the period of development of the existing stock exchanges in India. In this period, industrial development planning played the pivotal role of expanding the industrial and commercial state of the independence seven stock exchanges were functioning located in the major cities of the country. Between 1946 and 1990, 12 more stock exchanges were set up and, the country moved to form 19 stock exchanges by 1990.

Currently there are 23 stock exchanges in India, including the over the counter exchange of India for providing trading access to small and new companies. The minimum issued and paid up equity capital for a listed company has risen from ₹ 24 lakh in 1948 to ₹ 3 crore in 2009. The number of listed companies has crossed the 8000 figure and it is equally important to not that the network of Indian stock exchanges is spread through the length and width of the country.

1.3.2 Stock Market Indices

An Index is used to give information about the price movements of products in the financial, commodities or any other markets. Financial indexes are constructed to measure price movements of stocks, bonds, T-bills and other forms of investments. Stock market indexes are meant to capture the overall behaviour of equity markets. A stock market index is created by selecting a group of stocks that are representative of the whole market or a specified sector or segment of the market. An Index is calculated with reference to a base period and a base index value. Stock market indexes are useful for a variety of reasons. Some of them are:

1. They provide a historical comparison of returns on money invested in the stock market against other forms of investments such as gold or debt.

Notes

2. They can be used as a standard against which to compare the performance of an equity fund.
3. It is a lead indicator of the performance of the overall economy or a sector of the economy
4. Stock indexes reflect highly up to date information
5. Modern financial applications such as Index Funds, Index Futures, Index Options play an important role in financial investments and risk management

Why are indexes important?

If you invest in mutual funds or individual stocks then it's important to measure the performance of your investments against a relevant market index. If your investments consistently lag behind the index then it might be time to come up with a new investing strategy.

BSE: Bombay Stock Exchange is the oldest stock exchange in Asia What is now popularly known as the BSE was established as "The Native Share & Stock Brokers' Association" in 1875. Over the past 135 years, BSE has facilitated the growth of the Indian corporate sector by providing it with an efficient capital raising platform. Today, BSE is the world's number 1 exchange in the world in terms of the number of listed companies (over 4900). It is the world's 5th most active in terms of number of transactions handled through its electronic trading system. And it is in the top ten of global exchanges in terms of the market capitalization of its listed companies (as of December 31, 2009). The companies listed on BSE command a total market capitalization of USD Trillion 1.28 as of Feb, 2010. BSE is the first exchange in India and the second in the world to obtain an ISO 9001:2000 certifications. It is also the first Exchange in the country and second in the world to receive Information Security Management System Standard BS 7799-2-2002 certification for its BSE On-Line trading System (BOLT). Presently, we are ISO 27001:2005 certified, which is a ISO version of BS 7799 for Information Security. The BSE Index, SENSEX, is India's first and most popular Stock Market benchmark index. Exchange traded funds (ETF) on SENSEX, are listed on BSE and in Hong Kong. Futures and options on the index are also traded at BSE.

The launch of SENSEX in 1986 was later followed up in January 1989 by introduction of BSE National Index (Base: 1983-84 = 100). It comprised 100 stocks listed at five major stock exchanges in India - Mumbai, Calcutta, Delhi, Ahmedabad and Madras. The BSE National Index was renamed BSE-100 Index from October 14, 1996 and since then, it is being calculated taking into consideration only the prices of stocks listed at BSE. BSE launched the dollar-linked version of BSE-100 index on May 22, 2006.

CNX: The medium capitalized segment of the stock market is being increasingly perceived as an attractive investment segment with high growth potential. The primary objective of the CNX Madcap Index is to capture the movement and be a benchmark of the madcap segment of the market. CNX Madcap is computed using free float market capitalization* weighted method w.e.f. February 26, 2010, wherein the level of the index reflects the free float market value of all the stocks in the index relative to a particular base period. The method also takes into account constituent changes in the index and importantly corporate actions such as stock splits, rights, etc without affecting the index value. The CNX Madcap Index has a base date of Jan 1, 2003 and a base value of 1000.

S&P CNX Nifty: S&P CNX Nifty is a well diversified 50 stock index accounting for 23 sectors of the economy. It is used for a variety of purposes such as benchmarking fund portfolios, index based derivatives and index funds.

S&P CNX Nifty is owned and managed by India Index Services and Products Ltd. (IISL), which is a joint venture between NSE and CRISIL. IISL is India's first specialised company focused upon the index as a core product. IISL has Marketing and licensing agreement with standard & poor's (S&P), who world leaders are in index services.

Note: NIFTY consists of 50 top stocks from different sectors of NSE.

Notes

Company Name	Industry	Symbol	Series	ISIN Code
ACC Ltd.	Cement and Cement Products	ACC	EQ	INE012A01025
Ambuja Cements Ltd.	Cement and Cement Products	AMBUJACEM	EQ	INE079A01024
Axis Bank Ltd.	Banks	AXISBANK	EQ	INE238A01026
Bajaj Auto Ltd.	Automobiles - 2 and 3 Wheelers	BAJAJ-AUTO	EQ	INE917I01010
Bharat Heavy Electricals Ltd.	Electrical Equipment	BHEL	EQ	INE257A01018
Bharat Petroleum Corporation Ltd.	Refineries	BPCL	EQ	INE029A01011
Bharti Airtel Ltd.	Telecommunication - Services	BHARTIARTL	EQ	INE397D01024
Cairn India Ltd.	Oil Exploration/Production	CAIRN	EQ	INE910H01017
Cipla Ltd.	Pharmaceuticals	CIPLA	EQ	INE059A01026
DLF Ltd.	Construction	DLF	EQ	INE271C01023
Dr. Reddy's Laboratories Ltd.	Pharmaceuticals	DRREDDY	EQ	INE089A01023
GAIL (India) Ltd.	Gas	GAIL	EQ	INE129A01019
HCL Technologies Ltd.	Computers - Software	HCLTECH	EQ	INE860A01027
HDFC Bank Ltd.	Banks	HDFCBANK	EQ	INE040A01018
Hero Honda Motors Ltd.	Automobiles - 2 and 3 Wheelers	HEROHONDA	EQ	INE158A01026
Hindalco Industries Ltd.	Aluminium	HINDALCO	EQ	INE038A01020
Hindustan Unilever Ltd.	Diversified	HINDUNILVR	EQ	INE030A01027
Housing Development Finance Corporation Ltd.	Finance - Housing	HDFC	EQ	INE001A01036
I T C Ltd.	Cigarettes	ITC	EQ	INE154A01025
ICICI Bank Ltd.	Banks	ICICIBANK	EQ	INE090A01013
Infosys Technologies Ltd.	Computers - Software	INFOSYSTCH	EQ	INE009A01021
Infrastructure Development Finance Co. Ltd.	Financial Institution	IDFC	EQ	INE043D01016
Jaiprakash Associates Ltd.	Diversified	JPASSOCIAT	EQ	INE455F01025
Jindal Steel & Power Ltd.	Steel and Steel Products	JINDALSTEL	EQ	INE749A01030
Kotak Mahindra Bank Ltd.	Banks	KOTAKBANK	EQ	INE237A01028
Larsen & Toubro Ltd.	Engineering	LT	EQ	INE018A01030
Mahindra & Mahindra Ltd.	Automobiles - 4 Wheelers	M&M	EQ	INE101A01026
Maruti Suzuki India Ltd.	Automobiles - 4 Wheelers	MARUTI	EQ	INE585B01010
NTPC Ltd.	Power	NTPC	EQ	INE733E01010
Oil & Natural Gas Corporation Ltd.	Oil Exploration/Production	ONGC	EQ	INE213A01029
Power Grid Corporation of India Ltd.	Power	POWERGRID	EQ	INE752E01010
Punjab National Bank	Banks	PNB	EQ	INE160A01014
Ranbaxy Laboratories Ltd.	Pharmaceuticals	RANBAXY	EQ	INE015A01028
Reliance Capital Ltd.	Finance	RELCAPITAL	EQ	INE013A01015

Contd...

Notes

Reliance Communications Ltd.	Telecommunication - Services	RCOM	EQ	INE330H01018
Reliance Industries Ltd.	Refineries	RELIANCE	EQ	INE002A01018
Reliance Infrastructure Ltd.	Power	RELINFRA	EQ	INE036A01016
Reliance Power Ltd.	Power	RPOWER	EQ	INE614G01033
Sesa Goa Ltd.	Mining	SESAGOA	EQ	INE205A01025
Siemens Ltd.	Electrical Equipment	SIEMENS	EQ	INE003A01024
State Bank of India	Banks	SBIN	EQ	INE062A01012
Steel Authority of India Ltd.	Steel and Steel Products	SAIL	EQ	INE114A01011
Sterlite Industries (India) Ltd.	Metals	STER	EQ	INE268A01049
Sun Pharmaceutical Industries Ltd.	Pharmaceuticals	SUNPHARMA	EQ	INE044A01036
Suzlon Energy Ltd.	Electrical Equipment	SUZLON	EQ	INE040H01021
Tata Consultancy Services Ltd.	Computers - Software	TCS	EQ	INE467B01029
Tata Motors Ltd.	Automobiles - 4 Wheelers	TATAMOTORS	EQ	INE155A01014
Tata Power Co. Ltd.	Power	TATAPOWER	EQ	INE245A01013
Tata Steel Ltd.	Steel and Steel Products	TATASTEEL	EQ	INE081A01012
Wipro Ltd.	Computers - Software	WIPRO	EQ	INE075A01022

CNX Nifty Junior: It may be useful to think of the S&P CNX Nifty and the CNX Nifty Junior as making up the 100 most liquid stocks in India. As with the S&P CNX Nifty, stocks in the CNX Nifty Junior are filtered for liquidity, so they are the most liquid of the stocks excluded from the S&P CNX Nifty. The maintenance of the S&P CNX Nifty and the CNX Nifty Junior are synchronized so that the two indices will always be disjoint sets; i.e. a stock will never appear in both indices at the same time. Hence it is always meaningful to pool the S&P CNX Nifty and the CNX Nifty Junior into a composite 100 stock index or portfolio.

Note:

1. CNX Nifty Junior represents about 11.61 % of the Free Float Market Capitalization as on DEC 31, 2010.
2. The traded value for the last six months of all Junior Nifty stocks is approximately 13.18% of the traded value of all stocks on the NSE
3. Impact cost for CNX Nifty Junior for a portfolio size of ₹ 25 lakhs is 0.11%.

CNX 100: CNX 100 is a diversified 100 stock index accounting for 35 sector of the economy.

CNX 100 is owned and managed by India Index Services & Products Ltd. (IISL). Which is a joint venture between CRISIL & NSE. IISL is India's first specialized company focused upon the index as a core products. IISL has a licensing & marketing agreement with Standard & Poor's (S&P), who are leader's in index services.

1. CNX 100 represents about 74% of the Free Float market capitalization as on Dec 31, 2010.
2. The average traded value for the last six months of all CNX100 stocks is approximately 57.25 % of the traded value of all stocks on the NSE.
3. Impact cost for CNX 100 for a portfolio size of ₹ 50 Lakhs is 0.07%.

Notes

ACC Ltd.	Cement and Cement Products	ACC	EQ	INE012A01025
Adani Enterprises Ltd.	Trading	ADANIENT	EQ	INE423A01024
Aditya Birla Nuvo Ltd.	Textiles - Synthetic	ABIRLANUVO	EQ	INE069A01017
Ambuja Cements Ltd.	Cement and Cement Products	AMBUJACEM	EQ	INE079A01024
Andhra Bank	Banks	ANDHRABANK	EQ	INE434A01013
Ashok Leyland Ltd.	Automobiles - 4 Wheelers	ASHOKLEY	EQ	INE208A01029
Asian Paints Ltd.	Paints	ASIANPAINT	EQ	INE021A01018
Axis Bank Ltd.	Banks	AXISBANK	EQ	INE238A01026
Bajaj Auto Ltd.	Automobiles - 2 and 3 Wheelers	BAJAJ-AUTO	EQ	INE917I01010
Bank of Baroda	Banks	BANKBARODA	EQ	INE028A01013
Bank of India	Banks	BANKINDIA	EQ	INE084A01016
Bharat Electronics Ltd.	Electronics - Industrial	BEL	EQ	INE263A01016
Bharat Forge Ltd.	Castings/Forgings	BHARATFORG	EQ	INE465A01025
Bharat Heavy Electricals Ltd.	Electrical Equipment	BHEL	EQ	INE257A01018
Bharat Petroleum Corporation Ltd.	Refineries	BPCL	EQ	INE029A01011
Bharti Airtel Ltd.	Telecommunication - Services	BHARTIARTL	EQ	INE397D01024
Biocon Ltd.	Pharmaceuticals	BIOCON	EQ	INE376G01013
Cairn India Ltd.	Oil Exploration/Production	CAIRN	EQ	INE910H01017
Canara Bank	Banks	CANBK	EQ	INE476A01014
Cipla Ltd.	Pharmaceuticals	CIPLA	EQ	INE059A01026
Colgate Palmolive (India) Ltd.	Personal Care	COLPAL	EQ	INE259A01022
Container Corporation of India Ltd.	Travel and Transport	CONCOR	EQ	INE111A01017
Corporation Bank	Banks	CORPBANK	EQ	INE112A01015
Crompton Greaves Ltd.	Electrical Equipment	CROMPGREAV	EQ	INE067A01029
Cummins India Ltd.	Diesel Engines	CUMMINSIND	EQ	INE298A01020
DLF Ltd.	Construction	DLF	EQ	INE271C01023
Dr. Reddy's Laboratories Ltd.	Pharmaceuticals	DRREDDY	EQ	INE089A01023
Exide Industries Ltd.	Auto Ancillaries	EXIDEIND	EQ	INE302A01020
Federal Bank Ltd.	Banks	FEDERALBNK	EQ	INE171A01011
GAIL (India) Ltd.	Gas	GAIL	EQ	INE129A01019
GMR Infrastructure Ltd.	Construction	GMRINFRA	EQ	INE776C01039
Glaxosmithkline Pharmaceuticals Ltd.	Pharmaceuticals	GLAXO	EQ	INE159A01016
Glenmark Pharmaceuticals Ltd.	Pharmaceuticals	GLENMARK	EQ	INE935A01035
Grasim Industries Ltd.	Textiles - Synthetic	GRASIM	EQ	INE047A01013
HCL Technologies Ltd.	Computers - Software	HCLTECH	EQ	INE860A01027

Contd...

Notes

HDFC Bank Ltd.	Banks	HDFCBANK	EQ	INE040A01018
Hero Honda Motors Ltd.	Automobiles - 2 and 3 Wheelers	HEROHONDA	EQ	INE158A01026
Hindalco Industries Ltd.	Aluminium	HINDALCO	EQ	INE038A01020
Hindustan Petroleum Corporation Ltd.	Refineries	HINDPETRO	EQ	INE094A01015
Hindustan Unilever Ltd.	Diversified	HINDUNILVR	EQ	INE030A01027
Housing Development Finance Corporation Ltd.	Finance - Housing	HDFC	EQ	INE001A01036
Housing Development and Infrastructure Ltd.	Construction	HDIL	EQ	INE191I01012
I T C Ltd.	Cigarettes	ITC	EQ	INE154A01025
ICICI Bank Ltd.	Banks	ICICIBANK	EQ	INE090A01013
IDBI Bank Ltd.	Banks	IDBI	EQ	INE008A01015
IFCI Ltd.	Financial Institution	IFCI	EQ	INE039A01010
Indiabulls Real Estate Ltd.	Construction	IBREALEST	EQ	INE069I01010
Indian Hotels Co. Ltd.	Hotels	INDHOTEL	EQ	INE053A01029
Indian Overseas Bank	Banks	IOB	EQ	INE565A01014
Infosys Technologies Ltd.	Computers - Software	INFOSYSTCH	EQ	INE009A01021
Infrastructure Development Finance Co. Ltd.	Financial Institution	IDFC	EQ	INE043D01016
JSW Steel Ltd.	Steel and Steel Products	JSWSTEEL	EQ	INE019A01020
Jaiprakash Associates Ltd.	Diversified	JPASSOCIAT	EQ	INE455F01025
Jindal Steel & Power Ltd.	Steel and Steel Products	JINDALSTEL	EQ	INE749A01030
Kotak Mahindra Bank Ltd.	Banks	KOTAKBANK	EQ	INE237A01028
LIC Housing Finance Ltd.	Finance - Housing	LICHSGFIN	EQ	INE115A01026
Larsen & Toubro Ltd.	Engineering	LT	EQ	INE018A01030
Lupin Ltd.	Pharmaceuticals	LUPIN	EQ	INE326A01037
Mahindra & Mahindra Ltd.	Automobiles - 4 Wheelers	M&M	EQ	INE101A01026
Mangalore Refinery & Petrochemicals Ltd.	Refineries	MRPL	EQ	INE103A01014
Maruti Suzuki India Ltd.	Automobiles - 4 Wheelers	MARUTI	EQ	INE585B01010
MphasiS Ltd.	Computers - Software	MPHASIS	EQ	INE356A01018
Mundra Port and Special Economic Zone Ltd.	Travel and Transport	MUNDRAPORT	EQ	INE742F01042
NTPC Ltd.	Power	NTPC	EQ	INE733E01010
Oil & Natural Gas Corporation Ltd.	Oil Exploration/Production	ONGC	EQ	INE213A01029

Contd...

Notes

Oracle Financial Services Software Ltd.	Computers - Software	OFSS	EQ	INE881D01027
Patni Computer Systems Ltd.	Computers - Software	PATNI	EQ	INE660F01012
Power Finance Corporation Ltd.	Financial Institution	PFC	EQ	INE134E01011
Power Grid Corporation of India Ltd.	Power	POWERGRID	EQ	INE752E01010
Punj Lloyd Ltd.	Construction	PUNJLLOYD	EQ	INE701B01021
Punjab National Bank	Banks	PNB	EQ	INE160A01014
Ranbaxy Laboratories Ltd.	Pharmaceuticals	RANBAXY	EQ	INE015A01028
Reliance Capital Ltd.	Finance	RELCAPITAL	EQ	INE013A01015
Reliance Communications Ltd.	Telecommunication - Services	RCOM	EQ	INE330H01018
Reliance Industries Ltd.	Refineries	RELIANCE	EQ	INE002A01018
Reliance Infrastructure Ltd.	Power	RELINFRA	EQ	INE036A01016
Reliance Power Ltd.	Power	RPOWER	EQ	INE614G01033
Rural Electrification Corporation Ltd.	Financial Institution	RECLTD	EQ	INE020B01018
Sesa Goa Ltd.	Mining	SESAGOA	EQ	INE205A01025
Shriram Transport Finance Co. Ltd.	Finance	SRTRANSFIN	EQ	INE721A01013
Siemens Ltd.	Electrical Equipment	SIEMENS	EQ	INE003A01024
State Bank of India	Banks	SBIN	EQ	INE062A01012
Steel Authority of India Ltd.	Steel and Steel Products	SAIL	EQ	INE114A01011
Sterlite Industries (India) Ltd.	Metals	STER	EQ	INE268A01049
Sun Pharmaceutical Industries Ltd.	Pharmaceuticals	SUNPHARMA	EQ	INE044A01036
Suzlon Energy Ltd.	Electrical Equipment	SUZLON	EQ	INE040H01021
Syndicate Bank	Banks	SYNDIBANK	EQ	INE667A01018
Tata Chemicals Ltd.	Chemicals - Inorganic	TATACHEM	EQ	INE092A01019
Tata Consultancy Services Ltd.	Computers - Software	TCS	EQ	INE467B01029
Tata Motors Ltd.	Automobiles - 4 Wheelers	TATAMOTORS	EQ	INE155A01014
Tata Power Co. Ltd.	Power	TATAPOWER	EQ	INE245A01013
Tata Steel Ltd.	Steel And Steel Products	TATASTEEL	EQ	INE081A01012
Tech Mahindra Ltd.	Computers - Software	TECHM	EQ	INE669C01028
Torrent Power Ltd.	Power	TORNTPOWER	EQ	INE813H01021
UltraTech Cement Ltd.	Cement and Cement Products	ULTRACEMCO	EQ	INE481G01011
Union Bank of India	Banks	UNIONBANK	EQ	INE692A01016
United Phosphorus Ltd.	Pesticides and Agrochemicals	UNIPHOS	EQ	INE628A01036
United Spirits Ltd.	Brew/Distilleries	MCDOWELL-N	EQ	INE854D01016
Wipro Ltd.	Computers - Software	WIPRO	EQ	INE075A01022
Yes Bank Ltd.	Banks	YESBANK	EQ	INE528G01019

Notes

S&P CNX 500: Th4e S&P CNX 500 is India's first broad based benchmark of the Indian capital market. The S&P CNX 500 represents about 92.27% of the Free Float Market Capitalization and about 81.52% of the total turnover on the NSE as on December 31, 2010. The S&P CNX 500 companies are disaggregated into 72 industry indices viz. S&P CNX Industry Indices. Industry weightage in the index reflect the industry weightage in the market. For e.g. if the banking sector has a 5% weightage in the universe of stocks traded on NSE, banking stocks in the index would also have an approx. representation of 5% in the index.

1.3.3 Role and Stock Exchange Functions

The history of stock exchanges in foreign countries as well as India shows that the development of joint stock enterprise would never have reached its present stage but for the facilities which the stock exchanges provided for dealing the securities. Stock exchanges have a very important function to fulfil in the country's economy. In Union of India vs Allied International Products Ltd. (1971) [41 Comp Cas 127 (SC): (1970) 3 SCC 1941], the Supreme Court of India has enunciated the role of the stock exchanges in these words.

A Stock Exchange fulfils a vital function in the economic development of nation: its main function 'liquefy' capital, enabling a person who was invested money in, say a factory or a railway, to convert it into by disposing off his shares in the enterprise to someone else. Investment in joint stock companies is attach the public, because the value of the shares is announced day after day in the stock exchanges, and shares quantity on the exchanges are capable of almost immediate conversion into money. In modern days, a company stock has little chance of inducing the public to subscribe to its shares. It needs permission from reputed exchanges for securing quotation of their shares and the management of a company is anxious to inform the investing public that the shares in company will be quoted on the stock exchange.

The stock exchange is really an essential pillar of the private sector corporate economy. It discharges essential functions in the process of capital formation and in raising resources for the corporate sector.

First, the stock exchange provides a market place for purchase and sale of securities viz., shares, bonds, debentures etc. It, therefore, ensures the free transferability of securities which is the essential basis for the stock enterprise system. The private sector economy cannot function without the assurance provided by the exchange to the owners of shares and bonds that they can be sold in the market at any time. At the same time, those who with to invest their surplus funds in securities for long-term capital appreciation or for speculative can also buy scripts of their choice in the market.

Secondly, the stock exchange provides the linkage between the savings in the household sector and investment in corporate economy. It mobilizes savings, channelises them as securities into those enterprises which are favoured by the investors on the basis of such criteria as future growth prospects, good returns appreciation of capital. The importance of this function has remained undiminished in spite of the prevalence in the Indian Scenario, of such interventionist factors as industrial licensing, provisions of credit to private sector by public sector development banks, price controls and foreign exchange regulations. The stock exchanges discharge functions by laying down a number of regulations which have to be complied with while making public issues offering at least the prescribed of capital to the public, keeping the subscription list open for a minimum period three days, making provisions for receiving applications at least at the centres where they are recognized. Such exchanges allot the shares against applications on a fair and unconditional basis with the weightage to be given to the applications in lower categories, particularly those applying for shares worth ₹ 500 or ₹ 1,000. Members of stock exchanges also assist in the floatation of new issues by acting as managing brokers of new issues. In that capacity, they, inter alia, try to sell these issues to investors spread all over the country. They

Notes

also act as underwriters to new issues. In this way, the broker community provides an organized linkage between the primary and the secondary markets.

Thirdly, by providing a market quotation of the prices of shares and bonds: A sort of collective judgment simultaneously reached by many buyers and sellers in the market – the stock exchange serves the role of barometer, not only of the state of health of individual companies, but also of the nation's economy as a whole. It is often not realized that changes in share prices are brought about by a complex set of factors, all operating in the market simultaneously. Share values as a whole are subject to secular trends set by the economic programme of the nation, and governed by factors like the general economic situation, financial and monetary policies, tax changes, political environment, international economic and financial developments, etc. These trends are influenced to some extent by periodical cycles of booms and depressions in the free market economics. As against these long-term trends, the day-to-day prices are influenced by another variety of factors notably, the buying or selling of many operators, the buying and selling of shares by the investment financial institutions such as the UTI or LIC, which have in recent years emerged as the largest holders of corporate securities. Speeches and pronouncement by ministers and other government spokesmen, statements by company chairmen at annual general meetings and reports of bonus issues or good dividends by companies etc. play their part. While these factors, both long-term and short-term, act as macro influences on the corporate sector and the level of stock prices as a whole, there are also many of micro influences relating to prospects of individual companies such as the reputation of the related prospected capitalizations of reserves, etc. which have a bearing on the level of prices. In the complex interplay of all the forces, which leads to day-to-day quotation of prices of all listed securities, speculation plays a crucial role. In absence of speculative operations, every purchase by an investor has to be matched by a sale of the same security by an investor-seller, and this may lead to sharp fluctuation in prices. With speculative sale and purchase continuously, actual sale and purchase by investors on a large scale are absorbed by market with changes in prices. There are always some professional operators who hope that the prices would rise and others who predict that prices will fall. Both these groups acting on their respective assumption buy or sell continuously in the market. Their operation helps to bring about an orderly adjustment of prices. Without these active operations, a stock exchange can become a very mechanical thing. However, excessive speculation hinders the market-equilibrium and must be discouraged through appropriate safeguards. The regulatory authorities always take necessary precautionary measures to prevent and penalize excessive speculation and trading.

A fact which needs to be emphasized is that the stock exchanges in India also serve the joint sector units as income extent public sector enterprises. There is substantial private participation in the share capital of government companies such as Balmer Lawrie, Ander Yule, Gujarat State Fertilizers Corporation, Narmada Fertilizers Corporation, Hyderabad Allwyn, Polymers Corporation of Gujarat etc. In recent times, some central public sector companies have gone in for public debentures through stock exchanges. There are some public sector companies which have made their share capital open for public subscriptions. Another important function that the stock exchanges in India discharge is of providing a market for gilt-edged i.e., securities issued by the Central Government, state government, municipalities, etc., Trading transactions in these take place regularly on the stock exchanges.

1.3.4 Membership, Organization and Management

With the rich legacy of more than a century-old tradition, stock exchanges around the world have a highly organized and smoothly functioning network. The membership of stock exchanges initially comprised of individuals and partnership firms. Later on, these were also allowed to become members. A number of financial institutions are now members of Indian exchanges. Over the years, stock exchanges have been organized in various forms. For example, while the

Notes

Stock Exchange, Ahmedabad Stock Exchange and M.P. (Indore) Stock Exchange were organized as non-profit making association of persons, the Calcutta Stock Exchange, Delhi Stock Exchange, U.P. Stock Exchange, Cochin Stock Exchange, Guahati Stock Exchange, Jaipur Stock Exchange and (Mangalore) Stock Exchange were organized as public limited companies. Quite a few others have been sent on company limited by guarantee. 19 stock exchanges were functional in India as at the end of the year 1990.

The membership ranges from 69-650. The entrance fee is different for different stock exchange. Membership deposit annually ranges from 69 to 650. The entrance fee is different for different, among various exchanges. The internal governance of exchange rests with a governing board comprising members of the board and executive director. Members of the governing boards include brokers and non-brokers. Governing bodies of stock exchanges of government nominees, however, are dominated by stock brokers. The Executive Direct/President is expected to ensure the smooth functioning of the exchange. The position of Executive Director can't be expected to be very strong because if he really tries to be may bring him into conflict with influential broker-members who may also be on the exchange's board which determines the Executive Director's terms and conditions of service and his reappointment at the end of his term. It is not human nature to displease one's appointing authorities and it may be too much to expect the Executive Director's to be strict under the present scheme of things. Subject to the previous approval of the law, governing bodies of stock exchanges have wide powers to make bye-laws. Governing bodies furnish, censure and also expel any member, any remiser, authorized clerk and employee. They have to adjudicate disputes. Above all, they have the power to make, amend, suspend and enforce rules, bye-regulations and supervise the entire functioning of a stock exchange.

1.3.5 Trading System

Trading on stock exchanges is done through brokers and dealers. All members can act as brokers and for this purpose they have to maintain security deposits. Brokers act as agents, buying and selling or others for which they receive brokerage commission at stipulated rates. Dealers act as principals and sell securities on their own accounts.

However, members cannot enter into contract with any person other than a member without prior permission the governing body.

The stock exchange rules, bye laws and regulations have identified eight major functional specialization the members.

1. ***Commission Broker:*** The commission broker executes buying and selling on the floor of the stock exchange.
2. ***Floor Broker:*** Floor brokers are not many. They execute orders for fellow members and receives a share brokerage commission charged by a commission broker to his/her constituent.
3. ***Tataniwala:*** He/she is a jobber or specialist in selected shares he/she 'makes the market' i.e. brings continuity to dealings. They specialize in stocks which are traded inactively.
4. ***Dealer in non-cleared securities:*** He/she deals in securities which are not on the active list.
5. ***Odd-lot Dealer:*** He/she specializes in buying and selling in amounts which are less than present trading units. They buy and sell odd lots, make them up into marketable trading units. These dealers receive commission. Their earnings come from the difference between the process at which they buy and sell. The odd-lot dealer has become an important operator since the growth of new issues. When the number of applicants for a new issue is large, shares may be allotted in lots which are smaller than prescribed lots. The odd-lot

Notes

dealer makes profit on the large numbers of odd-lots by buying and selling at different prices.

6. ***Budiwalas:*** Budiwalas are functionally same as arbitrageurs. They specialize in buying and selling simultaneously in different markets. The difference between the buying price in another market constitutes their profit. However, they can transact such business only if a security is traded on more than one stock exchange and if exchanged telephonically or ax-linked. In India, arbitraging has become a growing business. Arbitraging requires prior application to the governing body "in order to avoid "the evil of "joint account" with members of other stock exchanges and consequent involvement of one exchange in the difficulties of another.

7. ***Security Dealer:*** This dealer specializes in trading in government securities. He/she mainly acts as a jobber and takes the risks inherent in ready purchase and sale of securities. The government securities are over the counter and not on the floor. They maintain daily contacts with the Reserve Bank of India and common banks and other financial institutions. As a result of their activities, government securities are quoted finely.

Members are permitted to deal only in listed securities. However, with the approval of the governing body they can deal in listed securities of other exchanges. There are three types of contracts permitted by the stock exchanges, members can transact for delivery. i.e., for delivery as well as payment on the same day as the date of contract or at the most the next day; for hand-delivery, i.e., delivery and payment within the time and dates stipulated at the time of entering into bank which time shall not exceed 14 days following the date of contract; for special delivery i.e., for delivery of the and payment for it within anytime exceeding 14 days from the date of contract when entering into a bargain permitted by the governing body or the president.

Trading settlement system

All transactions in all groups of securities in the Equity segment and Fixed Income securities listed on BSE are required to be settled on T+2 basis (w.e.f. from April 1, 2003). The settlement calendar, which indicates the dates of the various settlement related activities, is drawn by BSE in advance and is circulated among the market participants.

Under rolling settlements, the trades done on a particular day are settled after a given number of business days. A T+2 settlement cycle means that the final settlement of transactions done on T, i.e., trade day by exchange of monies and securities between the buyers and sellers respectively takes place on second business day (excluding Saturdays, Sundays, bank and Exchange trading holidays) after the trade day.

The transactions in securities of companies which have made arrangements for dematerialization of their securities are settled only in demat mode on T+2 on net basis, i.e., buy and sell positions of a member-broker in the same scrip are netted and the net quantity and value is required to be settled. However, transactions in securities of companies, which are in "Z" group or have been placed under "trade-to-trade" by BSE as a surveillance measure ("T" group) , are settled only on a gross basis and the facility of netting of buy and sell transactions in such scrips is not available.

The transactions in 'F' group securities representing "Fixed Income Securities" and " G" group representing Government Securities for retail investors are also settled at BSE on T+2 basis. In case of Rolling Settlements, pay-in and pay-out of both funds and securities is completed on the same day. Members are required to make payment for securities sold and/ or deliver securities purchased to their clients within one working day (excluding Saturday, Sunday, bank & BSE trading holidays) after the pay-out of the funds and securities for the concerned settlement is completed by BSE. This is the timeframe permitted to the Members to settle their funds/ securities obligations with their clients as per the Byelaws of BSE.

Notes

	Activity	Day
Trading	Rolling Settlement Trading	T
Clearing	Custodial Confirmation	T+1 working days
	Delivery Generation	T+1 working days
Settlement	Securities and Funds pay in	T+2 working days
	Securities and Funds pay out	T+2 working days
	Valuation Debit	T+2 working days
Post Settlement	Auction	T+3 working days
	Bad Delivery Reporting	T+4 working days
	Auction settlement	T+4 working days
	Rectified bad delivery pay-in and pay-out	T+6 working days
	Re-bad delivery reporting and pickup	T+8 working days
	Close out of re-bad delivery and funds pay-in & pay-out	T+9 working days

In NSE, the trades pertaining to the rolling settlement are settled on a T+2 day basis where T stands for the trade day. Hence trades executed on a Monday are typically settled on the following Wednesday (considering 2 working days from the trade day). The funds and securities pay-in and pay-out are carried out on T+2 day. An investor has to deliver the securities to the trading member immediately upon getting the contract note for sale but in any case, before the prescribed securities pay-in day. In case of buying, he has to pay the amount to the trading member in such a manner that the amount paid is realised before the funds pay-in day.

The securities and the funds are paid out to the trading member on the pay-out day. The NSE regulations stipulate that the trading member should pay the money or securities to the investor within 48 hours of the pay-out. An investor should instruct the Depository participant (DP) to give 'Delivery Out' instructions to transfer the shares from his Beneficiary Account to the Pool Account of trading member through whom he has sold the shares. The details of the Pool A/c of trading member to which the shares are to be transferred, scrip quantity, etc. should be mentioned in the delivery Out instructions. The instructions should be given well before the prescribed securities pay-in day. SEBI requires that the Delivery Out instructions should be given at least 24 hours prior to the cut-off time for the prescribed securities pay-in to avoid any rejection of instructions due to date entry errors, network problems, etc. In case of buying, the trading member will transfer the shares directly to Beneficiary Account of the investor on receipt of the same from the Clearing Corporation.

1.3.6 Stock Market Information System

Stock exchanges quotations and indices published in daily newspapers are the main source of information of the exchange traders and turnover. Dailies like Economic Times, Financial Express, Business Standard, Times of India and Hindustan Times publish daily quotations and indices. As for Bombay Stock Exchange, its quotation published in the Economic Times, information on equity shares, starting from the first column, is presented in the following order: company's name, previous day's closing price in brackets, all the daily traded prices as published, key financial parameters such as Earnings Per Share (EPS) on Tuesdays, Cash earnings Per Share (CPS) Wednesdays, cash P/E, and the high and low prices in the preceding 52 weeks.

The first traded price is the day's opening price. If only one such price is recorded, it is also the day's closing balance. If there are two prices recorded, then the first is the opening and the second the closing price. If there are three prices, then the middle quote is either the high or low price. If there are four prices, then one of the middle prices is the day's high and the other, the

Notes

low. If there are no transactions in a company's share on any day, the previous day's closing price is presented in brackets.

The EPS is the average net profit after tax per equity share and the CPS the average cash profit (after adding the depreciation) per share. The cash P/E is the ratio of the day's closing price to the cash earnings per share distinct form the P/E ratio which relates price to the net profit per share. PE values are not printed when earnings are either nil or negative.

The RNW is the net profit as a percentage of the net worth and measures the return earned on the shareholders i.e., equity capital plus reserves. The GPM is the gross profit margin (before depreciation and tax) as a percentage of gross sales and measures the company's profit margin which is available to absorb depreciation charges arising from capital expenditures, tax payments, dividend distribution and profit ploughback. All the figures taken from the latest available results (audited/unaudited) of the company. The 52-week high and low prices of each share are worked out a new every day on the basis of the higher and lowest points scaled during the immediately preceding 52 weeks. The high and lows are adjusted for bonus of rights issue of equity shares.

Besides these quotations, share price indices are also published in different dailies. The Bombay Stock Exchange's of share Sensex and 100 - share 'National' indices are quite popular. Besides these, there are other indices also which include The Economic Times Index of Ordinary Share Price, Business Standard Index of Ordinary Shares price and few others. Reserve Bank of India also publishes Share Price Index. PTI stockscan provides minute-to-minute share price information about Bombay, Delhi, Ahmedabad, Calcutta and Madras stock exchanges.

1.3.7 Principal Weaknesses of Indian Stock Market

While in terms of number of stock exchanges, listed companies, daily turnover, market capitalization and investor population, the Indian stock market has witnessed impressive growth over the last four decades. But it still suffers other forms of weaknesses, some of which are serious. We may point our principle weaknesses of the Indian stock market as follows:

1. ***Rampant speculation:*** Indian stock exchanges have been witnessing spells of unprecedented booms and crashes. While the cost has been experiencing generally 4-5% rate of growth, the share prices have shown high volatility. This only shows that the speculative activities have been rampant. This does not reflect a very healthy state of affairs. The twin characteristics of excessive exuberance and high volatility have made the Indian stock market crises prone. The distinction that Keynes made in 1929 in the Wall Street Journal between 'speculators' operating on the basis of forecasting the psychology market, and 'investor's trying to forecast the prospective yield of the assets over the whole life has almost vary in India's market conditions.

2. ***Insider Trading:*** Like speculation, insider trading is rampant in Indian stock exchanges. Insider trading means operation information which is price sensitive and not available to the public. Insider trading is thus trading from a position of privilege in respect of price-sensitive information. Insider trading is decried because it violates level playing, a state where equal opportunity to information is available to all the participants in the market.

3. ***Oligopolistic:*** The Indian stock market cannot be called truly competitive. It is highly dominated by large financial and institutional big brokers, and operators and is, thus, oligopolistic in structure.

4. ***Limited Forward Trading:*** As pointed out above, there can be three types of transactions undertaken at the stock exchanges namely spot delivery, hand delivery and forward

Notes

delivery. Trading in share for clearing, or 'forward trading' was common banned in India in 1969. It had a very adverse effect on share prices. The situation was further aggravated in 1974 restrictions put on dividend by companies as part of the anti-inflationary measures adopted by the government. From 1974 onwards, under a scheme first evolved by the Bombay Stock Exchanges and thereafter accepted Calcutta, Delhi and Ahmedabad, a certain informal type of forward trading was revived. This was done by carrying forward the delivery contract beyond 14 days in an informal manner, by concluding the earlier contract and entering into a new contract without any actual delivery, but merely by payment of the balance between the country price and market price, between the buyer and the seller. This system had been continued for selected securities often called cleared securities, in an extra-legal manner without anyone questioning its legality. In 1981, government at long last proceeded to permit the revival of limited volume of forward trading. This was done reviving the previous practice of trading in cleared securities, but by permitting carry forward of contracts beyond days up to three months. The real problem however, still persisted. While a certain volume of forward trade useful for providing liquidity and avoiding payment arises, when speculation runs riot and the actual price transfer of securities lies far behind, there will inevitably be a payment crisis.

5. ***Outdated Share Trading System:*** The share trading system followed in Indian stock exchanges, when matched an international prospectus is thoroughly outdated and inefficient. Major problem areas include settlement periods, margin system and carry for (badla) system. To prevent the risk of the rise of shops outside the stock exchange system, all transactions in all groups of securities in the equity segment and fixed income securities listed on stock indices are now required to be settled on T+2 basis. Under rolling settlement, the trades done on a particular day after a given number of business days. A T+2 settlement cycle means that the final settlement of transactions done of 'T', i.e. trade day by exchange of monies and securities between buyers and sellers takes place on the second business day after the trade day. Avoidance of margin payment under the margin system is a problem area. Margin system is the deposit which the members have to maintain with the clearing house stock exchange. The deposit is a certain percentage of the value of the security which is being traded by them. Under the margin system, if a member buys or sells securities marketed for margin above the free limit, a spot amount per share has to be deposited in the clearing house. Before we point out major weaknesses of the margin system, we may distinguish it from margin. Margin trading means that a customer buys a share paying a portion of the purchase price. The portion of the purchase price paid by the customer is called margin. For example, if a customer purchases shares worth ₹ 1 lakh market value by paying ₹ 60,000, he is in trade paying a margin of 60%. In this case, the balance is being lent by the broker and the securities bought be collateral for the loan and have to be left with the broker.

6. ***Lack of a single market:*** Due to the inability of various stock exchanges to function cohesively, the growth in business in any one exchange or region has not been transmitted to other exchanges. The limited inter-market operations have resulted in increased costs and risks of investors in smaller towns. This problem has been further aggravated by the lack of cohesion among exchanges in terms of legal structure, trading practices, settlement procedures and jobbing.

7. ***Problem of interface between the primary and secondary markets:*** The recent upsurge of the primary market has created serious problems of interfacing with the secondary market, viz. the stock exchanges which still, by and large, continue with the same old infrastructure and ways of long which suited the very narrow base of the capital market in the yester years but are totally out of tune with fast market and the desired tempo of work at present. Unless the secondary market is re-oriented so as to take charge of the new responsibilities cast on it by the recent developments, this will act as a drag on the future preface serious problems while trying to buy or sell scrips.

Notes

8. ***Inadequacy of investor service:*** It is commonly felt that exchanges, particularly the smaller ones, have been unable to service their investors adequately, and have been able to make only a limited contribution to the spread of the equity cult in their region. Level of computerization across stock exchanges has been inadequate, resulting in lower operational flexibility of stock exchanges and leaving brokers unable to handle sudden surges in volumes. The absence of computer linkage between stock exchanges and its members has also hampered effective inter-market operations, monitoring of trading and trading operations, as well as the free flow of information on an intra- and inter-exchange basis. The inadequate structure and ineffective trading practices/settlements have also resulted in lack of NRI confidence in the capital market. Major Indian corporates today need to diversify their sources of capital and seek the direct recitations of foreign investors. The areas of concern detailed above would effectively deter such direct foreign currency investments. The upgradation of existing stock exchanges thus has to be viewed as an integral component of the increasing globalization of the Indian economy.

1.3.8 Directions to Reform the Functioning of Stock Exchanges

The efforts to reform the functioning of stock exchanges in India have been as old as the stock exchanges themselves. The Indian regulatory and supervisory framework of securities market has been adequately strengthened through the legislative and administrative measures in the recent past. The regulatory framework for securities market is consistent with the best international benchmarks, such as, standards prescribed by International Organisation of Securities Commissions (IOSCO).

1. Extensive Capital Market Reforms were undertaken during the 1990s encompassing legislative regulatory and institutional reforms. Statutory market regulator, which was created in 1992, was suitably empowered to regulate the collective investment schemes and plantation schemes through an amendment in 1999. Further, the organization strengthening of SEBI and suitable empowerment through compliance and enforcement powers including search and seizure powers were given through an amendment in SEBI Act in 2002. Although dematerialisation started in 1997 after the legal foundations for electronic book keeping were provided and depositories created the regulator mandated gradually that trading in most of the stocks take place only in dematerialised form.

2. Till 2001 India was the only sophisticated market having account period settlement alongside the derivatives products. From middle of 2001 uniform rolling settlement and same settlement cycles were prescribed creating a true spot market.

3. After the legal framework for derivatives trading was provided by the amendment of SCRA in 1999 derivatives trading started in a gradual manner with stock index futures in June 2000. Later on options and single stock futures were introduced in 2000-2001 and now India 's derivatives market turnover is more than the cash market and India is one of the largest single stock futures markets in the world.

4. India's risk management systems have always been very modern and effective. The VaR based margining system was introduced in mid 2001 and the risk management systems have withstood huge volatility experienced in May 2003 and May 2004. This included real time exposure monitoring, disablement of broker terminals, VaR based margining etc.

5. India is one of the few countries to have started the screen based trading of government securities in January 2003.

6. In June 2003 the interest rate futures contracts on the screen based trading platform were introduced.

Notes

7. India is one of the few countries to have started the Straight Through Processing (STP), which will completely automate the process of order flow and clearing and settlement on the stock exchanges.
8. RBI has introduced the Real-time Gross Settlement system (RTGS) in 2004 on experimental basis. RTGS will allow real delivery v/s payment which is the international norm recognized by BIS and IOSCO.
9. To improve the governance mechanism of stock exchanges by mandating demutualisation and corporatisation of stock exchanges and to protect the interest of investors in securities market the Securities Laws (Amendment) Ordinance was promulgated on 12th October 2004. The Ordinance was replaced by a Bill that was followed by the Securities and Exchange Board of India (Amendment) Act, 2009. Under this, the Presiding Officer and Members of the Tribunal hold office for a term of five years and are eligible for re-appointment.

Listing of Securities

Listing means admission of the securities to dealings on a recognised stock exchange. The securities may be of any public limited company, central or state government, quasi governmental and other financial institutions/corporations, municipalities, etc.

The objectives of listing are mainly to:

1. provide liquidity to securities;
2. mobilize savings for economic development;
3. protect interest of investors by ensuring full disclosures.

The exchange has a separate Listing Department to grant approval for listing of securities of companies in accordance with the provisions of the Securities Contracts (Regulation) Act, 1956, Securities Contracts (Regulation) Rules, 1957, Companies Act, 1956, Guidelines issued by SEBI and Rules, Bye-laws and Regulations of the Exchange.

A company intending to have its securities listed on the Exchange has to comply with the listing requirements prescribed by the Exchange. Some of the requirements are as under:

1. Minimum Listing Requirements for new companies
2. Minimum Listing Requirements for companies listed on other stock exchanges
3. Minimum Requirements for companies delisted by this Exchange seeking relisting of this Exchange
4. Permission to use the name of the Exchange in an Issuer Company's prospectus
5. Submission of Letter of Application
6. Allotment of Securities
7. Trading Permission
8. Requirement of 1% Security
9. Payment of Listing Fees
10. Compliance with Listing Agreement
11. Cash Management Services (CMS) – Collection of Listing Fees

Notes

1.3.9 National Stock Exchange of India Ltd.

The National Stock Exchange of India Limited (NSE) was promoted by IDBI, ICICI, IFCI, GIC, LIC, State Bank of India, SBI Capital Markets Limited, SHCIL and IL & FS as a Joint Stock Company under the Companies Act, 1956, on November 27, 1992. The Government of India has granted recognition with effect from April 26, 1993, initially for a period of five years. The GOI has appointed IDBI as a lead promoter. To form the infrastructure of NSE, IDBI had appointed a Hongkong Bound consulting firm M/s International Securities Consulting Limited for helping in setting of the NSE. The main objective of NSE is to ensure comprehensive nationwide securities trading facilities to investors through automated screen-based trading and automatic post trade clearing and settlement facilities. The NSE will be encouraging corporate trading members with dealer networks, computerised trading and short settlement cycles. It proposes to have two segments, one dealing with wholesale debt instruments and the other dealing with capital market instruments. The Electronic Clearing and Depository System (ECDS) proposed to be set up by the Stock Holding Corporation of India Limited (SHCIL) would provide the requisite clearing and settlement systems.

Features

The recommendations of the high-powered committee on setting up of the National Stock Exchange, a 'model exchange' at New Mumbai to act as a National Stock Exchange (NSE) would provide access to investors from all across the country on an equal footings, and work as an integral component of the National Stock Market System. Such an NSE has the following vital features:

1. NSE is promoted by financial institutions, mutual funds, and financed on a self-sustaining basis through levy of membership fees. The capital outlay of 30 crores of rupees could be financed by admitting 1,000 members with an entry fee of ₹ 10 lakhs each. Fees for corporate and institutional members could be pegged at a higher level of ₹ 25 lakhs.
2. NSE is a company incorporated under the Companies Act of 1956. It is constituted by the Board of Directors (Board) and managed by it. 50% of the Managing Board of the Exchange should comprise of professionals who are not members. These professionals must be from a cross-section of finance and industry, and must actively contribute to ensuring that the stock exchange functions in a balanced and fair manner.
3. It trades on medium sized securities of equity shares and debt instruments.
4. It is a separate ring altogether. For the first time in our country, debt instruments would be traded to become an active part in the secondary market of the nation.
5. NSE made its debut with the debt market. The debt market is predominantly a market in government securities. The Central Government moving over to auctions at market-related rates of interest, the primary market has become active with the well-informed and fine-tuned bidding at the auctions.
6. It has the full support from the National Clearing and Settlement Divisions, SHCIL and the Securities Facilities Support Corporation. It uses modern computer technology for the clearance and settlement procedures.
7. Better transparency system for the securities.

NSE will provide nationwide computerised debt and stock trading facility to investors. NSE will operate in two segments i.e., the debt market and the capital market in the debt segment, there would be transactions in securities such as Government Securities, Treasury Bills, PSU bonds, Units of the UTI-64 Scheme of UTI, Commercial Papers (CP), and Certificates of Deposit

Notes

(CD). The capital market segment will cover trading in equities, convertible/non-convertible debenture and hybrids; this segment has not been made operational. The existing permissible repo-transactions in the 91 and 364 days treasury bills can now be routed through the NSE. This move is expected to provide a boost to trading in the secondary market for debt instruments.

1.3.10 Over the Counter Exchange of India (OTCEI)

Indeed, in the mid-eighties itself, the G.S. Patel Committee on Stock Exchange reforms and the Abid Holi Committee on Capital Markets had recommended the creation of a second tier stock market that will offset some of the problems of present stock exchanges. Over The Counter Exchange of India (OTCEI) has promoted by UTI, IDBI, IFCI, LIC, GIC, SBI Capital Market and Canbank Financial Services as a non-making company under Section 25 of the Companies Act, 1956. The OTCEI is a recognized Stock Exchanges under Section 4 of the Securities Contracts (Regulation) Act, 1956. Hence companies listed on the OTC Exchange enjoy the same status as companies listed on any other stock exchanges in the country as regards to interest rates on borrowings, etc.

OTC Exchange of India has picked the model from the NASADQ system (National Association of Security Dealers-Automated Quotations) prevalent in the United States of America. Modifications suited to Indian conditions been adopted OTC in America was an offshoot of their government's efforts to regulate the unlisted securities act. The Indian version of NASD-National Associations of Securities Dealers is what is called OTC Exchange of India. Unlike in the regular exchange, listing on OTCEI is a national listing from day one. Wherever and whenever countries start operating in the exchange they can trade in all the scripts of OTCEI. Separate listing in those regular places is not needed at all.

The unique features of OTCEI are as under:

Ringless Trading

OTCEI exchange has eliminated the traditional trading ring with a view to have greater accessibility to the factors. Trading will instead take place through a network of computers (screen-based) of OTC dealers located several places within the same city and even across cities. These computers allow dealers to quote, query and act through a central OTC computer using telecommunication links. Investors can walk into any of centres of members and dealers and see the quote display on the screen, decide to deal and conclude the fraction.

National Network

Unlike other stock exchanges, the OTC Exchange will have a nation wide reach, enabling widely dispersed ring across the cities, resulting in greater liquidity. Companies, thus, have the unique benefit of nationwide listing trading of their scrips by listing at one exchange, the OTC Exchange.

Totally Computerized

All the activities of the OTC trading will be computerized, making for a more transparent, quick and complained market.

Exclusive List of Companies

The OTC Exchange will not list and trade in companies listed on any other stock exchange. It will, therefore, an entirely new set of companies 'sponsored' by members of the OTC Exchange. However, it has recently viewed some 25 companies already listed on other exchanges to list on OTCEI.

Notes

Two Ways of Making a Public Offer

Another unique feature of OTCEI is its 'two ways' of making a public offer. Under 'direct offer', a company can of its shares directly to the public after getting them sponsored by a sponsor but under 'indirect offer' the company has give its shares first to the sponsor who along with the company can at a later and convenient time make a to offer.

Faster Transfers and Trading without Shares

OTC trading also provides for transfer of shares of Registrars, up to a certain percentage per folio. This assists in faster transfers. The concept of immediate settlement makes it better for the investors, who will not make with share certificates but with a different tradable document called counter receipt (CR). However, an investor can always exercise his right of having a share certificate his right of having a share certificate by surrendering the CR and again exchanging share certificate for CR when he wants to trade. There will be a custodian who will provide this facility along in a settler who will do the signature verification and CR validation.

Investor Registration

Yet another feature of OTCEI is investor registration, introduced for the first time in India. The investor registration required to be done only once and is valid for trading on any OTC counter in the country in any scrip. The purpose of the investor registration is to facilitate computerized trading. It also provides greater safety of operations the investors.

Trading Mechanism

An investor can buy and sell any listed scrip at any OTC Exchange counter. Similarly he can sell any listed scrip at by OTC Exchange counter. The investor can also make an application for services like transfer of shares, splitting and consolidation of shares, nomination and revocation of nomination, registering power of attorney, transmission shares and charge of holder's name, etc. The parties involved in trading on OTC are Investor, Counter, Settler Registered Custodian, Company and Bank.

The trading documents mainly involved in OTC Exchange transactions are

1. Temporary Counter Receipt (TCR)
2. Permanent Counter Receipt (PCR),
3. Sales Confirmation Slip (SCS),
4. Transfer Deed (TD),
5. Services Application Form (SAF),
6. Application Acknowledgement Slip (AAS) and
7. Deal Form (DF)

Customer Purchase (at Market Makers Counter)

Each market maker will be displaying the quantum of stock he is holding, the market lots and bid and offer prices. Customers will place the order and deliver the cheque. Counter will prepare TD, obtain all details of the buyers including signature on the transfer deed and forward to registrars for updating. Simultaneously, cheques received from the customer will be sent for collection.

Notes

After scrutiny and confirmation by the registrar, the TCRs which will be substituted by PCRs will be collected and delivered to the buyer. Copies will be distributed to the Counter, OTCEI and Registrar.

The counter receipts are tradable and they contain all the information which appears in a share certificate.

Customer Purchase (at Dealers Counter)

If the dealer is not a market maker, he can act as an agent/broker to procure the scrip to the investor. The purchase will also have a PTI scan which shows the scrips traded by various market makers. Against customer orders, he will make a deal with the market maker (over phone or otherwise) charge commission and deliver a CR.

Customer Sales

When an investor comes to a customer to sell, he produces a CR to be delivered to the counter along with Transfer Deed duly signed. Before that, he verifies the PTI scan and satisfies himself that the rate is acceptable. The customer will accept CR and TD, verify the details and compare TD with its own details and issue confirmation slips (SCS) in quadruplicate, which will contain the required details. One copy each of SCS distributed to the investor, the counter, the OTCEI and the custodian registrar.

Notes

TDS and SCS will be sent to Registrars for updation who will confirm back to the counter

The Registrar appointed by the company would be given power/authority to transfer the shares not exceeding 0.5% of the company's capital per folio, to maintain a register of members and to keep in custody the certificates of the company to be exchanged with CRs when the investor requests. In case where the price exceeds 0.5% of the capital per folio, the Registrar refers such transfer to the company, which in turn has to transfer the same within a specified time.

The Benefits which OTC Exchange will Offer are:

For Companies

It will provide a method of raising funds through capital market instruments which are priced fairly. In OTC, the company will be able to negotiate the issue price with the sponsors who will market the issue.

It will help save unnecessary issue expenses on raising funds from capital markets. The method of sponsor placing the scrips with members of OTC who will in turn off-load the scrips to the public will obviate the need of a public issue. Therefore, almost all associated costs will be eliminated. It will help achieve a greater degree of management stability. The OTC Exchange will list scrips over 20% of the capital made available for public trading. It will provide greater accessibility to a large pool of captive investor base, enhancing the fund's reign substantially. ITC Exchange will create a nationwide network, where investors will be serviced who will for captive investor base for companies.

Notes

For Investor

Investment in stocks will become easier. OTC Exchange's wide network will bring the stock exchanges to every street corner. It will provide greater confidence and fidelity of trade. The investor can look up the prices displayed at the OTC counter. He knows he is trading scrips at the right market price as there is a transparency of price. It will enable transactions to be completed quickly. Investors can settle the deals across the counter. A money or scrip proceeds from the deal will be settled in a matter of days if not earlier. It will provide definite liquidity to investors. The market making system in OTC will have two-way prices and will be quoted regularly to provide sufficient opportunity for investors to exist. Investors may get a greater sense of security because all scrips have been researched and members have been willing to themselves invest in these scrips. In the case of public issue/offer for sale, the allotment will be done in 26 days and trading in 30 days. This will immensely benefit the investors.

For Financial Environment

OTC Exchange will help spread the stock exchange operation geographically and integrate capital investment into a national forum. It will encourage closely-held companies to go public and venture capital across the country to boost entrepreneurship.

1.3.11 Inter-connected Stock Exchange of India

Inter-connected Stock Exchange of India Limited (ISE), has been promoted by 15 regional stock exchanges to provide trading linkage/connectivity to all the participating exchanges to widen their market. Thus, ISE is a national level exchange providing trading, clearing, settlement, risk management and surveillance support to the Inter-Connected Market System (ICMS). ISE aims to address the needs of small companies and retail investors with the guiding principle of optimising the infrastructure and harnessing the potential of regional markets to transform these into a liquid and vibrant market through the use of technology and networking. The participating exchanges in ISE have in all about 4,500 traders. In order to leverage its infrastructure as also expand its nationwide reach, ISE has also appointed dealers across various cities other than the participating exchange centres. These dealers are administratively supported through strategically located regional offices at Delhi, Calcutta, Chennai and Nagpur. ISE, thus, expects to emerge as a low cost national level exchange in the country for retail investors and small intermediaries. ISE has also floated a wholly-owned subsidiary namely, ISE Securities and Services Limited (ISS) to take membership of NSE and other premier exchanges, so that traders and dealers of ISE can access other markets in addition to the local market and ISE. This will provide the investors in smaller cities with a solution for cost-effective and efficient trading in securities.

Core objectives of the Inter-connected Stock Exchange include creation of single integrated national level solution with access to multiple markets for providing high quality, low cost services to millions of investors across the country, a liquid and vibrant national level market for all listed companies in general and small capital companies in particular and providing trading, clearing and settlement facilities to the traders and dealers across the country at their doorstep with decentralised support system. Some of the features which make ISE a new age stock exchange are as follows:

1. ISE is a national level recognised stock exchange having moderate listing fees and granting listing and trading permission to small and medium sized companies having a post public issue paid-up capital of ₹ 3 crore to ₹ 5 crore (subject to the appointment of market makers), besides companies with a capital of above ₹ 5 crore.

Notes

2. All traders and dealers of ISE have access to NSE through ISE Securities and Services Ltd. (ISS), which ensures the continuous attention of investors.
3. Proposing to introduce the 'IPO Distribution System' for offering primary market issue.
4. ISE has set up an 'Investors Grievance and Service Cell' which looks after all types of complaints of investors located across the country and provides decentralised support.
5. Listing of stocks with ISE would give the company an advantage of being identified as a technology-savvy and investor-friendly company.

1.3.12 Demutualisation of Stock Exchanges

Historically, stock exchanges were formed as 'mutual' organisations, which were considered beneficial in terms of tax benefits and matters of compliance. They are generally 'not-for-profit' and tax-exempted entities. The trading members who provide broking services, also own, control and manage such exchanges for their common benefit, but do not distribute the profits among themselves. The ownership rights and trading rights are clubbed together in a membership card which is not freely transferable and hence this card at times carries a premium. In contrast, in a 'demutual' exchange, three separate sets of people own the exchange, manage it and use its services. The owners usually vest management in a board of directors which is assisted by a professional team. A completely different set of people use the trading platform of the exchange. These are generally 'for-profit' and tax paying entities. The ownership rights are freely transferable. Trading rights are acquired/surrendered in terms of transparent rules. Membership cards do not exist. These two models of exchanges are generally referred to as 'club' and 'institution' respectively.

There are 23 recognised exchanges in the country. Three of them are 'Association of Persons', while the rest 20 are companies, either limited by guarantee or by shares. Except one exchange (NSE), all exchanges, whether corporates or association of persons, are not-for-profit making organisations. Except for two (OTCEI and NSE), all exchanges are 'mutual' organisations. An expert committee appointed by SEBI has recently recommended demutualisation of stock exchanges since stock exchanges, brokers associations and investors association have overwhelmingly felt that such a measure was desirable. The committee has accordingly suggested the steps for such demutualisation.

The most important development in the capital market is concerning the demutualisation of the stock exchanges. Demutualisation of exchanges means segregating the ownership from management. This move was necessitated by the fact that brokers in the management of the stock exchange were misusing their position for personal gains. Demutualisation would bring in transparency and prevent conflict of interest in the functioning of the stock exchanges. The Minister of Finance in his union budget speech of 2002-03, has made an important announcement that the process of demutualisation and corporatisation of stock exchanges is expected to be completed during the course of the current year.

There would be various benefits of demutualisation, a few of which are narrated herein below:

1. Stock exchanges owned by members tend to work towards the interest of members alone, which could on occasion be detrimental to the rights of other stakeholders. Division of ownership between members and outsiders can lead to a balanced approach, remove conflicts of interest, create greater management accountability, and take into consideration the interest of other players.
2. To cope with competition, stock exchanges require funds. While member owned stock exchanges have limitations in raising funds, publicly owned stock exchanges can tap capital markets.

Notes

3. Publicly owned stock exchanges can be more professional when compared to member-owned organisations. Further, as a result of the role played by shareholders, strengthening of the management and the organisation, there is greater transparency in dealings, accountability and market discipline.

4. This would enhance management flexibility. A publicly held company is better equipped to respond to changes when compared to a closely held mutually-owned organisation. Further, a company can spin off its subsidiaries, get into mergers and acquisitions, raise funds, etc.

The concept of demutualised exchange most probably originated in India, where two exchanges (OTCEI in 1990 and NSE in 1992) adopted a pure demutualised structure from their birth. The Stockholm Stock Exchange was the first major stock exchange in the world to become demutualised in 1993. Since then, over 20 exchanges have been demutualised. Some of them like the Australian Stock Exchange, London Stock Exchange and Singapore Stock Exchange have gone one step further by becoming a listed company. Many others, including commodity exchanges, are in the process of demutualisation.

1.4 Investment alternatives

Investment is the employment of funds on assets with the aim of earning income or capital appreciation. Investment has two attributes namely time and risk. Present consumption is sacrificed to get a return in the future. The sacrifice that has to be borne is certain but the return in the future may be uncertain. This attribute of investment indicates the risk factor. The risk is undertaken with a view to reap some return from the investment. For a layman, investment means some monetary commitment. A person's commitment to buy a flat or a house for his personal use may be an investment from his point of view. This cannot be considered as an actual investment as it involves sacrifice but does not yield any financial return. The problem of surplus gives rise to the question of where to invest. In the past, investment avenues were limited to real assets, schemes of the post office and banks. At present, a wide variety of investment avenues are open to the investors to suit their needs and nature. Knowledge about the different avenues enables the investors to choose investment intelligently. The required level of return and the risk tolerance level decide the choice of the investor. The investment alternatives range from financial securities to traditional non-security investments. The financial securities may be negotiable or non-negotiable. The negotiable securities are financial securities that are transferable. The negotiable securities may yield variable income or fixed income. Securities like equity shares are variable income securities. Bonds, debentures, Indra Vikas Patras, Kisan Vikas Patras, Government securities and money market securities yield a fixed income.

The non-negotiable financial investment as the name itself suggests is not transferable. This is also known as non-securitised financial investments. Deposit schemes offered by the post offices, banks, companies, and non-banking financial companies are of this category. The tax-sheltered schemes such as public provident fund, national savings certificate and national savings scheme are also non-securitised financial investments. Mutual fund is another investment alternate. It is of recent origin in India. Within a short span of time several financial institutions and banks have floated varieties of mutual funds. The investors with limited funds can invest in the mutual funds and can have the benefits of the stock market and money market investments as specified by the particular fund. The real assets always find a place in the portfolio. They are gold, silver, arts, property and antiques. These are non-financial investment.

Notes

Notes **Investment Alternatives Include:**

1. Equity
2. Preference shares
3. Debentures
4. Bonds or fixed income securities
   - (a) Government securities
   - (b) Savings bonds
   - (c) Private sector debentures
   - (d) PSU bonds
   - (e) Preference shares
5. Money market instruments
   - (a) Treasury bills
   - (b) Certificates of deposits
   - (c) Commercial paper
   - (d) Repos
6. Non-marketable financial assets
   - (a) Bank deposits
   - (b) Post Office Time Deposits (POTD)
   - (c) Monthly Income Scheme of the Post Office (MISPO)
   - (d) Kisan Vikas Patra (KVP)
   - (e) National Savings Certificate
   - (f) Company Deposits
   - (g) Employees Provident Fund Scheme
   - (h) Public Provident Fund Scheme
7. Real estate
   - (a) Residential House
   - (b) Sources of Housing Finance
   - (c) Features of Housing Loans
   - (d) Guidelines for Buying a Flat
   - (e) Commercial Property
   - (f) Agricultural Land
   - (g) Suburban Land
   - (h) Time Share in a Holiday Resort

Contd...

Notes

8. Precious objects
   (a) Gold and Silver
   (b) Precious Stones
   (c) Art Objects
9. Insurance policies
   (a) Endowment Assurance
   (b) Money Back Plan
   (c) Whole Life Assurance
   (d) Unit Linked Plan
   (e) Term Assurance
   (f) Immediate Annuity
   (g) Deferred Annuity

While some plans accrue short term profits some are long term deposits. The first step towards investing in Indian market is to evaluate individual requirements for cash, competence to undertake involved risks and the amount of returns that the investor is expecting.

Investments in Bank Fixed Deposits (FD)

Fixed Deposit or FD is accrues 8.5% of yearly profits, depending on the bank's tenure and guidelines, which makes it's widely sought after and safe investment alternative. The minimum tenure of FD is 15 days and maximum tenure is 5 years and above. Senior citizens are entitled for exclusive rate of interest on Fixed Deposits.

Investments in Insurance policies

Insurance features among the best investment alternative as it offers services to indemnify your life, assets and money besides providing satisfactory and risk free profits. Indian Insurance Market offers various investment options with reasonably priced premium. Some of the popular Insurance policies in India are Home Insurance policies, Life Insurance policies, Health Insurance policies and Car Insurance policies.

Some top Insurance firm in India under whom you can buy insurance scheme are LIC, SBI Life, ICICI Prudential, Bajaj Allianz, Birla Sunlife, HDFC Standard Life, Reliance Life, Max NewYork Life, Metlife, Tata AIG, Kotak Mahindra Life, ING Life Insurance, etc.

Investments in National Saving Certificate (NSC)

National Saving Certificate (NSC) is subsidized and supported by government of India as is a secure investment technique with a lock in tenure of 6 years. There is no utmost limit in this investment option while the highest amount is estimated as ₹ 100. The investor is entitled for the calculated interest of 8% which is forfeited two times in a year. National Saving Certificate falls under Section 80C of IT Act and the profit accrued by the investor stands valid for tax deduction up to ₹ 1, 00,000.

Notes

Investments in Public Provident Fund (PPF)

Like NSC, Public Provident Fund (PPF) is also supported by the Indian government. An investment of minimum ₹ 500 and maximum ₹ 70, 000 is required to be deposited in a fiscal year. The prospective investor can create it PPF account in a GPO or head post office or in any sub-divisions of the centralized bank.

PPF also falls under Section 80C of IT Act so investors could gain income tax deduction of up to ₹ 1, 00,000. The rate of interest of PPF is evaluated yearly with a lock in tenure of maximum 15 years. The basic rate of interest in PPF is 8%.

Investments in Stock Market

Investing in share market yields higher profits. Influenced by unanticipated turn of market events, stock market to some extent cannot be considered as the safest investment options. However, to accrue higher gains, an investor must update himself on the recent stock market news and events.

Investments in Mutual Funds

Mutual Fund firms accumulate cash from willing investors and invest it in share market. Like stock market, mutual fund investment are also entitled for various market risks but with a fair share of profits. As defined in the pamphlet of the Association of Mutual Funds in India (AMFI), "A mutual fund is a trust that pools the savings of a number of investors who share common financial goal Anybody with an investible surplus of as little as a few thousand rupees-can invest in \mutual funds. These investors buy units of a particular mutual fund scheme that has a defined investment objective and strategy." According to SEBI Regulations, 1996, "Mutual fund means a fund established in the form of a trust to raise monies through the sale of units to the public or a section of public under one or more schemes for investing in securities, in accordance with Regulations". Investment is the sacrifice of certain present value of the uncertain future reward. It involves the decisions like, where to invest, when to invest and how much to invest. In the last few years, there have been a variety of investments that have been made available to choose from. Mutual Fund is one form of them. It is one of those areas of financial services which has grown rapidly and is playing a significant role in mobilizing individual saving and providing stability to the Indian capital market. Mutual Fund, a financial innovation, provides for a novel way of mobilizing savings from small investors and allowing them to participate in the equity and other securities of the industrial organisations with less risk. A Mutual Fund is a trust that pools together the savings of a number of investors who share a common financial goal. They buy units of a fund that best suits their needs. The Fund Manager then invests this pool of money (called a corpus) in securities ranging from shares to debentures to money market instruments depending on the objective of the scheme. The income earned through this investment and the capital appreciation realised by the scheme, are distributed amongst the investors in proportion to the number of units they own by way of dividend or Net Asset Value (NAV) appreciation. Thus, a mutual fund is the most suitable form of investment for the common man as it offers an opportunity to invest in a diversified, professionally managed basket of securities at a relatively low cost. Mutual Fund is a mechanism for pooling the resources by issuing units to the investors and investing funds in securities in accordance with objectives as disclosed in offer document. Investments in securities are spread across a wide cross-section of industries and sectors and thus the risk is reduced. Diversification reduces the risk because all stocks may not move in the same direction in the same proportion at the same time. Mutual fund issues units to the investors in accordance with quantum of money invested by them. Investors of mutual funds are known as unit holders. The profits or losses are shared by the investors in

Notes

proportion to their investments. The mutual funds normally come out with a number of schemes with different investment objectives which are launched from time to time. A mutual fund is required to be registered with Securities and Exchange Board of India (SEBI) which regulates securities markets before it can collect funds from the public. Basically, mutual funds are functioning as a financial institution to mobilize resources from various investors to invest them in financial assets, since the average investor does not have the necessary resources, time, knowledge and expertise to participate in today's complex and volatile investment markets. Further, the mutual fund ensure its participants a professional management for portfolio selection, diversify the investment in large number of companies and selects various forms of securities viz., shares, debentures and bonds. Mutual funds do not determine an investor's risk preference. But once he determines his risk-return preferences, an investor can choose a mutual fund from a large and growing variety of alternative funds designed to meet almost any investment goal. In other words, each mutual fund has its own investment objective such as capital appreciation, high current income or money market income. A mutual fund will state its own investment objective and investors as a part of their own investment strategies, will choose the appropriate mutual fund in which to invest.

1. ***Unit Investment Trusts (UITs):*** These instruments resemble mutual funds in that each unit of the trust represents a portion of each security that is held within the portfolio. However, they are more tax-efficient than actively managed funds, although they may post substantial gains or losses when the trust matures.
2. ***Variable Annuity Sub accounts:*** These are essentially clones of taxable retail funds, but must be treated and reported as separate securities for regulatory reasons. Variable sub accounts have most of the same disadvantages as open-ended funds except that they do not post capital gains distributions.
3. ***Closed-End Mutual Funds:*** These funds have a limited number of shares than can be issued to investors. Once all of the shares are sold, the fund is closed to new investors and the shares begin trading in the secondary market.
4. ***Exchange-Traded Funds (ETFs):*** Although this class of fund is still the new kid on the block, ETFs have quickly become very popular with serious investors for a number of reasons. As their name implies, these funds trade like stocks on the major exchanges and can be sold like any other security while the markets are open. They provide liquidity, diversity and some degree of professional management as well as tax efficiency in most cases. They can be ideal instruments for tax-loss harvesting.

Investments in Gold Deposit Scheme

It is controlled by SBI; Gold Deposit Scheme was instigated in the year 1999. Investments in this scheme are open for trusts, firms and HUFs with no specific upper limit. The investor can deposit invest minimum of 200 gm in exchange for gold bonds holding a tariff free rate of interest of 3% - 4% on the basis of the period of the bond varying with a lock in period of 3 to 7 years.

Moreover, Gold bonds are not entitled of capital gains tax and wealth tariff. The sum insured can be accrued back in cash or gold, as per the investor's preference.

Investments in Real Estate

Indian real estate industry has huge prospects in sectors like commercial, housing, hospitality, retail, manufacturing, healthcare etc. Calculated realty demand for IT/ITES industry in 2010 is estimated at 150mn sq.ft. around the chief Indian cities. Termed as the "money making industry", realty sector of India promises annual profits of 30% to 100% through real estate investments.

Notes

Investments in Equity

Private Equity is expanding at a fast pace. India acquired US $13.5 billion in 2008 under equity shares and featured among the top 7 nations in the world. In 2010, the total equity investment is predicted to increase up to USD 20 billion. Indian equities promise satisfactory returns and have more than 365 equity investments firms functioning under it.

Investments in Non Resident Ordinary (NRO) funds

Investing in domestic (NRO) is one of the best investment alternatives for NRIs who wish to deposit their income accrued abroad and maintain it in Indian rupees. The deposited amount along with the interest is completely repatriable. Investment can be done in Indian financial institutions including the Non Banking Finance Companies which are listed with RBI. The interest returns accrued on in this account is entitled under IT Act and is subject to 30% tax reduction at source including the appropriate surcharge and education cess. The NRI investor can repatriate upto USD 1 million every year, for genuine reasons, by forfeiting valid tariffs.

1.5 Dematerialization

Dematerialization is the process by which a client can get physical certificates converted into electronic balances. An investor intending to dematerialize its securities needs to have an account with a DP. The client has to deface and surrender the certificates registered in its name to the DP. After intimating NSDL electronically, the DP sends the securities to the concerned Issuer/ R&T agent. NSDL in turn informs the Issuer/ R&T agent electronically, using NSDL Depository system, about the request for dematerialization. If the Issuer/ R&T agent finds the certificates in order, it registers NSDL as the holder of the securities (the investor will be the beneficial owner) and communicates to NSDL the confirmation of request electronically. On receiving such confirmation, NSDL credits the securities in the depository account of the Investor with the DP.

Dematerialized securities trading, settlement and custody has changed considerably the market microstructure of Indian stock exchanges. Generally, an investor would look for more liquidity to less liquidity in a stock. Higher liquidity means lower transaction costs and easy entry and exit options. Therefore, higher liquidity is preferred. Ownership transfer of demat shares is quite fast. Investors would be able to churn their portfolio many a times over, contributing to the increase in turnover and liquidity.

Dematerialised shares are definitely superior to physical (paper) form of shares. Physical forms of shares are fraught with fake, forgery, stolen and duplicate problems. Logically speaking, higher demand should emanate for demat shares, which is expected to push up (pull down to a lesser extent) shares prices resulting in higher returns (lesser losses) to the investors compared to predemat period. This higher demand will continue for sometime (adjustment period lasting, sometimes, a few months) only.

Features:

1. Holdings in only those securities that are admitted for dematerialisation by NSDL can be dematerialised.
2. Only those holdings that are registered in the name of the account holder can be dematerialised.
3. Names of the holders of the securities should match with the names given for the demat account.

Notes

4. If the same set of joint holders held securities in different sequence of names, these joint holders by using ' Transposition cum Demat facility' can dematerialise the securities in the same account even though share certificates are in different sequence of names. e.g., If there are two share certificates one in the name of X first and Y second and another in the name of Y first and X second, then these shares can be dematerialised in the depository account which is in any name combination of X and Y i.e., either X first and Y second or Y first and X second. Separate accounts need not be opened to demat each share certificate. If shares are in the name combinations of X and Y, it cannot be dematerialised into the account of either X or Y alone.
5. Check the demat performance of the companies whose shares are to be given for dematerialisation.
6. Demat requests received from client (registered owner) with name not matching exactly with the name appearing on the certificates merely on account of initials not being spelt out fully or put after or prior to the surname, can be processed, provided the signature of the client on the Dematerialisation Request Form (DRF) tallies with the specimen signature available with the Issuers or its R & T agent.
7. A client may, in the normal course, receive demat confirmation in about 30 days from the date of submission of demat request to the DP.
8. There are special processes for Securities issued by Government of India and simultaneous transmission and demat.

Procedure

The client (registered owner) will submit a request to the DP in the Dematerialization Request Form for dematerialisation, along with the certificates of securities to be dematerialised. Before submission, the client has to deface the certificates by writing "SURRENDERED FOR DEMATERIALISATION". The DP will verify that the form is duly filled in and the number of certificates, number of securities and the security type (equity, debenture etc.) are as given in the DRF. If the form and security count is in order, the DP will issue an acknowledgement slip duly signed and stamped, to the client. The DP will scrutinize the form and the certificates. This scrutiny involves the following:

1. Verification of Client's signature on the dematerialisation request with the specimen signature (the signature on the account opening form). If the signature differs, the DP should ensure the identity of the client.
2. Compare the names on DRF and certificates with the client account.
3. Paid up status
4. ISIN (International Securities Identification Number)
5. Lock - in status
6. Distinctive numbers

In case the securities are not in order they are returned to the client and acknowledgment is obtained. The DP will reject the request and return the DRF and certificates in case:

1. A single DRF is used to dematerialise securities of more than one company.
2. The certificates are mutilated, or they are defaced in such a way that the material information is not readable. It may advise the client to send the certificates to the Issuer/ R&T agent and get new securities issued in lieu thereof.

Notes

3. Part of the certificates pertaining to a single DRF is partly paid-up; the DP will reject the request and return the DRF along with the certificates. The DP may advise the client to send separate requests for the fully paid-up and partly paid-up securities.

4. Part of the certificates pertaining to a single DRF is locked-in, the DP will reject the request and return the DRF along with the certificates to the client. The DP may advise the client to send a separate request for the locked-in certificates. Also, certificates locked-in for different reasons should not be submitted together with a single DRF

In case the securities are in order, the details of the request as mentioned in the form are entered in the DPM (software provided by NSDL to the DP) and a Dematerialisation Request Number (DRN) will be generated by the system. The DRN so generated is entered in the space provided for the purpose in the dematerialisation request form. A person other than the person who entered the data is expected to verify details recorded for the DRN. The request is then released by the DP which is forwarded electronically to DM (DM - Depository Module, NSDL's software system) by DPM. The DM forwards the request to the Issuer/ R&T agent electronically.

The DP will fill the relevant portion viz., the authorisation portion of the demat request form. The DP will punch the certificates on the company name so that it does not destroy any material information on the certificate.

The DP will then dispatch the certificates along with the request form and a covering letter to the Issuer/ R&T agent. The Issuer/ R&T agent confirms acceptance of the request for dematerialisation in his system DPM (SHR) and the same will be forwarded to the DM, if the request is found in order. The DM will electronically authorise the creation of appropriate credit balances in the client's account. The DPM will credit the client's account automatically. The DP must inform the client of the changes in the client's account following the confirmation of the request.

The issuer/ R&T may reject dematerialisation request in some cases. The issuer or its R&T Agent will send an objection memo to the DP, with or without DRF and security certificates depending upon the reason for rejection. The DP/Investor has to remove reasons for objection within 15 days of receiving the objection memo. If the DP fails to remove the objections within 15 days, the issuer or its R&T Agent may reject the request and return DRF and accompanying certificates to the DP. The DP, if the client so requires, may generate a new dematerialisation request and send the securities again to the issuer or its R&T Agent. No fresh request can be generated for the same securities until the issuer or its R&T Agent has rejected the earlier request and informed NSDL and the DP about it.

Case Study

Savings vs Investment

I lost all my savings in the stock market scam of 1998. "I lost all my savings when CRB Capital markets shut down." Or if you want something current then try -

"I lost all my savings in the 'New' economy meltdown of 2000." Make no mistake- these are painful statements. All through our lives, we have been repeatedly advised that we must save money for a rainy day. And when we did just that, some of us have suffered the misfortune of losing it all.

A penny saved..... is a penny earned is what I was told by my favorite English teacher in middle school. Unfortunately that penny doesn't get us very far anymore. Nobody told me about the silent enemy called inflation that could lay waste to the coin that the tooth fairy left under my pillow. Incidentally I was also taught how to calculate interest by an

Contd...

Notes

excellent but stern Mathematics teacher. But at that point I did not comprehend that it (interest) was my best weapon against that stealthy enemy (a simple preference for English over Mathematics?).

Realisation dawns

In High School I was introduced to the dismal science of economics and the world of basic finance. That is when it all fell in place - the way to safeguard my savings from inflation was to put it in the bank or invest it somewhere. So that I could earn a rate of interest higher than inflation and protect my money.

Life rolled on

I entered the workplace at the age of 22. The saving habit came naturally to me. What with all those sayings ringing in my head - a penny saved...I was determined. I wasn't going to let that sneaky character 'Inflation' get at my savings. No simple bank deposits for me - I was going to beat the hell out of inflation by investing my savings profitably in the stock market. In fact, I would beat the rate of inflation by a wide margin. I was too cool for my own good. And with impeccable timing, I caught the concluding part of the great Harshad Mehta orchestrated boom (caught in the Bulls' tail!). But I caught the full impact of the downdraught that followed the famous boom. The rest is history.

Some more...

My financial situation or shall I say penury as a result of that debacle taught me some more lessons that none of my English, Mathematics or Economics textbooks had. A new host of aphorisms pored forth- No free Lunch, No pain-No gain...You see it is true that you must save for a rainy day. But what follows, as a natural corollary is that to protect your savings against inflation you must invest it in some asset that will earn you returns. Be they shares, debentures, bonds, gold or even real estate.

And therein lies the crux of the issue. All these investment options have been associated with rags to riches as well as riches to rags stories. So - Investing is a risky business. The higher the return you expect from your investment, the higher the risk you will have to take. Your savings are not savings anymore. When you decide to invest your savings you are crossing the Rubicon threshold. Your savings have now taken the form of Risk Capital.

Risk capital?

Yes, because that is what it is. Don't panic at the thought. You could put your money in a government bond or in a NSC and that would qualify as almost a zero risk investment. (Actually it is just the lowest risk investment available to you, but that's the topic of another debate). And at the other end of the spectrum you have equities, which come with a high degree of risk. So do Gold and real estate. But we'll discuss that some other time.

It's time to step back and spell out what I have learnt

1. Savings is the difference between Income and Expenditure
2. You must save for a rainy day
3. Savings have no 'form' and must be protected from Inflation
4. When you invest your savings it has morphed into Risk Capital
5. Risk Capital can be eroded
6. Risk can be minimized by choosing to invest in low risk investments

Contd...

Notes

7. The risk associated with each investment changes with time, and must be monitored carefully.

The take home from all of this is that the Rubicon must be crossed. And this is not a Catch-22 situation. Yes you must invest to protect your savings from inflation but that need not necessarily place your financial future at jeopardy. There are low risk investments that exist in the market place. You can structure your investments based on your appetite for risk.

By the time you get to this point in the write-up, you may be feeling just a wee bit nervous about your savings. Nay, Investments. Don't. At the end of the day, investing your Savings is like falling in love. It can be risky and it can hurt, but that doesn't stop us from falling in love does it? For the heady and glorious experience.... The old adage, "its better to have loved and lost than never to have loved at all" may assume a new meaning. Investing can be a rewarding experience just as being in love is.

Question:

Analyze the difference between investment and saving.

1.6 Summary

- When an existing listed company either makes a fresh issue of securities to the public or makes an offer for sale of securities to the public for the first time, through an offer document, such issues are called as 'Follow on Public Offering'.
- Such public issue of securities or offer for sale to public is required to satisfy the stock exchange listing obligations along with SEBI guidelines.
- When a listed company proposes to issue securities to its existing shareholders, whose names appear in the register of members on the record date, in the proportion to their existing holding, through an offer document, such issues are called 'Rights Issue'.
- This mode of raising capital is best suited when the dilution of controlling interest is not intended.
- A preferential issue is an issue of equity shares or of convertible securities by listed companies to a select group of persons, which is neither a rights issue nor a public issue.
- A company that makes any public or rights issue or an offer for sale can issue shares only in the dematerialised form.
- A company shall not make a public or rights issue of shares unless all the existing partly paid shares have been fully paid-up or forfeited.
- A company that is making public issue of securities shall make an application to the stock exchange for listing of those shares.
- The new issue market encompasses all institutions dealing in fresh claims.
- The forms in which these claims are created are equity shares, preference shares, debentures, rights issues, deposits etc.
- All financial institutions that contribute, underwrite and directly subscribe to the securities are part of new issue markets.
- The industrial securities markets in India consist of new issue markets and stock exchanges.

Notes

- The new issue market deals with the new securities, which were not previously available to the investing public, i.e. the securities that are offered to the investing public for the first time.
- The market, therefore, makes available a new block of securities for public subscription. In other words, new issue market deals with the raising of fresh capital by companies either for cash or for consideration other than cash.
- The process of offering new issues of existing stocks to the purchasers is known as underwriting. At the same time if new stocks are introduced in the market, it is called the Initial Public Offering.
- The primary issues which are offered in the primary capital market provide the essential funds to the companies.
- The main function of new issue market is to facilitate transfer resources from savers to the users.
- The savers are individuals, commercial banks, insurance company etc. the users are public limited companies and the government.
- The various methods which are used in the floating of securities in the new issue market are Public issues, Offer for sale, Placement and Rights issues.
- A 'promoter' has been defined as a person or group of persons who are instrumental in formation of the company, who enable the company to start its commercial operations by bringing in the necessary funds required for the concern.
- In the post-liberalisation era, the companies are free to make any issue of capital in the form they like and they can freely price the issues.
- 'Lock- in' indicates the freeze on transfer of shares.
- SEBI (Disclosure and Investor Protection) Guidelines, 2000 have stipulated lock-in requirement as to specified percentage of shares subscribed by promoters with a view to avoid unscrupulous floating of securities.
- A stock exchange is a corporation or mutual organization which provides "trading" facilities for stock brokers and traders, to trade stocks and other securities.
- The companies are now allowed to issue capital to the public through the on-line system of the stock exchanges.

1.7 Keywords

Initial Public Offering (IPO): An IPO is the first sale of stock by a private company to the public.

Preferential Issue: A preferential issue can be defined as an issue of stock available only to designated buyers.

Rights Issue: The rights issue is a special form of shelf offering or shelf registration for existing Companies. With the issued rights, existing shareholders have the privilege to buy a specified number of new shares from the firm at a specified price within a specified time.

1.8 Self Assessment

Fill in the blanks:

1. An ..... is the selling of securities to the public in the primary market.

Notes

2. All financial institutions, which ....., ... and directly subscribe to the securities, are part of new issue markets.
3. The main function of new issue market can be divided into three service function, viz. ....., ... and .....
4. Underwriting is an agreement whereby the underwriter promises to subscribe to a specified number of shares or debentures or a specified amount of stock in the event of public ..... to the issue.
5. The non-institutional underwriters are .....
6. A ..... is an issue of equity shares or of convertible securities by listed companies to a select group of persons, which is neither a rights issue nor a public issue.
7. ..... denotes 'an option of allocating shares in excess of the shares included in the public issue'.
8. An ..... means 'prospectus' in case of a public issue or an offer for sale and 'letter of offer' in case of rights issue.
9. A ..... has been defined as a person or group of persons who are instrumental in formation of the company, who enable the company to start its commercial operations by bringing in the necessary funds required for the concern.
10. In the post-liberalisation era, the companies are free to make any issue of capital in the form they like and they can freely ..... the issues.
11. ..... indicates the freeze on transfer of shares.
12. The securities forming part of promoters' contribution and issued ..... to the promoters shall be locked-in first for the specified period.
13. ..... are those institutional investors who are generally perceived to possess expertise and the financial muscle to evaluate and invest in the capital market.
14. ..... is basically a capital issuance process used in Initial Public Offer (IPO), aiding price and demand discovery.
15. ..... is a scheme under which a person or a company (generally a finance company) undertakes to buy shares issued and allotted in a new issue from the allottees at a stipulated price.

1.9 Review Questions

1. Make distinctions between new issue market and stock exchange.
2. What are the relationship between new issue market and stock exchange?
3. What do you think about the significance of new issue market?
4. Examine the different kinds of offer documents.
5. Make an analysis and write a note on lock-in of excess promoters' contribution and lock-in of pre-issue share capital of an unlisted company.
6. What is difference between the shares offered through book-building and offer of shares through normal public issue in your opinion?
7. What are the principal weaknesses of Indian stock market?
8. What are the major directions to reform the functioning of stock exchanges?

Notes

9. Write a short note on:
   - (a) National Stock Exchange of India Ltd.
   - (b) Over the Counter Exchange of India (OTCEI)
   - (c) Inter-connected Stock Exchange of India
   - (d) Demutualization of Stock Exchanges
   - (e) Money market
   - (f) Importance of money market
     - (i) Features of a developed money market
     - (ii) State government/public sector/municipality issued
   - (g) Certificate of deposit
   - (h) Call money market
   - (i) Repurchase agreements (repos)
   - (j) Inter-bank participation certificate
   - (k) Bills rediscounting
   - (l) Other money market instruments
   - (m) Money laundering
10. Explain stock markets in India and its role and stock exchange functions.

Answers: Self Assessment

1.	Initial Public Offer (IPO)	2.	contribute, underwrite
3.	origination, underwriting, distribution	4.	not subscribing
5.	brokers	6.	preferential issue
7.	Green Shoe Option	8.	offer document
9.	'promoter'	10.	price
11.	Lock- in	12.	last
13.	Qualified Institutional Buyers	14.	Book-building
15.	Safety net		

1.10 Further Readings

Books

Maclachlan, DIL, *Guide to share investment*, N.Y.Longman, 1977.

Meredith, G.G., *Capital Investment Decisions*, N.Y., Harper & Row, 1969.

Newlyn, W.T., *Theory of Money*, Clarendon press, Oxford, 1971.

Prime, John H., *Investment Analysis*, New Jersey, Prentice Hall, 1967.

Quirin, G. David, *Capital Expenditure Decision*, Homewood, Illinois, Friwin, 1967.

Notes

Sametz, Arnold W., *Prospects for Capital Formation and Capital Markets: Financial Requirements Over the Next Decade*, Lexington, Lexington Books, 1978.

Sudhindhra Bhat, *Security Analysis and Portfolio Management*, Excel Books.

Notes

Unit 2: Risk and Return

CONTENTS

Objectives

Introduction

2.1 Risk Defined

2.1.1 Systematic versus Non-systematic Risk

2.1.2 Measurement of Risk

2.2 Risk and Expected Return

2.3 Risk-Return Relationship

2.4 Portfolio and Security Returns

2.5 Return and Risk of Portfolio

2.6 Portfolio Diversification and Risk

2.7 Summary

2.8 Keywords

2.9 Self Assessment

2.10 Review Questions

2.11 Further Readings

Objectives

After studying this unit, you will be able to:

- Discuss the concept of risk
- Define systematic risk
- Define unsystematic risk
- Understand the concept of risk & expected Return
- Discuss risk return relationship
- Explain portfolio & security returns
- Describe return & risk of portfolio
- Explain diversification

Introduction

Unlike natural science and like medicine, law and economics, investing lies somewhere between an art and a science. Certain aspects of investing lend themselves to a scientific approach. The creation of computer skills has accelerated the use of scientific methods.

However, corporations are managed by people and therefore open to problems associated with their faulty judgments. Moreover, the corporations operate in a highly dynamic and competitive environment, and many operate both nationally and internationally. As a result, the judgment factor still dominates investment decisions.

Notes

Whether investing will ever be classified as a science is doubtful, but research, training and experience have developed investing into a discipline. Discipline means a structured, consistent and orderly process without rigidity in either concept or methods.

Financial Analysis

Financial analysis is the informative and predictive function in investing. It provides information about the past and present, and it quantifies expectations for the future. Capital budgeting decisions, corporate financial polices, and informed selections of securities for investment are all products of financial analysis. Analytical resources mobilized for these purposes include economic, capital market, sector and specific security analyses.

Economic Analysis

Economic analysis provides both near-term and longer-term projections for the total economy in terms of the nation's output of goods and services, inflation, profits, monetary and fiscal policy, and productivity. It, thus, provides the foundation for capital market, sector, industry and company estimates of the future.

Capital Market Analysis

Capital market analysis examines the industries and securities of individual companies primarily to develop value and return expectations for securities and thus to distinguish over-priced securities from under-priced ones.

Between capital market analysis and security analysis, incorporating some characteristics of each is sector analysis. Broader than industry and company analysis, sector analysis may be viewed as a bridge between capital market context; sectors consist of major groupings of stocks (i.e. according to economic sector, growth rate, or cyclically in earnings) that either cut across or combine several industries.

Comparative Selection of Securities

Selection among alternative investment opportunities requires appraisal of securities so that their relative attractiveness in terms of return and risk can be judged at any time. This purpose can be accomplished only if consistent analytical procedures are employed and industry and company forecasts are based on an internally consistent set of economic and capital market projections.

If Hindalco is considered for purchase, it must be considered more attractive than Nalco, Indian Aluminium, or other issues with comparable investment characteristics. Thus, isolated analysis and evaluation of an individual security are impractical and inappropriate. One security cannot be effectively appraised apart from other securities, or apart from the general investment climate.

Consistency and comparability are so important that they should be the twin goals of the investment analysis process. Consistency applies to data for an individual company across time, whereas comparability seeks valid data on companies for each time period. Without consistency and comparability, the investor cannot exercise sound judgment in identifying instances of overvaluation and under-valuation.

Notes

Investment Decision-making

Investment decision-making can best be viewed as an integrated process to which security analysis makes its unique contribution. Portfolio management requires the consistent application of economic, capital market and sector analysis to the definition of objectives and the measurement of performance. Security analysis serves the investment decision-maker by identifying the fairly priced or under-priced securities that are most likely to produce the desired results.

Investment policies and asset allocation strategies are developed based on the following objectives:

1. To earn a sufficient "real" rate of return and maintain the purchasing power of its assets adjusted for inflation in perpetuity.
2. To control portfolio risk and volatility in order to provide as much year-to-year spending stability as possible and still meet.

2.1 Risk Defined

Risk can be defined as the probability that the expected return from the security will not materialize. Every investment involves uncertainties that make future investment returns risk-prone. Uncertainties could be due to the political, economic and industry factors.

Risk could be systematic in future depending upon its source. Systematic risk is for the market as a whole, while unsystematic risk is specific to an industry or the company individually. The first three risk factors discussed below are systematic in nature and the rest are unsystematic. Political risk could be categorised depending on whether it affects the market as whole, or just a particular industry.

2.1.1 Systematic versus Non-systematic Risk

Modern investment analysis categorizes the traditional sources of risk causing variability in returns into two general types: those that are pervasive in nature, such as market risk or interest rate risk, and those that are specific to a particular security issue, such as business or financial risk. Therefore, we must consider these two categories of total risk. The following discussion introduces these terms. Dividing total risk into its two components, a general (market) component and a specific (issuer) component, we have systematic risk and non-systematic risk, which are additive:

Total risk = General risk + Specific risk

= Market risk + Issuer risk

= Systematic risk + Non-systematic risk

Systematic Risk: An investor can construct a diversified portfolio and eliminate part of the total risk, the diversifiable or non-market part. What is left is the non-diversifiable portion or the market risk. Variability in a security's total returns that is directly associated with overall movements in the general market or economy is called systematic (market) risk.

Virtually all securities have some systematic risk, whether bonds or stocks, because systematic risk directly encompasses interest rate, market, and inflation risks. The investor cannot escape this part of the risk because no matter how well he or she diversifies, the risk of the overall market cannot be avoided. If the stock market declines sharply, most stocks will be adversely affected; if it rises strongly, as in the last few months of 1982, most stocks will appreciate in value. These movements occur regardless of what any single investor does. Clearly, market risk is critical to all investors.

Notes

Non-systematic Risk: The variability in a security's total returns not related to overall market variability is called the non- systematic (non-market) risk. This risk is unique to a particular security and is associated with such factors as business and financial risk as well as liquidity risk. Although all securities tend to have some non-systematic risk, it is generally connected with common stocks.

Remember the difference: Systematic (market) risk is attributable to broad macro factors affecting all securities. Non-systematic (non-market) risk is attributable to factors unique to a security. Different types systematic and unsystematic risk are explained as under:

1. ***Market Risk:*** The variability in a security's returns resulting from fluctuations in the aggregate market is known as market risk. All securities are exposed to market risk including recessions, wars, structural changes in the economy, tax law changes and even changes in consumer preferences. Market risk is sometimes used synonymously with systematic risk.

2. ***Interest Rate Risk:*** The variability in a security's return resulting from changes in the level of interest rates is referred to as interest rate risk. Such changes generally affect securities inversely; that is, other things being equal, security prices move inversely to interest rates. The reason for this movement is tied up with the valuation of securities. Interest rate risk affects bonds more directly than common stocks and is a major risk that all bondholders face. As interest rates change, bond prices change in the opposite direction.

3. ***Purchasing Power Risk:*** A factor affecting all securities is purchasing power risk, also known as inflation risk. This is the possibility that the purchasing power of invested dollars will decline. With uncertain inflation, the real (inflation-adjusted) return involves risk even if the nominal return is safe (e.g., a Treasury bond). This risk is related to interest rate risk, since interest rates generally rise as inflation increases, because lenders demand additional inflation premiums to compensate for the loss of purchasing power.

4. ***Regulation Risk:*** Some investments can be relatively attractive to other investments because of certain regulations or tax laws that give them an advantage of some kind. Municipal bonds, for example, pay interest that is exempt from local, state and federal taxation. As a result of that special tax exemption, municipals can price bonds to yield a lower interest rate since the net after-tax yield may still make them attractive to investors. The risk of a regulatory change that could adversely affect the stature of an investment is a real danger. In 1987, tax law changes dramatically lessened the attractiveness of many existing limited partnerships that relied upon special tax considerations as part of their total return. Prices for many limited partnerships tumbled when investors were left with different securities, in effect, than what they originally bargained for. To make matters worse, there was no extensive secondary market for these illiquid securities and many investors found themselves unable to sell those securities at anything but 'firesale' prices if at all.

5. ***Business Risk:*** The risk of doing business in a particular industry or environment is called business risk. For example, as one of the largest steel producers, U.S. Steel faces unique problems. Similarly, General Motors faces unique problems as a result of such developments as the global oil situation and Japanese imports.

6. ***Reinvestment Risk:*** The YTM calculation assumes that the investor reinvests all coupons received from a bond at a rate equal to the computed YTM on that bond, thereby earning interest on interest over the life of the bond at the computed YTM rate. In effect, this calculation assumes that the reinvestment rate is the yield to maturity.

   If the investor spends the coupons, or reinvests them at a rate different from the assumed reinvestment rate of 10%, the realized yield that will actually be earned at the termination

Notes

of the investment in the bond will differ from the promised YTM. And, in fact, coupons almost always will be reinvested at rates higher or lower than the computed YTM, resulting in a realized yield that differs from the promised yield. This gives rise to reinvestment rate risk. This interest-on-interest concept significantly affects the potential total dollar return. Its exact impact is a function of coupon and time to maturity, with reinvestment becoming more important as either coupon or time to maturity, or both, rise. Specifically:

(a) Holding everything else constant, the longer the maturity of a bond, the greater the reinvestment risks.

(b) Holding everything else constant, the higher the coupon rate, the greater the dependence of the total dollar returns from the bond on the reinvestment of the coupon payments.

Let's look at realized yields under different assumed reinvestment rates for a 10% non-callable 20-year bond purchased at face value. If the reinvestment rate exactly equals the YTM of 10%, the investor would realize a 10% compound return when the bond is held to maturity, with $4,040 of the total dollar return from the bond attributable to interest on interest. At a 12% reinvestment rate, the investor would realize an 11.14% compound return, with almost 75% of the total return coming from interest-on-interest ($5,738/ $7,738). With no reinvestment of coupons (spending them as received), the investor would achieve only a 5.57% return. In all cases, the bond is held to maturity.

Clearly, the reinvestment portion of the YTM concept is critical. In fact, for long-term bonds the interest-on-interest component of the total realized yield may account for more than three-fourths of the bond's total dollar return.

7. ***Bull-Bear Market Risk:*** This risk arises from the variability in the market returns resulting from alternating bull and bear market forces. When security index rises fairly consistently from a low point, called a trough, over a period of time, this upward trend is called a bull market. The bull market ends when the market index reaches a peak and starts a downward trend. The period during which the market declines to the next trough is called a bear market.

8. ***Management Risk:*** Management, all said and done, is made up of people who are mortal, fallible and capable of making a mistake or a poor decision. Errors made by the management can harm those who invested in their firms. Forecasting errors is difficult work and may not be worth the effort and, as a result, imparts a needlessly sceptical outlook.

   An agent-principal relationship exists when the shareholder owners delegate the day-to-day decision-making authority to managers who are hired employees rather than substantial owners. This theory suggests that owners will work harder to maximize the value of the company than employees will. Various researches in the field indicate that investors can reduce their losses to difficult-to-analyse management errors by buying shares in those corporations in which the executives have significant equity investments.

9. ***Default Risk:*** It is that portion of an investment's total risk that results from changes in the financial integrity of the investment. For example, when a company that issues securities moves either further away from bankruptcy or closer to it, these changes in the firm's financial integrity will be reflected in the market price of its securities. The variability of return that investors experience, as a result of changes in the credit worthiness of a firm in which they invested, is their default risk.

   Almost all the losses suffered by investors as a result of default risk are not the result of actual defaults and/or bankruptcies. Investor losses from default risk usually result from security prices falling as the financial integrity of a corporation's weakness - market prices of the troubled firm's securities will already have declined to near zero. However, this is

Notes

not always the case - 'creative' accounting practices in firms like Enron, WorldCom, Arthur Anderson and Computer Associates may maintain quoted prices of stock even as the company's net worth gets completely eroded. Thus, the bankruptcy losses would be only a small part of the total losses resulting from the process of financial deterioration.

10. ***International Risk:*** International risk can include both country risk and exchange rate risk.

Exchange Rate Risk: All investors who invest internationally in today's increasingly global investment arena face the prospect of uncertainty in the returns after they convert the foreign gains back to their own currency. Unlike the past, when most US investors ignored international investing alternatives, investors today must recognize and understand exchange rate risk, which can be defined as the variability in returns on securities caused by currency fluctuations. Exchange rate risk is sometimes called currency risk.

Example: A US investor who buys a German stock denominated in marks (German currency), must ultimately convert the returns from this stock back to dollars. If the exchange rate has moved against the investor, losses from these exchange rate movements can partially or totally negate the original return earned. Obviously, US investors who invest only in US stocks on US markets do not face this risk, but in today's global environment where investors increasingly consider alternatives from other countries, this factor has become important. Currency risk affects international mutual funds, global mutual funds, closed-end single country funds, American Depository Receipts, foreign stocks, and foreign bonds.

Country Risk: Country risk, also referred to as political risk, is an important risk for investors today. With more investors investing internationally, both directly and indirectly, the political, and therefore economic stability and viability of a country's economy need to be considered.

Example: The United States has the lowest country risk, and other countries can be judged on a relative basis using the United States as a benchmark. Examples of countries that needed careful monitoring in the 1990s because of country risk included the former Soviet Union and Yugoslavia, China, Hong Kong, and South Africa.

Liquidity Risk: Liquidity risk is the risk associated with the particular secondary market in which a security trades. An investment that can be bought or sold quickly and without significant price concession is considered liquid. The more uncertainty about the time element and the price concession, the greater the liquidity risk. A Treasury bill has little or no liquidity risk, whereas a small OTC stock may have substantial liquidity risk.

Liquid Assets Risk: It is that portion of an asset's total variability of return which results from price discounts given or sales concessions paid in order to sell the asset without delay. Perfectly liquid assets are highly marketable and suffer no liquidation costs. Illiquid assets are not readily marketable and suffer no liquidation costs. Either price discounts must be given or sales commissions must be paid, or the seller must incur both the costs, in order to find a new investor for an illiquid asset. The more illiquid the asset is, the larger the price discounts or the commissions that must be paid to dispose of the assets.

Political Risk: It arises from the exploitation of a politically weak group for the benefit of a politically strong group, with the efforts of various groups to improve their relative positions increasing the variability of return from the affected assets. Regardless of whether the changes that cause political risk are sought by political or by economic interests, the resulting variability of return is called political risk, if it is accomplished through legislative, judicial or administrative branches of the government.

Notes

Notes Domestic political risk arises from changes in environmental regulations, zoning requirements, fees, licenses, and most frequently, taxes. Taxes could be both direct and indirect. Some types of securities and certain categories of investors enjoy a privileged tax status.

International political risk takes the form of expropriation of non-residents' assets, foreign exchange controls that won't let foreign investors withdraw their funds, disadvantageous tax and tariff treatments, requirements that non-residents investors give partial ownership to local residents, and un-reimbursed destruction of foreign-owned assets by hostile residents of the foreign country.

Industry Risk: An industry may be viewed as group of companies that compete with each other to market a homogeneous product. Industry risk is that portion of an investment's total variability of return caused by events that affect the products and firms that make up an industry.

Example: Commodity prices going up or down will affect all the commodity producers, though not equally.

The stage of the industry's life cycle, international tariffs and/or quotas on the products produced by an industry, product/industry related taxes (e.g. cigarettes), industry-wide labour union problems, environmental restrictions, raw material availability, and similar factors interact with and affect all the firms in an industry simultaneously. As a result of these common features, the prices of the securities issued by the competing firms tend to rise and fall together.

Caution These risk factors do not make up an exhaustive list, but are merely representative of the major classifications involved. All the uncertainties taken together make up the total risk, or the total variability of return.

2.1.2 Measurement of Risk

Volatility

Of all the ways to describe risk, the simplest and possibly most accurate is "the uncertainty of a future outcome." The anticipated return for some future period is known as the expected return. The actual return over some past period is known as the realized return. The simple fact that dominates investing is that the realized return on an asset with any risk attached to it may be different from what was expected. Volatility may be described as the range of movement (or price fluctuation) from the expected level of return. For example, the more a stock goes up and down in price, the more volatile that stock is. Because wide price swings create more uncertainty of an eventual outcome, increased volatility can be equated with increased risk. Being able to measure and determine the past volatility of a security is important in that it provides some insight into the riskiness of that security as an investment.

Standard Deviation

Investors and analysts should be at least somewhat familiar with the study of probability distributions. Since the return an investor will earn from investing is not known, it must be

Notes

estimated. An investor may expect the TR (total return) on a particular security to be 10% for the coming year, but in truth this is only a "point estimate."

Probability Distributions

To deal with the uncertainty of returns, investors need to think explicitly about a security's distribution of probable TRs In other words, investors need to keep in mind that, although they may expect a security to return 10%, for example, this is only a one-point estimate of the entire range of possibilities. Given that investors must deal with the uncertain future, a number of possible returns can, and will, occur.

In the case of a Treasury bond paying a fixed rate of interest, the interest payment will be made with 100 per cent certainty, barring a financial collapse of the economy. The probability of occurrence is 1.0, because no other outcome is possible. With the possibility of two or more outcomes, which is the norm for common stocks, each possible likely outcome must be considered and a probability of its occurrence assessed. The result of considering these outcomes and their probabilities together is a probability distribution consisting of the specification of the likely returns that may occur and the probabilities associated with these likely returns.

Probabilities represent the likelihood of various outcomes and are typically expressed as a decimal (sometimes fractions are used). The sum of the probabilities of all possible outcomes must be 1.0, because they must completely describe all the (perceived) likely occurrences. How are these probabilities and associated outcomes obtained? In the final analysis, investing for some future period involves uncertainty, and therefore subjective estimates. Although past occurrences (frequencies) may be relied on heavily to estimate the probabilities, the past must be modified for any changes expected in the future. Probability distributions can be either discrete or continuous. With a discrete probability distribution, a probability is assigned to each possible outcome. With a continuous probability distribution, an infinite number of possible outcomes exists. The most familiar continuous distribution is the normal distribution depicted by the well-known bell-shaped curve often used in statistics. It is a two-parameter distribution in that the mean and the variance fully describe it.

To describe the single-most likely outcome from a particular probability distribution, it is necessary to calculate its expected value. The expected value is the average of all possible return outcomes, where each outcome is weighted by its respective probability of occurrence. For investors, this can be described as the expected return.

We have mentioned that it's important for investors to be able to quantify and measure risk. To calculate the total risk associated with the expected return, the variance or standard deviation is used. This is a measure of the spread or dispersion in the probability distribution; that is, a measurement of the dispersion of a random variable around its mean. Without going into further details, just be aware that the larger this dispersion, the larger the variance or standard deviation. Since variance, volatility and risk can, in this context, be used synonymously, remember that the larger the standard deviation, the more uncertain the outcome.

Calculating a standard deviation using probability distributions involves making subjective estimates of the probabilities and the likely returns. However, we cannot avoid such estimates because future returns are uncertain. The prices of securities are based on investors' expectations about the future. The relevant standard deviation in this situation is the *ex ante* standard deviation and not the ex post based on realized returns.

Although standard deviations based on realized returns are often used as proxies *for ex ante* standard deviations, investors should be careful to remember that the past cannot always be extrapolated into the future without modifications. *Ex post* standard deviations may be convenient, but they are subject to errors. One important point about the estimation of standard deviation is

Notes

the distinction between individual securities and portfolios. Standard deviations for well-diversified portfolios are reasonably steady across time, and therefore historical calculations may be fairly reliable in projecting the future. Moving from well-diversified portfolios to individual securities, however, makes historical calculations much less reliable. Fortunately, the number one rule of portfolio management is to diversify and hold a portfolio of securities, and the standard deviations of well-diversified portfolios may be more stable.

Something very important to remember about standard deviation is that it is a measure of the total risk of an asset or a portfolio, including, therefore, both systematic and unsystematic risk. It captures the total variability in the asset's or portfolio's return, whatever the sources of that variability. In summary, the standard deviation of return measures the total risk of one security or the total risk of a portfolio of securities. The historical standard deviation can be calculated for individual securities or portfolios of securities using total returns for some specified period of time. This ex post value is useful in evaluating the total risk for a particular historical period and in estimating the total risk that is expected to prevail over some future period.

The standard deviation, combined with the normal distribution, can provide some useful informations about the dispersion or variation in returns. In a normal distribution, the probability that a particular outcome will be above (or below) a specified value can be determined. With one standard deviation on either side of the arithmetic mean of the distribution, 68.3% of the outcomes will be encompassed; that is, there is a 68.3% probability that the actual outcome will be within one (plus or minus) standard deviation of the arithmetic mean. The probabilities are 95% and 99% that the actual outcome will be within two or three standard deviations, respectively, of the arithmetic mean.

Beta

Beta is a measure of the systematic risk of a security that cannot be avoided through diversification. Beta is a relative measure of risk-the risk of an individual stock relative to the market portfolio of all stocks. If the security's returns move more (less) than the market's returns as the latter changes, the security's returns have more (less) volatility (fluctuations in price) than those of the market. It is important to note that beta measures a security's volatility, or fluctuations in price, relative to a benchmark, the market portfolio of all stocks.

Securities with different slopes have different sensitivities to the returns of the market index. If the slope of this relationship for a particular security is a 45-degree angle, the beta is 1.0. This means that for every one per cent change in the market's return, on average this security's returns change 1%. The market portfolio has a beta of 1.0. A security with a beta of 1.5 indicates that, on average, security returns are 1.5 times as volatile as market returns, both up and down. This would be considered an aggressive security because when the overall market return rises or falls 10%, this security, on average, would rise or fall 15%. Stocks having a beta of less than 1.0 would be considered more conservative investments than the overall market.

Beta is useful for comparing the relative systematic risk of different stocks and, in practice, is used by investors to judge a stock's riskiness. Stocks can be ranked by their betas. Because the variance of the market is constant across all securities for a particular period, ranking stocks by beta is the same as ranking them by their absolute systematic risk. Stocks with high betas are said to be high-risk securities.

2.2 Risk and Expected Return

Risk and expected return are the two key determinants of an investment decision. Risk, in simple terms, is associated with the variability of the rates of return from an investment; how much do individual outcomes deviate from the expected value? Statistically, risk is measured by

Notes

any one of the measures of dispersion such as co-efficient of range, variance, standard deviation etc.

The risk involved in investment depends on various factors such as:

1. The length of the maturity period – longer maturity periods impart greater risk to investments.
2. The credit-worthiness of the issuer of securities – the ability of the borrower to make periodical interest payments and pay back the principal amount will impart safety to the investment and this reduces risk.
3. The nature of the instrument or security also determines the risk. Generally, government securities and fixed deposits with banks tend to be riskless or least risky; corporate debt instruments like debentures tend to be riskier than government bonds and ownership instruments like equity shares tend to be the riskiest. The relative ranking of instruments by risk is once again connected to the safety of the investment.
4. Equity shares are considered to be the most risky investment on account of the variability of the rates of returns and also because the residual risk of bankruptcy has to be borne by the equity holders.
5. The liquidity of an investment also determines the risk involved in that investment. Liquidity of an asset refers to its quick saleability without a loss or with a minimum of loss.
6. In addition to the aforesaid factors, there are also various others such as the economic, industry and firm specific factors that affect the risk an investment.

Another major factor determining the investment decision is the rate of return expected by the investor. The rate of return expected by the investor consists of the yield and capital appreciation.

Before we look at the methods of computing the rate of return from an investment, it is necessary to understand the concept of the return on investment. We have noted earlier that an investment is a postponed consumption. Postponement of consumption is synonymous with the concept of 'time preference for money'. Other things remaining the same, individuals prefer current consumption to future consumption. Therefore, in order to induce individuals to postpone current consumption they have to be paid certain compensation, which is the time preference for consumption. The compensation paid should be a positive real rate of return. The real rate of return is generally equal to the rate of return expected by an investor from a risk-free capital asset assuming a world without inflation. However, in real life, inflation is a common feature of a capitalist economy. If the investor is not compensated for the effects of inflation, the real rate of return may turn out to be either zero or negative. Therefore, the investors, generally, add expected inflation rate to the real rate of return to arrive at the nominal rate of return.

Example: Assume that the present value of an investment is ₹ 100; the investor expects a real time rate of 3% per annum and the expected inflation rate is 3% per annum. If the investor were to receive only the real time rate, he would get back ₹ 103 at the end of one year. The real rate of return received by the investor would be equal to zero because the rime preference rate of 3% per annum is matched by the inflation of 3% per annum. If the actual inflation rate is greater than 3% per annum, the investor would suffer negative returns.

Thus, nominal rate of return on a risk-free asset is equal to the time preference real rate plus expected inflation rate.

If the investment is in capital assets other than government obligations, such assets would be associated with a degree of risk that is idiosyncratic to the investment. For an individual to

Notes

invest in such assets, an additional compensation, called the risk premium will have to be paid over and above the nominal rate of return.

Determinants of the Rate of Return

Therefore, three major determinants of the rate of return expected by the investor are:

1. The time preference risk-free real rate
2. The expected rate of inflation
3. The risk associated with the investment, which is unique to the investment.

Hence,

Required return = Risk-free real rate + Inflation premium + Risk premium

It was stated earlier that the rate of return from an investment consists of the yield and capital appreciation, if any. The difference between the sale price and the purchase price is the capital appreciation and the interest or dividend divided by the purchase price is the yield. Accordingly

$$\text{Rate of return } (R_t) = \frac{I_t + [P_t - P_{t-1}]}{P_{t-1}} \quad ...(1)$$

Where, R_t = Rate of return per time period 't'

I_t = Income for the period 't'

P_t = Price at the end of time period 't'

P_{t-1} = Initial price, i.e., price at the beginning of the period 't'.

In the above equation 't' can be a day or a week or a month or a year or years and accordingly daily, weekly, monthly or annual rates of return could be computed for most capital assets.

The above equation can be split in to two components. *Viz.*,

$$\text{Rate of return } (R_t) = \frac{I_t}{P_{t-1}} + \frac{P_t - P_{t-1}}{P_{t-1}} \quad ...(2)$$

Where, $\frac{I_t}{P_{t-1}}$ is called the current yield,

and $\frac{P_t - P_{t-1}}{P_{t-1}}$ is called the capital gain yield.

Or **ROR = Current yield + Capital gain yield**

Example: The following information is given for a corporate bond. Price of the bond at the beginning of the year: ₹ 90, Price of the bond at the end of the year: ₹ 95.40, Interest received for the year: ₹ 13.50. Compute the rate of return.

Solution: The rate of return can be computed as follows:

$$\frac{13.50 + (95.40 - 90)}{90} = 0.21 \text{ or } 21\% \text{ per annum}$$

The return of 21% consists of 15% current yield and 6% capital gain yield.

Notes

There is always a direct association between the rates of return and the asset prices. Finance theory stipulates that the price of any asset is equal to the sum of the discounted cash flows, which the capital asset owner would receive. Accordingly, the current price of any capital asset can be expected, symbolically, as:

$$P_0 = \sum_{t=1}^{n} \frac{E(I_t)}{(1+r)^t} + \frac{P_n}{(1+r)^n} \quad ...(3)$$

Where, $E(R_t)$ = Expected income to be received in year 't'

P_0 = Current price of the capital asset

P_n = Price of the asset on redemption or on liquidation

R = The rate of return investors expect given the risk inherent in that capital asset.

Thus, 'r' is the rate or return, which the investors require in order to invest in a capital asset that is used to discount the expected future cash flows from that capital asset.

Case Study

Kinetic Ltd.

Mr. Amirican has purchased 100 shares of ₹ 10 each of Kinetic Ltd. in 2005 at ₹ 78 per share. The company has declared a dividend @ 40% for the year 2006-07. The market price of share as on 1-4-2006 was ₹ 104 and on 31-3-2007 was ₹ 128. What will be the annual return on the investment for the year 2006-07.

Dividend received for 2004 – 05 = ₹ 10 × 40/100 = ₹ 4

Solution: Calculation of annual rate of return on investment for the year 2006-07

$$R = \frac{d_1 + (P_1 - P_0)}{P_0} = \frac{4 + (128 - 104)}{104} = 0.2692 \text{ or } 26.92\%$$

2.3 Risk-Return Relationship

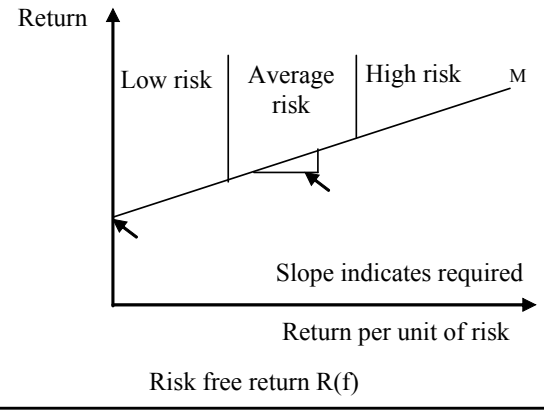
The most fundamental tenet of finance literature is that there is a trade-off between risk and return. The risk-return relationship requires that the return on a security should be commensurate with its riskiness. If the capital markets are operationally efficient, then all investment assets should provide a rate or return that is consistent with the risks associated with them. The risk and return are directly variable, i.e., an investment with higher risk should produce higher return.

The risk/return trade-off could easily be called the "ability-to-sleep-at-night test." While some people can handle the equivalent of financial skydiving without batting an eye, others are terrified to climb the financial ladder without a secure harness. Deciding what amount of risk you can take while remaining comfortable with your investments is very important.

In the investing world, the dictionary definition of risk is the possibility that an investment's actual return will be different than expected. Technically, this is measured in statistics by standard deviation. Risk means you have the possibility of losing some, or even all, of your original investment.

Notes

Figure 2.1: Risk and Return Relationship

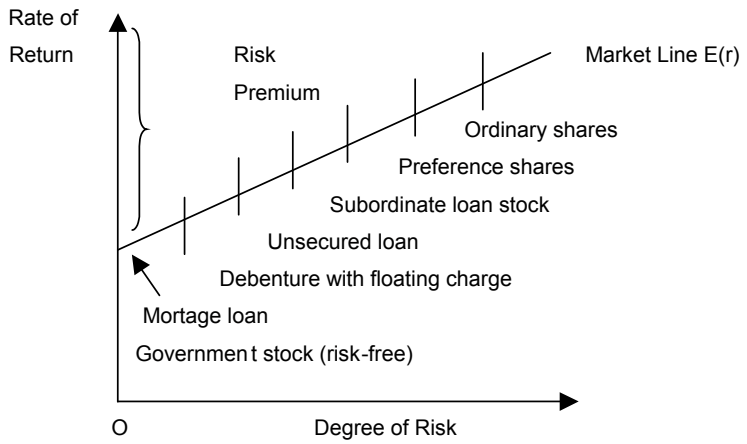


Low levels of uncertainty (low risk) are associated with low potential returns. High levels of uncertainty (high risk) are associated with high potential returns. The risk/return trade-off is the balance between the desire for the lowest possible risk and the highest possible return. This is demonstrated graphically in the chart below. A higher standard deviation means a higher risk and higher possible return. The figure below represents the relationship between risk and return.

The slope of the Market Line indicates the return per unit of risk required by all investors. Highly risk-averse investors would have a steeper line, and vice versa. Yields on apparently similar stocks may differ. Differences in price, and therefore yield, reflect the market's assessment of the issuing company's standing and of the risk elements in the particular stocks. A high yield in relation to the market in general shows an above average risk element.

This is shown in the figure below:

Figure 2.2: Risk Return Relationship of Different Stocks



Given the composite market line prevailing at a point of time, investors would select investments that are consistent with their risk preferences. Some will consider low-risk investments, while others prefer high-risk investments.

A common misconception is that higher risk equals greater return. The risk/return trade-off tells us that the higher risk gives us the possibility of higher returns. But there are no guarantees. Just as risk means higher potential returns, it also means higher potential losses.

Notes

On the lower end of the scale, the risk-free rate of return is represented by the return on Treasury Bills of government securities, because their chance of default is next to nil. If the risk-free rate is currently 8 to 10 %, this means, with virtually no risk, we can earn 8 to 10 % per year on our money.

The common question arises: who wants to earn 6% when index funds average 12% per year over the long run? The answer to this is that even the entire market (represented by the index fund) carries risk. The return on index funds is not 12% every year, but rather -5% one year, 25% the next year, and so on. An investor still faces substantially greater risk and volatility to receive an overall return that is higher than a predictable government security. We call this additional return the risk premium, which in this case is 8% (12% - 8%).

Task What do you think determines the risk level?

1. goals
2. income
3. personal situation
4. any other factor.

Give reasons to support your argument.

2.4 Portfolio and Security Returns

A portfolio is a collection of securities. Since it is rarely desirable to invest the entire funds of an individual or an institution in a single security, it is essential that every security be viewed in a portfolio context. Thus, it seems logical that the expected return of a portfolio should depend on the expected return of each of the security contained in the portfolio. It also seems logical that the amounts invested in each security should be important. Indeed, this is the case. The example of a portfolio with three securities shown in Table A illustrates this point.

The expected holding period value - relative for the portfolio is clearly shown:

$$\frac{₹\ 23,100}{₹\ 20,000} = 1.155$$

Giving an expected holding period return of 15.50%.

1. ***Security and Portfolio Values***

Security	No. of Shares (₹)	Current Price Per Share (₹)	Current Value (₹)	Expected End-of Period Share Value (₹)	Expected End-of Period Share Value (₹)
1	2	3	4	5	6
XYZ	100	15.00	1,500	18.00	1,800
ABC	150	20.00	3,000	22.00	3,300
RST	200	40.00	8,000	45.00	9,000
KNF	250	25.00	6,250	30.00	7,500
DET	100	12.50	1,250	15.00	1,500
			20.000		23.100

Notes

2. *Security and Portfolio Value-Relative*

Security	Current Value	Proportion of current value of Properties	Current Price Per Share	Expected End-of-Period Value Per Share	Expected Holding-Period Value-Relative	Contribution to Portfolio Expected Holding-Period Value-Relative
(1)	(2) (₹)	3 = (2) ₹ 20,000	(4) (₹)	(5) (₹)	(6) = (5)/(4)	(7) = (3) × (6)
XUZ	1,500	.0750	15,00	18.00	. 1,200	0.090000
ABC	3,000	.1500	20,00	22.00	1,100	0.165000
RST	8,000	.4000	40,00	45.00	1,125	0.450000
KNF	6,250	.3125	25,00	30.00	1,200	0.375000
DET	1,250	.0625	12,50	15.00	1,200	0.075000
	20,000	1.0000				1.155000

3. *Security and Portfolio Holding-period Returns*

Security	Proportion of Current Value of Portfolio	Expected Holding Period Return (%)	Contribution to Portfolio Expected Holding Period Return (%)
1	2	3	4
XYZ	.0750	20.00	1.50
ABC	.1500	10.00	1.50
RST	.4000	12.50	5.00
KNF	.3125	20.00	6.25
DET	.0625	20.00	1.25
	1.0000		15.50

Since the portfolio's expected return is a weighted average of the expected returns of its securities, the contribution of each security to the portfolio's expected returns depends on its expected returns and its proportionate share of the initial portfolio's market value. Nothing else is relevant. It follows that an investor who simply wants the greatest possible expected return should hold one security. This should be the one that is considered to have the greatest expected return. Very few investors do this, and very few investment advisers would counsel such an extreme policy. Instead, investors should diversify, meaning that their portfolio should include more than one security. This is because diversification can reduce risk.

Notes

Case Study

Asian CERC – Last 6 Years

The average market prices and dividend per share of Asian CERC Ltd. for the past 6 years are given below:

Year	Average market price (`)	Dividend per share (`)
2007	68	3.0
2006	61	2.6
2005	50	2.0
2004	53	2.5
2003	45	2.0
2002	38	1.8

What will be the average rate of return of Asian CERC Ltd.'s shares for past 6 years.

All possible questions which the investor may ask, the most important one is concerned with the probability of actual yield being less than zero, that is, with the probability of loss. This is the essence of risk. A useful measure of risk should somehow take into account both the probability of various possible "bad" outcomes and their associated magnitudes. Instead of measuring the probability of a number of different possible outcomes, the measure of risk should somehow estimate the extent to which the actual outcome is likely to diverge from the expected.

Two measures are used for this purpose: The average (or mean) absolute deviation and the standard deviation.

Case Study

Performance of Equity Shares at Wipro Ltd.

The rate of return of equity shares of Wipro Ltd., for past six years are given below:

Year	01	02	03	04	05	06
Rate of return (%)	12	18	-6	20	22	24

Calculate the average rate of return, standard deviation and variance.

Solution:

Calculation of Average rate of Return ($\bar{R}$)

$$\bar{R} = \frac{\Sigma R}{N} = \frac{12+18-6+20+22+24}{6} = 15\%$$

$$\sigma^2 = \frac{\Sigma(R-\bar{R})^2}{N} \qquad .....(1)$$

Contd...

Notes

Year	Rate of Return (%) (R)	$(R-\bar{R})$	$(R-\bar{R})^2$
2001	12	-3 (12-15)	9
2002	18	3 (18-15)	9
2003	-6	-21(-6-15)	441
2004	20	5(20-15)	25
2005	22	7(22-15)	49
2006	24	9(24-15)	81
		$\Sigma(R-\bar{R})^2$	614

Putting the values of $\Sigma(R-\bar{R})^2$ and N in equation (1), we get Variance $(\sigma^2) = \frac{614}{6} = 102.33$

Standard Deviation = $\sigma = \sqrt{\text{Variance}} = \sqrt{\sigma^2}$ .....(2)

Putting the value of σ^2 in equation (2),

we get $\sigma = \sqrt{102.33} = 10.1158$ (approx.)

Hence standard deviation = 10.12%

2.5 Return and Risk of Portfolio

Return of Portfolio (Two Assets)

The expected return from a portfolio of two or more securities is equal to the weighted average of the expected returns from the individual securities.

$$\Sigma(R_P) = W_A(R_A) + W_B(R_B)$$

Where,

$\Sigma(R_P)$ = Expected return from a portfolio of two securities

W_A = Proportion of funds invested in Security A

W_B = Proportion of funds invested in Security B

R_A = Expected return of Security A

R_B = Expected return of Security B

$W_A + W_B = 1$

Example: A Ltd.'s share gives a return of 20% and B Ltd.'s share gives 32% return. Mr. Gotha invested 25% in A Ltd.'s shares and 75% of B Ltd.'s shares. What would be the expected return of the portfolio?

Solution:

Portfolio Return = 0.25(20) + 0.75 (32) = 29%

Notes

Case Study

RKV's Portfolio

Mr. RKV's portfolio consists of six securities. The individual returns of each of the security in the portfolio are given below:

Security	Proportion of Investment in the Portfolio	Return
Wipro	10%	18%
Latham	25%	12%
SBI	8%	22%
ITC	30%	15%
RNL	12%	6%
DLF	15%	8%

Calculate the weighted average of return of the securities consisting the portfolio.

Solution:

Security	Weight (W)	Return (%) (R)	(W × R)
Wipro	0.10	18	1.80
Latham	0.25	12	3.00
SBI	0.08	22	1.76
ITC	0.30	15	4.50
RNL	0.12	6	0.72
DLF	0.15	8	1.20
			12.98

∴ Portfolio return is 12.98%

Risk of Portfolio (Two Assets)

The risk of a security is measured in terms of variance or standard deviation of its returns. The portfolio risk is not simply a measure of its weighted average risk. The securities that a portfolio contains are associated with each other. The portfolio risk also considers the covariance between the returns of the investment. Covariance of two securities is a measure of their co-movement; it expresses the degree to which the securities vary together. The standard deviation of a two-share portfolio is calculated by applying formula given below:

$$\sigma_p^2 = W_A^2\sigma_A^2 + W_B^2\sigma_B^2 + 2W_A W_B \rho_{AB}\sigma_A\sigma_B$$

Where,

σ_p = Standard deviation of portfolio consisting securities A and B

W_A W_B = Proportion of funds invested in Security A and Security B

σ_A σ_B = Standard deviation of returns of Security A and Security B

ρ_{AB} = Correlation coefficient between returns of Security A and Security B

Notes

The correlation coefficient (AB) can be calculated as follows:

$$AB = \frac{Cov_{AB}}{\sigma_A \sigma_B}$$

The covariance of Security A and Security B can be presented as follows:

$$Cov_{AB} = \sigma_A \, \sigma_B \, \rho_{AB}$$

The diversification of unsystematic risk, using a two-security portfolio, depends upon the correlation that exists between the returns of those two securities. The quantification of correlation is done through calculation of correlation coefficient of two securities (ρ_{AB}). The value of correlation ranges between –1 to 1; it can be interpreted as follows:

If ρ_{AB} = 1, No unsystematic risk can be diversified.

If ρ_{AB} = –1, All unsystematic risks can be diversified.

If ρ_{AB} = 0, No correlation exists between the returns of Security A and Security B.

Case Study

Portfolio Consisting Wipro & Infosys Securities

The returns of Security of Wipro and Security of Infosys for the past six years are given below:

Year	Security of Wipro Return %	Security of Infosys Return %
2003	9	10
2004	5	-6
2005	3	12
2006	12	9
2007	16	15

Calculate the risk and return of portfolio consisting both where the proportion of funds invested in security of Wipro is 80%.

Solution: Calculation of Mean Return and Standard Deviation of Security of Wipro (Security A)

Year	Return % (R_A)	$(R_A - \bar{R}_A)$	$(R_A - \bar{R}_A)^2$
2003	9	0 (9 – 9)	0
2004	5	-4 (5 – 9)	16
2005	3	-6 (3 – 9)	36
2006	12	3 (12 – 9)	9
2007	16	7 (16 – 9)	49
	45		110

Mean Return ($\bar{R}_A$) = 45/5 = 9%

Standard Deviation (σ_A) = $\sqrt{110}$ = 10.49%

Contd...

Notes

Calculation Mean Return and Standard Deviation of Security of Infosys (Security B)

Year	Return % (R_B)	$(R_B - \bar{R}_B)$	$(R_B - \bar{R}_B)^2$
2001	10	2 (10 – 8)	4
2002	-6	–14 (–6 – 8)	196
2003	12	4 (12– 8)	16
2004	9	1 (9 – 8)	1
2005	15	7 (15 – 8)	49
	40		266

Mean Return ($\bar{R}_B$) = 40/5 = 8%

Standard Deviation (σ_B) = $\sqrt{266}$ = 16.31%

Analysis – Security A has a higher historic level of return and lower risk as compared to Security B. Correlation Coefficient (ρ_{AB}).

$$= \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{N\Sigma X^2 - (\Sigma X)^2}\sqrt{N\Sigma Y^2 - \Sigma Y^2}}$$

A's return (%)		B's return (%)		
X	X^2	Y	Y^2	XY
9	81	10	100	90
5	25	-6	36	-30
3	9	12	144	36
12	144	9	81	108
16	256	15	225	240
ΣX= 45	ΣX^2 = 515	ΣY = 40	ΣY^2 = 586	ΣXY = 444

$$= \frac{5 \times 444 - (45 \times 40)}{\sqrt{5 \times 515 - (45)^2}\sqrt{5 \times 586 - (40)^2}}$$

$$= \frac{2,220 - 1800}{\sqrt{2575 - 2025}\sqrt{2930 - 1600}} = \frac{420}{\sqrt{550}\sqrt{1330}}$$

$$= \frac{420}{23.452 \times 36.469} = \frac{420}{855.271} = 0.491$$

Verification:

Calculation of Covariance of Returns of Securities A and B

Year	Returns (%)		$(R_A - \bar{R}_A)$	$(R_B - \bar{R}_B)$	$(R_A - \bar{R}_A) \times (R_B - \bar{R}_B)$
	R_A	R_B			
2001	9	10	0(9 – 9)	2 (10 – 8)	0 (0 × 2)
2002	5	-6	-4 (5 – 9)	-14 (-6 – 8)	56 (-4 × -14)
2003	3	12	-6 (3 – 9)	4 (12 – 8)	-24 (-6 × 4)
2004	12	9	3 (12 – 9)	1 (9 – 8)	3 (3 × 1)
2005	16	15	7 (16 – 9)	7 (15 – 8)	49 (7 × 7)
					Cov_{AB} = 84

Contd...

Notes

$$\rho_{AB} = \frac{Cov_{AB}}{\sigma_A \sigma_B} = \frac{84}{10.49 \times 16.31} = 0.491$$

$$Cov_{AB} = \sigma_A \sigma_B \rho_{AB} = 10.49 \times 16.31 \times 0.491 = 84$$

$$\text{Return of portfolio } (R_p) = W_A (R_A) + W_B (R_B) \quad .....(1)$$

$$W_A = 80\% = .8; W_B = 1 - .8 = .2$$

Putting the values in Eq. (1), we get (0.80 × 9) + (0.20 × 8) = 7.2+1.6 = 8.8%

Risk of portfolio (σ_p)

Since, $$\sigma_P^2 = w_A^2\sigma_A^2 + w_B^2\sigma_B^2 + 2W_A W_B P_{AB}\sigma_A\sigma_B \quad .....(2)$$

Putting the values in Eq. (2), we get

$$\sigma_P^2 = (0.80^2 \times 10.49^2) + (0.20^2 \times 16.31^2) + (2 \times 0.80 \times 0.20 \times 0.491 \times 10.49 \times 16.31)$$

$$= (0.64 \times 110.04) + (0.04 \times 266.02) + 26.88$$

$$= 70.43 + 10.64 + 26.88 = 107.95$$

Hence, $\sigma_P = \sqrt{\sigma_P^2} = \sqrt{107.95} = 10.39\%$

Thus the risk and return of combined portfolio are 10.39% and 8.8% respectively.

Risk and Return of Portfolio (Three Assets)

Formula for calculating risk of portfolio consisting three securities

$$\sigma_P^2 = W_x^2\sigma_x^2 + W_y^2\sigma_y^2 + W_z^2\sigma_z^2 + 2W_x W_y \rho_{yz}\sigma_y\sigma_z + W_x W_z \rho_{xz}\sigma_x\sigma_z$$

Where,

W_1, W_2, W_3 = Proportion of amount invested in securities X, Y and Z

$\sigma_x, \sigma_y, \sigma_z$ = Standard deviations of securities X, Y and Z

ρ_{xy} = Correlation coefficient between securities X and Y

ρ_{yz} = Correlation coefficient between securities Y and Z

ρ_{xz} = Correlation coefficient between securities X and Z

Example: A portfolio consists of three securities P, Q and R with the following parameters:

	Security			Correlation coefficient
	P	**Q**	**R**	
Expected return (%)	35	22	20	
Standard deviation (%)	20	26	24	
Correlation coefficient:				
PQ				-0.5
QR				+0.4
PR				+0.6

Notes

If the securities are equally weighted, how much is the risk and return of the portfolio of these three securities?

Solution:

Expected Portfolio Return

$$= (25 \times 1/3) + (22 \times 1/3) + (20 \times 1/3) = 22.33\%$$

$$\sigma_P^2 = \begin{array}{l}(30)^2(1/3)^2 + (26)^2 + (24)^2(1/3)^2 + 2(1/3)(-0.5)(30)(26) + 2(1/3)(1/3)(0.4)(26)(24) \\ +2(1/3)(1/3)(0.6)(30)(24)\end{array}$$

$$\sigma_P^2 = 100 + 75.11 + 64 - 86.67 + 55.47 + 96 = 303.91$$

$$\sigma_P = \sqrt{303.91} = 17.43\%$$

Optimal Portfolio (Two Assets)

The investor can minimise his risk on the portfolio. Risk avoidance and risk minimisation are the important objectives of portfolio management. A portfolio contains different securities; by combining their weighted returns we can obtain the expected return of the portfolio. A risk-averse investor always prefers to minimise the portfolio risk by selecting the optimal portfolio. The minimum risk portfolio with two assets can be ascertained as follows:

$$W_A = \frac{\partial_B{}^2 - Cov_{AB}}{\partial_A{}^2 + \partial_B{}^2 - Cov_{AB}}$$

We can also calculate the proportion to be invested (W_A) in Security A.

$$= \frac{16.31^2 - 84}{(10.49^2 + 16.31^2) - (2 \times 84)} = \frac{182.02}{208.06} = 0.875$$

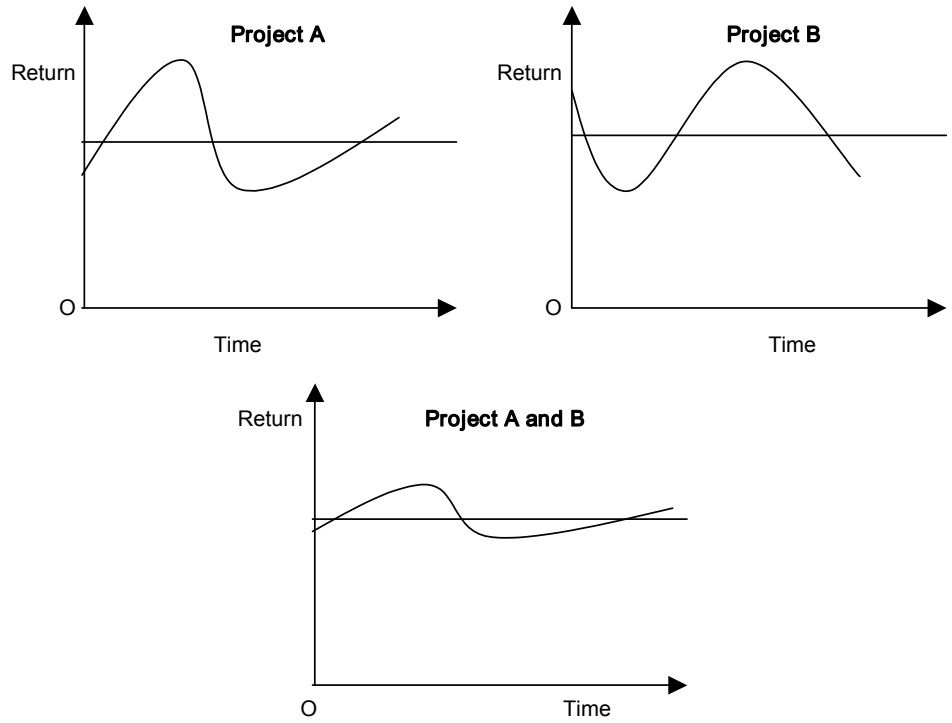
Therefore, 87.5% of funds should be invested in Security A and 12.5% should be invested in Security B, which represents the optimal portfolio.

2.6 Portfolio Diversification and Risk

In an efficient capital market, the important principle to consider is that, investors should not hold all their eggs in one basket; investor should hold a well-diversified portfolio. In order to understand portfolio diversification, one must understand correlation. Correlation is a statistical measure that indicates the relationship, if any, between series of numbers representing anything from cash flows to test data. If the two series move together, they are positively correlated; if the series move in opposite directions, they are negatively correlated. The existence of perfectly correlated especially negatively correlated-projects is quite rare. In order to diversify project risk and thereby reduce the firm's overall risk, the projects that are best combined or added to the existing portfolio of projects are those that have a negative (or low positive) correlation with existing projects. By combining negatively correlated projects, the overall variability of returns or risk can be reduced. The figure illustrates the result of diversifying to reduce risk.

Notes

Figure 2.3: Reduction of Risk through Diversification



It shows that a portfolio is containing the negatively corrected projects A and B, both having the same expected return, E, but less risk (i.e. less variability of return) than either of the projects taken separately. This type of risk is sometimes described as diversifiable or alpha risk. The creation of a portfolio by combining two perfectly correlated projects cannot reduce the portfolio's overall risk below the risk of the least risky project, while the creation of a portfolio combining two projects that are perfectly negatively correlated can reduce the portfolio's total risk to a level below that of either of the component projects, which in certain situations may be zero.

Benefits of Diversification

The gains in risk reduction from portfolio diversification depend inversely upon the extent to which the returns on securities in a portfolio are positively correlated. Ideally, the securities should display negative correlation. This implies that if a pair of securities has a negative correlation of returns, then in circumstances where one of the securities is performing badly, the other is likely to be doing well and vice versa in reverse circumstances. Therefore the average return on holding the two securities is likely to be much 'safer' than investing in one of them alone.

Utility Function and Risk Taking

Common investors will have three possible attitudes to undertake risky course of action (i) an aversion to risk (ii) a desire to take risk, and (iii) an indifference to risk. The following example will clarify the risk attitude of the individual investors.

Notes

Example: The possible outcomes of two alternatives A and B, depending on the state of economy, are as follows:

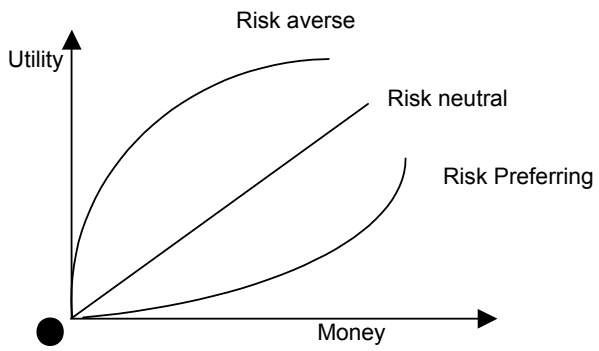
State of economy	Possible outcome (`)	
	A	B
Normal	100	100
Boom	110	200

If we assume that the three states of the economy are equally likely, then expected value for each alternative is ₹ 100.

1. A risk-seeker is one who, given a choice between more or less risky alternatives with identical expected values, prefers the riskier alternative i.e. alternative B.
2. A risk averted would select the less risky alternative i.e. alternative A.
3. The person who is indifferent to risk (risk neutral) would be indifferent to both alternative A and B, because they have same expected values.

The empirical evidence shows that majority of investors are risk-averse. Some generalisations concerning the general shape of utility functions are possible. People usually regard money as a desirable commodity, and the utility of a large sum is usually greater than the utility of a smaller sum. Generally a utility function has a positive slope over an appropriate range of money values, and the slope probably does not vary in response to small changes in the stock of money. For small changes in the amount of money going to an individual, the slope is constant and the utility function is linear. If the utility function is linear, the decision-maker maximises expected utility by maximising expected monetary value. However, for large variations in the amount of money, this is likely to be the case. For large losses and large gains, the utility function often approaches upper and lower limits. The slope of the curve will usually increase sharply as the amount of loss increases, because the dis-utility of a large loss is proportionately more than the disutility of a small loss, but the curve will flatten as the loss becomes very large. For a risk-averse decision-maker, the expected utility of a function is less than the utility of the expected monetary value. It is also possible for the decision-maker to be risk preferring, at least over some range of the utility function. In this case, the expected utility of a function is more than the utility of the expected monetary value (EMV).

Figure 2.4: Utility Function and Risk Taking



Notes

Case Study

Historical Return on Stock A and B

Stocks A and B have the following historical returns:

Year	Stock A's Return (K_A) %	Stock A's Return (K_B) %
2003	-12.24	-5.00
2004	23.67	19.55
2005	35.45	44.09
2006	5.82	1.20
2007	28.30	21.16

You are required to calculate the average rate of return for each stock during the period 2003 through 2007. Assume that someone held a portfolio consisting 50% of stock A and 50% of stock B. What would have been the average return on the portfolio during the period? (You may assume that the year ended on 31st March.)

Solution:

Calculation of Average Rate of Return on Portfolio during 2003-2007.

Year	Stock A's Return (%)	Stock A's Return (%)
2003	-12.24	-5.00
2004	23.67	19.55
2005	35.45	44.09
2006	5.82	1.20
2007	28.30	21.16
	81.00	81.00
Average Rate of Return	81/5 years =16.20%	81/5 years = 16.20%

Calculation of Realised Rate of Return on Portfolio during 2003-2007

Year	Stock A			Stock B			Total Net return (a)+(b)
	Proportion	Return	Net return (a)	Proportion	Return	Net return (b)	
2003	0.50	-12.24	-6.12	0.50	-5.00	-2.50	-8.62
2004	0.50	23.67	11.83	0.50	19.55	9.77	21.60
2005	0.50	35.45	17.72	0.50	44.09	22.04	39.76
2006	0.50	5.82	2.91	0.50	1.20	0.60	3.51
2007	0.50	28.30	14.15	0.50	21.16	10.58	24.73
		81.00	40.49		81.00		80.98

Average Rate of Return = ₹ 80.98/5 = 16.20%

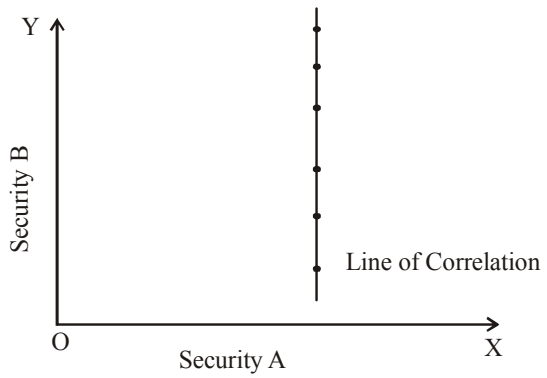
Notes

When Diversification does not Help

Perfectly Positively Correlated Returns

The return from two securities is perfectly positively correlated when a cross-plot gives points lying precisely on an upward-sloping straight line (as shown in Figure 2.5). Each point indicates the return on security A (horizontal axis) and the return on security B (vertical axis) corresponding to one event.

Figure 2.5: Perfectly Positive Correlation



What is the effect on risk when two securities of this type are combined? The general formula is:

$$V_p = W^2_x V_x + 2 W_x W_y C_{xy} + W^2_y V_y$$

The covariance term can, of course, be replaced, using formula for correlation:

$$C_{xy} = r_{xy} S_x S_y$$

However, if in a case, there is perfect positive correlation, then $r_{xy} = + 1$ and $C_{xy} = S_x S_y$.

As always, $V_x = S^2_x$, $V_y = S^2_y$ and $V_p = S^2_p$

Substituting all these values in general formula gives:

$$S^2_p = W^2_x S^2_x + 2W_x W_y S_x S_y + W^2_y S^2_y$$

$$S^2_p = (W_x S_x + W_y S_y)^2$$

$$S_p = W_x S_x + W_y S_y \quad \text{When } r_{xy} = +1$$

This is an important result. When two securities returns are perfectly positively correlated, the risk of a combination, measured by the standard deviation of return, is just a weighted average of the risks of the component securities, using market value as weights. The principle holds as well if more than two securities are included in a portfolio. In such cases, diversification does not provide risk reduction but only risk averaging.

2.7 Summary

- Corporations are managed by people and therefore open to problems associated with their faulty judgments.
- Corporations operate in a highly dynamic and competitive environment, and many operate both nationally and internationally.

Notes

- As a result, the judgment factor still dominates investment decisions.
- Risk can be defined as the probability that the expected return from the security will not materialize.
- Every investment involves uncertainties that make future investment returns risk-prone.
- Uncertainties could be due to the political, economic and industry factors.
- Risk could be systematic in future, depending upon its source.
- Systematic risk is for the market as a whole, while unsystematic risk is specific to an industry or the company individually.
- The first three risk factors discussed below are systematic in nature and the rest are unsystematic.
- Political risk could be categorised depending upon whether it affects the market as whole or just a particular industry.
- Beta is a measure of the systematic risk of a security that cannot be avoided through diversification.
- Beta is a relative measure of risk - the risk of an individual stock relative to the market portfolio of all stocks.
- If the security's returns move more (less) than the market's returns as the latter changes, the security's returns have more (less) volatility (fluctuations in price) than those of the market.
- It is important to note that beta measures a security's volatility, or fluctuations in price, relative to a benchmark, the market portfolio of all stocks.
- The risk/return trade-off could easily be called the "ability-to-sleep-at-night test."
- While some people can handle the equivalent of financial skydiving without batting an eye, others are terrified to climb the financial ladder without a secure harness.
- Deciding what amount of risk you can take while remaining comfortable with your investments is very important.
- The investor can minimise his risk on the portfolio. Risk avoidance and risk minimisation are the important objectives of portfolio management.
- A portfolio contains different securities; by combining their weighted returns we can obtain the expected return of the portfolio.

2.8 Keywords

Beta: A coefficient, that describes how the expected return of a stock or portfolio is correlated to the return of the financial market as a whole

Portfolio: A collection of investments held by an institution or a private individual

Systematic Risks: A risk of security that cannot be reduced through diversification.

Unsystematic Risks: Company or industry specific risk that is inherent in each investment. The amount of unsystematic risk can be reduced through appropriate diversification

Notes

2.9 Self Assessment

State whether the following statements are true or false:

1. If the utility function is linear, the decision-maker maximises expected utility by maximising expected monetary value.
2. The portfolio's expected return is a arithmetic mean of the expected returns of its securities.
3. Diversification can reduce risk.
4. Risk is the possibility that an investment's actual return will be different than expected.
5. Higher risk equals greater return.

Fill in the blanks:

6. ..... is the risk associated with the particular secondary market in which a security trades.
7. The rate of return expected by the investor consists of the ..... and .....
8. Beta is useful for comparing the relative ..... of different stocks.
9. ..... are considered to be the most risky investment.
10. The ..... for some future period is known as the expected return.
11. International risk can include both ..... and .....
12. Beta is a measure of the systematic risk of a security that cannot be avoided through .....
13. Risk ..... and risk ..... are two main objectives of portfolio management.
14. Every investment involves uncertainties that make future investment returns .....
15. Beta measures a security's ....., or fluctuations in price, relative to a ....., the market portfolio of all .....

2.10 Review Questions

1. Mr. RKV invested in equity shares of Wipro Ltd., its anticipated returns and associated probabilities are given below:

Return (%)	-15	-10	5	10	15	20	30
Probability	0.05	0.10	0.15	0.25	0.30	0.10	0.05

You are required to calculate the expected rate of return and risk in terms of standard deviation.

2. The probabilities and associated returns of Modern Foods Ltd., are given below:

Return (%)	12	15	18	20	24	26	30
Probability	0.05	0.10	0.24	0.26	0.18	0.12	0.05

Calculate the standard deviation.

Notes

3. Mr. Marin provides the following informations, from the same compute his expected return and standard deviation and variance.

Events	1	2	3	4
Probability	.20	.40	.30	.10
Return (%)	–10	25	20	10

4. The possible returns and associated probabilities of Securities X and Y are given below:

Security X		**Security Y**	
Probability	**Return (%)**	**Probability**	**Return (%)**
0.05	6	0.10	5
0.15	10	0.20	8
0.40	15	0.30	12
0.25	18	0.25	15
0.10	20	0.10	18
0.05	24	0.05	20

Calculate the expected return and standard deviation of securities X and Y.

5.

Type of Security	**(₹)**	**Nos.**	**Annual Coupon (%)**	**Maturity Years**	**Yield %**
Bond A	(1000)	10	9	3	12
Bond B	(1000)	10	10	5	12
Preference shares C	(100)	100	11	*	13*
Preference shares D	(100)	100	12	*	13*

Dr. TKV inherited the following securities upon his uncle's death:

Likelihood of being called at a premium over par. Compute the current value of his uncle's portfolio.

6. Following is the data regarding six securities:

	A	**B**	**C**	**D**	**E**	**F**
Return (%)	8	8	121	4	9	8
Risk (%) (standard deviation)	4	5	12	4	5	6

(a) Which of the securities will be selected?

(b) Assuming perfect correlation, analyse whether it is preferable to invest 75% in Security A and 25% in Security C.

7. Given below is the information of market rates of returns and data from two companies A and B (%).

	Year 2005	**Year 2006**	**Year 2007**
Market	12.0	11.0	9.0
Company A	13.0	11.5	9.8
Company B	11.0	10.5	9.5

Determine the beta coefficients of the shares of Company A and Company B.

Notes

8. You are evaluating an investment in two companies whose past ten years of returns are shown below:

Companies				Percent returns during years						
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
FST	37	24	-7	6	18	32	-5	21	18	6
SND	32	29	-12	1	15	30	0	18	27	10

(a) Calculate the standard deviation of each company's returns.

(b) Calculate the correlation coefficient of the company's returns.

(c) If you had placed 50% of your money in each, what would have been the standard deviation of your portfolio and the average yearly return?

(d) What percentage investment in each would have resulted in the lowest risk?

(e) Assume that a yearly risk-free return of 8% was available and that you had held only one of the two companies. Which would have been the better to own?

(f) Graph the risk and return of each fund. Given your answer to part (d), what was the single efficient portfolio of the two?

(g) Use part (f) to determine:

(i) How an average return of 10.8% would have been obtained.

(ii) How an average return of 17.8% would have been obtained.

9. K.S. Bhatt holds a well-diversified portfolio of stocks in the XYZ Group. During the last five years, returns on these stocks have average 20.0% per year and had a standard deviation of 15.0%. He is satisfied with the yearly availability of his portfolio and would like to reduce its risk without affecting overall returns. He approaches you for help in finding an appropriate diversification medium. After a lengthy review of alternatives, you conclude: (i) future average returns and volatility of returns on his current portfolio will be the same as he has historically expected, (ii) to provide a quarter degree of diversification in his portfolio, investment could be made in stocks of the following groups:

Groups	Expected Return	Correlation of Returns with Group XYZ	Standard Deviation
ABC	20%	+1.0	15.0%
KLM	20%	-1.0	15.0%
RST	20%	+0.0	15.0%

(a) If Bhatt invests 50% of his funds in ABC Group and leaves the remainder in XYZ Group, how would this affect both his expected return and his risk? Why?

(b) If Bhatt invests 50% of his funds in KLM Group and leaves the remainder in XYZ Group, how would this affect both his expected return and his risk? Why?

(c) What should he do? Indicate precise portfolio weighting.

10. Consider the two stocks Wipro and TCS with a standard deviation 0.05 and 0.10 respectively.

The correlation coefficient for these two stocks is 0.8.

Notes

(a) What is the diversification gain from forming a portfolio that has equal proportions of each stock?

(b) What should be the weights of the two assets in a portfolio that achieves a diversification gain of 3%?

11. You have been asked by a client for advice in selecting a portfolio of assets based on the following data:

Year	Return		
	A	B	C
2005	0.14	0.18	0.14
2006	0.16	0.16	0.16
2007	0.18	0.14	0.18

You have been asked to create portfolios by investing equal proportions (i.e., 50%) in each of two different securities. No probabilities have been supplied.

(a) What is the expected return on each of these securities over the three-year period?

(b) What is the standard deviation on each security's return?

(c) What is the expected return on each portfolio?

(d) For each portfolio, how would you characterize the correlation between the returns on its two assets?

(e) What is the standard deviation of each portfolio?

(f) Which portfolio do you recommend? Why?

12. You are considering purchasing the equity stock of B Company. The current price per share is ₹ 10. You expect the dividend a year hence to be ₹ 1.00. You expect the price per share of stock B a year hence to have the following probability distribution:

Price a year hence `	10	11	12
Probability	0.4	0.4	0.2

(a) What is the expected price per share a year?

(b) What is the probability distribution of the rate of return on B's equity stock?

13. The stock of X Company performs well relative to other stocks during recessionary periods. The stocks of Y Company, on the other hand, do well during growth periods. Both the stocks are currently selling for ₹ 50 per share. The rupee returns (dividend plus price change) of these for the next year would be as follows:

	Economic Condition			
	High Growth	**Low Growth**	**Stagnation**	**Recession**
Probability	0.3	0.3	0.2	0.2
Return on Wipro stock	55	50	60	70
Return on Infosys stock	75	65	50	40

Calculate the expected return and standards deviation of:

(a) ₹ 1,000 in the equity stock of Wipro.

(b) ₹ 1,000 in the equity stocks of Infosys.

Notes

(c) ₹ 500 in the equity stock of Wipro and ₹ 500 in the equity stock of Infosys.

(d) ₹ 700 in the equity stock of Wipro and ₹ 300 in the equity of Infosys.

Which of the above four options would you choose? Why?

14. The return on four stocks X, Y, Z and A over a period of six years has been as follows:

	1	**2**	**3**	**4**	**5**	**6**
X	10%	12%	-8%	15%	-2%	20%
Y	8%	4%	15%	12%	10%	6%
Z	7%	8%	12%	9%	6%	12%
A	9%	9%	11%	4%	8%	16%

Calculate the returns on:

(a) A portfolio of one stocks at a time

(b) Portfolios of two stocks at a time

(c) Portfolios of three stocks at a time

(d) A portfolio of all four stocks

Assume equivalent proportional investment.

15. The returns on the equity stocks of TCS limited and the market portfolios over a 12-year period are given below:

Year	**Return on auto TCS Ltd. (%)**	**Return on market portfolio (%)**
1	15	12
2	-6	1
3	18	14
4	30	24
5	12	16
6	25	30
7	2	-3
8	20	24
9	18	15
10	24	22
11	8	12

(a) Calculate the beta for the stock of TCS Limited.

(b) Established the characteristics line for the stock of TCS Limited.

16. Assume that the current rate on a one-year security is 7%. You believe that the yield on a one-year security will be 9% one year from now and 10% two years from now. According to the expectations hypothesis, what should the yield be on a three-year security?

17. RKV is evaluating a security. One-year Treasury bills are currently paying 9.1%. Calculate the below investment's expected return and its standard deviation. Should RKV invest in this security?

Probability	.15%	.30%	.40%	.15%
Return	15	7	10	5

Notes

18. T.S. Shekhar has a portfolio of five securities. The expected rate and amount of investment in each security is as follows:

Security	A	B	C	D	E
Expected Return	.14	.08	.15	.09	.12
Amount invested (₹)	20,000	10,000	30,000	25,000	15,000

Compute the expected return on Shekhar's portfolio.

19. T.S. Kumar holds a two-stock portfolio. Stock ABC has a standard deviation of returns of .6 and stock XYZ has a standard deviation of .4. The correlation coefficient of the two stocks returns is 0.25. Kumar holds equal amounts of each stock. Compute the portfolio standard deviation for the two-stock portfolio.

20. Ravi Shankar has prepared the following information regarding two investments under consideration. Which investment should be accepted?

Security ABC		Security XYZ	
Probability	Return (%)	Probability	Return (%)
0.30	27	0.21	15
0.50	18	0.30	6
0.30	-2	0.40	10
-	-	0.10	4

21. Ammy, a Korean-based auto manufacturer, is evaluating two overseas locations for proposed expansion of production facilities, one site in Neeroland and another on Forexland. The likely future return from investment in cash site depends to a great extent on future economic conditions. These scenarios are postulated, and the internal rate of return from cash investment is computed under each scenario. The results with their estimated probabilities are shown below:

Probability	Internal Rate of Return (%)	
	Neeroland	Forexland
0.3	20	10
0.3	10	30
0.4	15	20

Calculate the expected value of the IRR and the standard deviation of the return of investments in each location. What would be the expected return and the standard deviation of the following split investment strategies:

(a) Committing 50% of the available funds to the site in Neeroland and 50% to Forexland?

(b) Committing 75% of the available funds to the site in Neeroland and 25% to Forexland site? (Assume zero correlation between the returns form the two sites.)

22. You have invested ₹ 50,000, 30% of which is invested in Company A, which has an expected rate of return of 15%, and 70% of which is invested in Company B, with an expected return of 12%. What is the return on your portfolio? What is the expected percentage rate of return?

23. Suppose you invest in four securities. Company ABC has on expected return of 20%, Company BCD has an expected return of 10%, Company CDE has an expected return of 12%, and Company DEF has an expected return of 9%. You have invested ₹ 40,000. What is the expected rate of return on your portfolio?

Notes

24. Assume the investor in Problem 35 wants to determine how risky his portfolio is and wants you to compute the portfolio variance. If the expected correlations and variance of the stocks are as follows, what is the variance of the portfolio?

Correlations		ABC	BCD	CDE	DEF
	BCD	.50	-	-	-
	CDE	.60	.30	-	-
	DEF	-.30	-.20	-.10	-
Variances:		.04	.16	.02	.10

25. Suppose you have ₹ 10,000 to invest and would like to sell ₹ 5,000 in stock XYZ short to invest in ABC. Assuming no correlation between the two securities, compute the expected return and the standard deviation of the portfolio from the following characteristics:

Security	ABC	XYZ
E(R)	.12	.02
σ (R)	.08	.10

26. Suppose we have two portfolios known to be on the minimum variance set for a population of three securities A, B, and C. There are no restrictions on short sales. The weights for each of the two portfolios are as follows:

	W_A	W_B	W_C
Portfolio X	.24	.52	.24
Portfolio Y	-.36	.72	.64

(a) What would the stock weights be for a portfolio constructed by investing ₹ 2,000 in portfolio X and ₹ 1,000 in portfolio Y?

(b) Suppose you invest ₹ 1,500 of the ₹ 3,000 in Security X. How will you allocate the remaining ₹ 1500 between Securities X and Y to ensure that your portfolio is on the minimum variance set?

27. A stock that pays no dividends is currently selling at ₹ 100. The possible prices for which the stock might sell at the end of one year, with associated probabilities, are:

End-of-year Price (in ₹)	Probability
90	0.1
100	0.2
110	0.4
120	0.2
130	0.1

(a) Calculate the expected rate of return by year-end.

(b) Calculate the standard deviations of the expected rate of return.

28. An investor saw an opportunity to invest in a new security with excellent growth potential. He wants to invest more than he had, which was only ₹ 10,000. He sold another security short with an expected rate of return of 15%. The total amount he sold of was ₹ 40,000, and his total amount invested in the growth security, which had an expected rate of return of 30%, was that ₹ 50,000. Assume no margin requirements, what is his expected rate of return on this portfolio.

Notes

Answer: Self Assessment

1.	True	2.	False
3.	True	4.	True
5.	False	6.	Liquidity risk
7.	yield, capital appreciation	8.	systematic risk
9.	Equity shares	10.	anticipated return
11.	country risk, exchange rate risk	12.	diversification
13.	avoidance, minimisation	14.	risk-prone
15.	volatility, benchmark, stocks		

2.11 Further Readings

Books

Bonus Shares, *A Study of the Dividend and Price Effects of Bonus Shares Issues*, Bombay, MacMillan, 1973.

Graham, Benjamin, David, L., Dodd, Sidney Cottle,*et al.*, *Security Analysis: Principles and Techniques*, 4th ed., New York McGraw – Hill Book Co. Inc., 1962.

Granger, Clive W and Morgenstem Oskar, *Predictability of Stock Market Prices*, Lexington, Health Lexington, 1970.

Granville, Joseph E., *A Strategy of Daily Timings for Maximum Profit*, Englewood Cliffs, N.J., Prentice-Hall, 1960.

Gup, Benton E., *Basics of Investing*, N.Y. Wiley, 1979.

Gupta L.C., *Rates of Return on Equities: The Indian Experience*, Bombay, Oxford University Press, 1981.

Sudhindra Bhat, *Security Analysis and Portfolio Management*, Excel Books.

Unit 3: Introduction to Security Analysis

Notes

CONTENTS

Objectives
Introduction
3.1 Equity Value and Enterprise Value
3.2 Valuation Methods
3.3 Free Cash Flow Calculation
3.4 Leverage
3.5 Calculating the Cost of Capital
3.6 Share Buy-back
3.6.1 Reasons to Buyback
3.6.2 Restrictions on Buyback by Indian Companies
3.6.3 Finding the Feasibility of the Buyback
3.7 Project Valuation
3.8 Warrant Valuation
3.9 Treatment of Goodwill
3.10 Summary
3.11 Keywords
3.12 Self Assessment
3.13 Review Questions
3.14 Further Readings

Objectives

After studying this unit, you will be able to:

- Explain the concept of Security Analysis
- Discuss equity value and enterprise value
- Describe Valuation Methods
- Understand free cash flow calculation
- Define Leverage
- Explain calculation of the Cost of Capital
- Discuss Share Buy-Back
- Understand the concept of project warrant valuation
- Analyze P/E Ratio
- Discuss treatment of Goodwill

Notes

Introduction

Security analysis comprises of an examination and evaluation of the various factors affecting the value of a security. Security analysis is about valuing the assets, debt, warrants, and equity of companies from the perspective of outside investors using publicly available information. The security analyst must have a through understanding of financing statements, which are an important source of this information. As such, the ability to value equity securities requires cross-disciplinary knowledge in both finance and financial accounting.

While there is much overlap between the analytical tools used in security analysis and those used in corporate finance, security analysis tends to take the perspective of potential investors, whereas corporate finance tends to take an inside perspective such as that of a corporate financial manager.

3.1 Equity Value and Enterprise Value

The equity value of a firm is simply its market capitalization, that is, market price per share multiplied by the number of outstanding shares. The enterprise value, also referred to as the firm value, is the equity value plus the net liabilities. The enterprise value is the value of the productive assets of the firm, not just its equity value, based on the accounting identity.

Assets = Net liabilities + Equity

Note that net values of the assets and liabilities are used. Any cash and cast-equivalents would be used to offset the liabilities and therefore are not included in the enterprise value.

Example: Imagine purchasing a house with a market value of ₹ 10, 00,000, for which the owner has ₹ 5,00,000 assumable mortgage. To purchase the house, the new owner would pay ₹ 5,00,000 in cash and assume the ₹ 5,00,000 mortgage, for a total capital structure of ₹ 10, 00,000. If ₹ 2,00,000 of that market value were due to ₹ 2,00,000 in cash locked in a safe the basement, and the owner pledged to leave the money in the house, the cash could be used to pay down the ₹ 5,00,000 mortgage and the net assets would become ₹ 8,00,000 and the liabilities would become ₹ 3,00,000. The "enterprise value" of the house therefore would be ₹ 8,00,000.

3.2 Valuation Methods

Two types of approaches to valuation are discounted cash flow methods and financial ratio methods.

Two discounted cash flow approaches to valuation are:

1. Value the flow to equity, and
2. Value the cash flow to the enterprise.

The "cash flow to equity" approach to valuation directly discounts the firm's cash flow to the equity owners. This cash flow takes the form of dividends or share buybacks. While intuitively straightforward, this technique suffers from numerous drawbacks. First, it is not very useful in identifying areas of value creation. Second, changes in the dividend payout ratio result in a change in the calculated value of the company even though the operating performance might not change. This effect must be compensated by adjusting the discount rate to be consistent with the new payout ratio. Despite its drawbacks, the equity approach often is more appropriate when valuing financial institutions because it treats the firm's liabilities as a part of operations.

Notes

Notes Since banks have significant liabilities that are owed to the retail depositors, they indeed have significant liabilities that are part of operations.

The "cash flow to the enterprise" approach value the equity of the firm as the value of the operations less the value of the debt. The value of the operations is the present value of the future free cash flows expected to be generated. The free cash flow is calculated by taking the operating earnings (earnings excluding interest expenses), subtracting items that required cash but that did not reduce reported earnings, and adding non-cash items that did reduce reported earnings but that did not result in cash expenditures. Interest and dividend payments are not subtracted since we are calculating the free cash flow available to all capital providers, both equity and debt, before financing. The result is the cash generated by operations. The free cash flow basically is the cash that would be available to shareholders if the firm had no debt-the cash produced by the business regardless of the way it is financed. The expected determine the enterprise value. The value of the equity then is the enterprise value less the value of the debt.

Caution When valuing cash flows, proforma projections are made a certain number of years into the future, then a terminal value is calculated for years thereafter and discounted back to the present.

3.3 Free Cash Flow Calculation

Free cash flow (FCF) is cash flow available for distribution among all the securities holders of an organization. They include equity holders, debt holders, preferred stock holders, convertible security holders, and so on. The free cash flow (FCF) is calculated by starting with the profits after taxes, then adding back depreciation that reduced earnings even though it was not a cash outflow, then adding back after-tax interest (since we are interested in the cash flow from operations), and adding back any non-cash decrease in net working capital (NWC).

Example: If accounts receivable decreased, this decrease had a positive effect on cash flow.

If the accounting earnings are negative and the free cash flow is positive, the carry-forward tax benefit is in realized in the current year and must be added to the FCF calculation.

When a company has negative sales growth it's likely to diminish its capital spending dramatically. Receivables, provided they are being timely collected, will also ratchet down. All this "deceleration" will show up as additions to Free Cash Flow. However, over the longer term, decelerating sales trends will eventually catch up.

3.4 Leverage

In 1958, economists and now Nobel Laureates Franco Modigliani and Merton H. Miller proposed that the capital structure of a firm did not affect its value, assuming no taxes, no bankruptcy costs, no transaction costs, that the firm's investment decisions are independent of capital structure, and that managers, shareholders, and bondholders have the same information. The mix of debt and equity simply reallocates the cash flow between stockholders and bondholders but the total amount of the flow is independent of the capital structure. According to Modigliani and Miller's first proposition, the value of the firm if levered equals the value unlevered:

$$V_L = V_U$$

Notes

However, the assumptions behind Proposition I do not all hold. One of the more unrealistic assumption is that of no taxes. Since the firm benefits from the tax deduction associated with interest paid on the debt, the value of the levered firm becomes:

$$V_L = V_U + t_c D$$

where t_c = marginal corporate tax rate.

When considering the effect of taxes on firm value, it is worthwhile to consider taxes from a potential investors point of view. For equity investors, the firm first must pay taxes at the corporate tax rate, t_c, then investor must pay taxes at the individual equity holder tax rate, t_e. Then for debt holders.

After-tax income = (debt income) $(1 - t_d)$

For equity holders,

After-tax income = (equity income) $(1 - t_c)(1 - t_e)$

The relative advantage (if any) of equity to debt can be expressed as:

Relative Advantage $(R_A) = (1 - t_c)(1 - t_e)/(1 - t_d)$

$R_A > 1$ signifies a relative advantage for equity financing.

$R_A < 1$ signifies a relative advantage for debt financing.

One can define T as the net advantage of debt:

$$T = 1 - R_A$$

For T positive, there is a net advantage from using debt; for T negative there is net disadvantage.

Empirical evidence suggests that T is small, in equilibrium T = 0. This is known as Miller's equilibrium and implies that the capital structure does not affect enterprise value (though it can affect equity value, even if T = 0).

3.5 Calculating the Cost of Capital

Note that the return on assets, r_a, sometimes is referred to as r_u the unlevered return.

Gordon Dividend Model

$$P_0 = Div^1/(r_e - g)$$

where, P_0 = Current stock price,

Div_1 = Dividend paid out one year from now

r_e = Return of equity

g = Dividend growth rate

Then: $r_e = (Div^1/P_0) + g$

Capital Asset Pricing Model

The security market line is used to calculate the expected return on equity.

$$r_e = r_f + \beta_e (r_m - r_f)$$

where, r_f = Risk-free rate,

Notes

r_m = Market return

β_e = Equity beta

However, this model ignores the effect of corporate income taxes.

Considering corporate income taxes:

$$r_e = r_f(1 - t_c) + \beta_e [r_m - r_f(1 - t_c)]$$

where t_c = corporate tax rate.

Once the expected return on equity and on debt are known, the weighted average cost of capital can be calculated using Modigliani and Miller's second proposition:

$$WACC = r_eE/(E + D) + r_dD/(E + D)$$

Taking into account the tax shield:

$$WACC = r_eE/(E + D) + r_d(1 - t_c)D/(E + D)$$

For T = 0 (no tax advantage for debt), the WACC is equivalent to the return on assets, r_a. r_d is calculated using the CAPM:

$$r_d + r_f + \beta_d [r_m - r_f(1 - t_c)]$$

For a levered firm in an environment in which there are both corporate and personal income taxes and in which there is no tax advantage to debt (T = 0), WACC is equal to r_a, and the above WACC equation can be rearranged to solve for r_e:

$$r_e = r_a + (D/E)[r_a - r_d(1 - t_c)]$$

From this equation it is evident that if a firm with a constant future free cash flow increases its debt-equity ratio, for example by issuing debt and repurchasing some of its shares, its cost of equity will increase.

r_a also can be calculated directly by first obtaining a value for the asset beta, β_a, and then applying the CAPM. The asset beta is:

$$\beta_a = \beta_e (E/V) + \beta_d (D/V)(1 - t_c)$$

Then return on assets is calculated as:

$$r_a = r_f(1 - t_c) + \beta_a [r_m - r_f(1 - t_c)]$$

In summary, for the case in which there is personal taxation and in which Miller's Equilibrium holds (T = 0), the following equations describe the expected returns on equity, debt, and assets:

$$r_e = r_f(1 - t_c) + \beta_e [r_m - r_f(1 - t_c)]$$

$$r_a = r_f(1 - t_c) + \beta_e [r_m - r_f(1 - t_c)]$$

$$r_d = r_f + \beta_d [r_m - r_f(1 - t_c)]$$

The cost of capital also can be calculated using historical averages. The arithmetic mean generally is used for this calculation, though some argue that the geometric mean should be used.

Finally, the cost of equity can be determined from financial ratios. For example, the cost of unleveraged equity is:

$$r_eU = [r_{e'}, L + r_{f'}, debt(1 - t_c)D/E]/(1 + D/E)$$

$$r_{e'}L = b(1 + g)/(P/E) + g$$

Notes

where b = dividend payout ratio

$$g = (1 - b)(ROE)$$

where (1 – b) = plough back ratio.

The payout ratio can be calculated using dividend and earnings ratios:

$$b = (Dividend/Price)(Price/Earnings)$$

3.6 Share Buy-back

Buyback is reverse of issue of shares by a company where it offers to take back its shares owned by the investors at a specified price; this offer can be binding or optional to the investors.

Case Study

Buyback of Shares by MNCs in India

In the financial year 2001-2002, twenty MNCs made buyback offers. Some of the well-known MNCs which offered to buy back their shares were Philips India Limited (Philips), Cadbury India Limited (Cadbury), Britannia Industries Limited (Britannia), Carrier Aircon (Carrier) and Otis Elevators (Otis). All these companies made open offers for the non-promoter shareholding in their Indian subsidiaries. To buy back shares, Cadbury paid ₹ 9 billion, Philips ₹ 2 billion, and Carrier, Otis and Reckitt Benkiser all paid over ₹ 1 billion.

According to analysts, the increased buyback activity by MNCs was due to three reasons. They felt that the share prices of most MNCs were under priced and did not reflect the true value of the company. Moreover, the buyback of shares allowed MNCs to convert their Indian ventures into Wholly Owned Subsidiaries (WOS). It also allowed them to delist the shares of these ventures from the stock markets and thus protect them from the volatility of the stock markets (caused by scams and other market manipulations).

Analysts also felt that MNCs had used the buyback of shares as a method for distributing surplus cash to their shareholders. Buyback also acted as a tool for creating wealth for the shareholders. The buyback of shares improved a company's return on equity (ROE), and this improvement would ultimately be reflected in a higher price earning ratio.

Buyback by the company usually indicated that the management felt that the stock was undervalued. It resulted in an increase in stock price, bringing it closer to the intrinsic value. For example, when Philips announced its first buyback offer at a maximum price of ₹ 105 in October 2000, its shares were trading at around ₹ 60. The buyback announcement resulted in an increase in the share price to ₹ 90 even before the buyback offer opened on November 13, 2000. Hence, the buyback offer gave shareholders an exit option that paid them a premium over the pre-buyback share price. However, in spite of the benefits of buyback, a section of analysts and investors felt that it was being misused by MNCs.

Analysts felt that the buyback option may be misused by MNCs to increase their equity stakes in their Indian ventures, escape public scrutiny and accountability and prevent them from the Indian regulatory environment. Moreover, the option to convert their Indian ventures into wholly owned subsidiaries and delist their shares from the stock

Contd...

Notes

markets provided MNCs with complete control over their Indian ventures, allowed them to repatriate profits and make more independent investment decisions.

A section of investors felt that government regulations must have provided them with a choice. However, minority shareholders claimed that they had no option and were forced to sell their shares once MNCs bought back shares from the majority shareholders. For example, because Life Insurance Corporation (LIC) and the General Insurance Corporation (GIC), who together held a 21% stake in Philips, surrendered their shares when Philips made its first buyback offer, the minority shareholders were forced to surrender the remaining shares when Philips made a second offer in November 2001. Reportedly, investors feared losing an exit option in case the shares get delisted. Moreover, during the second offer, the trading volume of shares fell to less than (on an average) 500 shares per day since December 2001.

Similarly, when Cadbury made a buyback offer, public shareholding fell from 26.67% to just 7.32% within six months after the majority shareholders surrendered their shares. Moreover, in this case, investors felt that the premium offered by Cadbury Schweppes, the UK based parent company of Cadbury, was low. The offer was priced at ₹ 500, which represented a premium of 24% on the average high and low prices over the past 26 weeks prior to the offer. However, Cadbury's stock had been trading at prices in excess of ₹ 500 in 1999 and 2000, with an average P/E multiple of 60 in 1999 and 54 in March 2000. Moreover, Cadbury's third quarter (October to December 2001) sales had increased by 11.2% compared to the same period in 2000, while its profits had increased by 5.2%. Hence, investors felt that the price offered for the buyback had not taken into consideration the future potential profits of the company and was not attractive to shareholders who had been holding their shares for a longer term.

As a result of depressed stock market conditions, investors (in most cases) received a low buyback price. The price at which the open offers were made by MNCs caused great concern to both investors and regulators.

Analysts argued that like China and Indonesia, India must revert back to a system that prevented multinationals from delisting their shares from the stock exchange by prescribing a minimum amount of floating stock. The buyback by MNCs not only affected the small shareholders, it also had an impact on the stock exchanges. The buyback of floating stock resulted in a decline in the trading volumes. For example, the Delhi Stock Exchange was badly affected as MNCs accounted for more than 90% of the volume traded and 85% of the listing fees earned by the exchange before the buyback act was introduced. Given the negative impact of the Buyback Act, market observers felt that the act had failed to revive the capital markets.

The dilemma that faced small investors in India was whether the buyback option, along with the SEBI guidelines, actually protected their interests and offered them an exit option at a fair price or was it a tool that provided them with no options allowing large MNCs to gain complete control of their subsidiaries.

Investors felt that the regulations framed by SEBI did not have provisions for preventing good stocks from delisting. Moreover, the buyback price, which was determined using the parameters specified in the SEBI Takeover Code, did not consider the future potential of the stock (Refer Exhibit III for details of pricing parameters of open offers). They felt that SEBI should have looked at various financial parameters such as future cash flows, value of brands and the value of fixed assets to determine a pricing formula for open offers

Contd...

Notes

which ensured that investors who had been holding the stock for several years received a fair price for their investment.

Questions

1. What were the objectives of the buyback ordinance issued by the Government of India in 1998? Describe the salient features of the buyback ordinance. Why did MNCs want to buy back the shares of their Indian ventures? Explain.
2. The depressed stock markets in India are being utilized by several large MNCs to increase their stake in their Indian subsidiaries through the buyback of shares. Explain in detail the different methods of buyback available to an organization.
3. According to minority shareholders, MNCs had misused the buyback option. Explain the various grievances of minority shareholders regarding the buyback of shares.
4. Do you think stringent measures should be introduced to protect the interests of small investors? What should SEBI do to safeguard small investors' interests and resolve their grievances?

Source: www.icmrindia.org

Buyback may lead to abnormal increase of prices posing heavy risk to those who value shares based on fundamentals. This may also lead to reduction in investor interest in the market particularly with de-listing of good shares.

Example: It was feared in 2001-03 that de-listing by many MNCs may drop the money flow to stock exchanges.

3.6.1 Reasons to Buyback

Unused Cash: If they have huge cash reserves with not many new profitable projects to invest in and if the company thinks the market price of its share is undervalued.

Example: Bajaj Auto went on a massive buy back in 2000 and Reliance's recent buyback.

However, companies in emerging markets like India have growth opportunities. Therefore applying this argument to these companies is not logical. This argument is valid for MNCs, which already have adequate R&D budget and presence across markets. Since their incremental growth potential limited, they can buyback shares as a reward for their shareholders.

Tax Gains: Since dividends are taxed at higher rate than capital gains companies prefer buyback to reward their investors instead of distributing cash dividends, as capital gains tax is generally lower. At present, short-term capital gains are taxed at 10% and long-term capital gains are not taxed.

Market Perception: By buying their shares at a price higher than prevailing market price company signals that its share valuation should be higher.

Example: 1. In October 1987 stock prices in US started crashing. Expecting further fall, many companies like Citigroup, IBM, etc, came out with buyback offers worth billions of dollars at prices higher than the prevailing rates thus stemming the fall.

Notes

2. Recently the prices of RIL and REL have not fallen, as expected, despite the spat between the promoters. This is mainly attributed to the buyback offer made at higher prices.

Exit Option: If a company wants to exit a particular country or wants to close the company.

Escape monitoring of accounts and legal controls: If a company wants to avoid the regulations of the market regulator by delisting. They avoid any public scrutiny of its books of accounts.

Show rosier financials: Companies try to use buyback method to show better financial ratios.

Example: When a company uses its cash to buy stock, it reduces outstanding shares and also the assets on the balance sheet (because cash is an asset).

Thus, Return On Assets (ROA) actually increases with reduction in assets, and return on equity (ROE) increases as there is less outstanding equity. If the company earnings are identical before and after the buyback Earnings Per Share (EPS) and the P/E ratio would look better even though earnings did not improve. Since investors carefully scrutinize only EPS and P/E figures, an improvement could jump-start the stock. For this strategy to work in the long term, the stock should truly be undervalued.

Increase promoter's stake: Some companies buyback stock to contain the dilution in promoter holding, EPS and reduction in prices arising out of the exercise of ESOPs issued to employees. Any such exercising leads to increase in outstanding shares and to drop in prices. This also gives scope to takeover bids as the share of promoters dilutes.

Example: Technology companies which have issued ESOPs during dot-com boom in 2000-01 have to buyback after exercise of the same.

However the logic of buying back stock to protect from hostile takeovers seem not logical. It may be noted that one of the risks of public listing is welcoming hostile takeovers. This is one method of market disciplining the management. Though this type of buyback is touted as protecting over-all interests of the shareholders, it is true only when management is considered as efficient and working in the interests of the shareholders.

1. Generally the intention is mix of any of the above
2. Sometimes Governments nationalize the companies by taking over it and then compensates the shareholders by buying back their shares at a predetermined price.

Example: Reserve Bank of India in 1949 by buying back the shares.

Task

Find out the methods in which buyback can happen and discuss them with examples.

3.6.2 Restrictions on Buyback by Indian Companies

Some of the features in government regulation for buyback of shares are:

1. A special resolution has to be passed in general meeting of the shareholders
2. Buyback should not exceed 25% of the total paid-up capital and free reserves
3. A declaration of solvency has to be filed with SEBI and Registrar of Companies

Notes

4. The shares bought back should be extinguished and physically destroyed;
5. The company should not make any further issue of securities within 2 years, except bonus, conversion of warrants, etc.

These restrictions were imposed to restrict the companies from using the stock markets as short term money provider apart from protecting interests of small investors.

3.6.3 Finding the Feasibility of the Buyback

Take a firm that is 100% equity financed in an environment in which T is not equal to zero; i.e., there is a net tax advantage to debt. If the firm decides to issue debt and buyback shares, the levered value of the firm then is

$$V_L = V_U + T(\text{debt})$$

The number of shares that could be repurchased then is:

$$n = (\text{debt})/(\text{price per share after relevering})$$

where the price per share after relevering is:

$$V_L/(\text{original number of outstanding shares})$$

The buyback will lower the firm's WACC.

3.7 Project Valuation

In general, each project's value will be estimated using a discounted cash flow (DCF) valuation, and the opportunity with the highest value, as measured by the resultant net present value (NPV) will be selected. This requires estimating the size and timing of all of the incremental cash flows resulting from the project. These future cash flows are then discounted to determine their present value. These present values are then summed, and this sum net of the initial investment outlay is the NPV.

The NPV is greatly affected by the discount rate. Thus identifying the proper discount rate—the project "hurdle rate"—is critical to making the right decision. The hurdle rate is the minimum acceptable return on an investment—i.e. the project appropriate discount rate. The hurdle rate should reflect the riskiness of the investment, typically measured by volatility of cash flows, and must take into account the financing mix. Managers use models such as the CAPM or the APT to estimate a discount rate appropriate for a particular project, and use the weighted average cost of capital (WACC) to reflect the financing mix selected.

Caution A common error in choosing a discount rate for a project is to apply a WACC that applies to the entire firm. Such an approach may not be appropriate where the risk of a particular project differs markedly from that of the firm's existing portfolio of assets.

In conjunction with NPV, there are several other measures used as (secondary) selection criteria in corporate finance. These are visible from the DCF and include discounted payback period, IRR, Modified IRR, equivalent annuity, capital efficiency, and ROI; see list of valuation topics.

The NPV of a capital investment made by a firm, assuming that the investment results in an annual free cash flow P received at the end of each year beginning with the first year, and assuming that the asset is financed using current debt/equity ratios, is equal to:

$$NPV = -P_0 + P/WACC$$

Notes

3.8 Warrant Valuation

A warrant is a security that entitles the holder to buy stock of the company that issued it at a specified price, which is usually higher than the stock price at time of issue. It can be used to enhance the yield of the bond, and make them more attractive to potential buyers. Warrants can also be used in private equity deals. Any outstanding warrants must be considered when valuing the equity of the firm.

There are various methods (models) of evaluation available to value warrants theoretically, including the Black-Scholes evaluation model. However, it is important to have some understanding of the various influences on warrant prices. The market value of a warrant can be divided into two components:

1. ***Intrinsic value***: This is simply the difference between the exercise (strike) price and the underlying stock price. Warrants are also referred to as in-the-money or out-of-the-money, depending on where the current asset price is in relation to the warrant's exercise price. Thus, for instance, for call warrants, if the stock price is below the strike price, the warrant has no intrinsic value (only time value - to be explained shortly). If the stock price is above the strike, the warrant has intrinsic value and is said to be in-the-money.
2. ***Time value:*** Time value can be considered as the value of the continuing exposure to the movement in the underlying security that the warrant provides. Time value declines as the expiry of the warrant gets closer. This erosion of time value is called time decay. It is not constant, but increases rapidly towards expiry. A warrant's time value is affected by the following factors:
   (a) *Time to expiry:* The longer the time to expiry, the greater the time value of the warrant. This is because the price of the underlying asset has a greater probability of moving in-the-money which makes the warrant more valuable.
   (b) *Volatility:* The more volatile the underlying instrument, the higher the price of the warrant will be (as the warrant is more likely to end up in-the-money).
   (c) *Dividends:* To include the factor of receiving dividends depends on if the holder of the warrant is permitted to receive dividends from the underlying asset.
   (d) *Interest rates:* An increase in interest rates will lead to more expensive call warrants and cheaper put warrants. The level of interest rates reflects the opportunity cost of capital.

Valuation Calculation

Once the free cash flow and WACC are known, the valuation calculation can be made. If the free cash flow is equally distributed across the year, an adjustment is necessary to shift the year-end cash flows to mid-year. This adjustment is performed by shifting the cash flow by one-half of a year by multiplying the valuation by $(1 + WACC)^{1/2}$.

The enterprise value includes the value of any outstanding warrants. The value of the warrants must be subtracted from the enterprise value to calculate the equity value. This result is divided by the current number of outstanding shares to yield the per share equity value.

Notes

Did u know? **What is P/E Ratio?**

As a rule of thumb, the P/E ratio of a stock should be equal to the earnings growth rate. Mathematically, this can be shown as follows:

$$P = D/r_e + PVGO$$

where P = Price

D = Annual dividend

r_e = Return on equity

PVGO = Present value of growth opportunities.

For high growth firms, PVGO usually dominates D/r_e. PVGO is equal to the earnings dividend by the earnings growth rate.

3.9 Treatment of Goodwill

Goodwill is considered to be one of the largest intangible assets, the value of which companies want to reflect correctly in their financial statements. Accounting for this asset, poses many challenges for accountants, as it is an unidentifiable intangible asset.

Definition of Goodwill

This intangible asset can be defined from two approaches:

1. ***Residuum approach:*** Under this method, goodwill is taken to be the difference between the purchase price and the fair market value of an acquired company's assets.
2. ***Excess profits approach:*** Under this method, the present value of the projected future excess earnings over normal earnings for similar businesses is recorded as goodwill. Due to uncertainty of future earnings, valuing goodwill using this method is difficult.

Accounting Treatment of Goodwill

1. ***Capitalisation and amortisation method:*** Companies valuing goodwill, follow the residuum approach to capitalise their assets. The net affect of this approach is that, the goodwill account also includes all other assets that are identifiable by the company. Thereby the goodwill account reflects an incorrect picture of intangible assets. One method of correcting this error is to use the 'Hidden Assets approach'. Under this method, the excess purchase price that companies pay over the fair market value of assets is for assets that are not shown or hidden from the balance sheet.

   These hidden assets can be both tangible and as intangible in nature. They must be identified, recorded in the balance sheet and then amortised over their appropriate economic life. Then, the goodwill account reflects the true picture of only intangible assets.

   Amortisation of recorded goodwill enables the company to match the cost of intangible assets with benefits from their use. The point of focus in this case is the period over which amortisation must take place. If the life of the asset is not determinable, as in the case of goodwill, amortisation of its value is done over a period of about 40 years. This will cause a minimal impact of writing off of goodwill on the annual net income.

Notes

Example:	Assets	₹ 20000
	Liabilities	₹ 5000
	Owner's equity	₹ 15000

ABC owns land the historical cost of which is ₹ 6000, but currently worth ₹ 13000. Market value of the land is ₹ 7000 more than its book value.

PQR ltd. purchases the outstanding stock of ABC for ₹ 32000, price based on the market position and earnings performance of the company over the past few years.

Market value of acquired assets is calculated as follows:

Assets: ₹ 20000 + ₹ 7000 excess land value = ₹ 27000

Market value of acquired liabilities ₹ 5000

Market value of net assets ₹ 22000

The firm sold all its assets and paid off its liabilities. Purchase price is ₹ 32000. Hence, PQR ltd. will record ₹ 10000 as goodwill on the purchase. It must be noted that ₹ 7000 from the excess ₹ 10000 is attributable to the excess of market value of land over the book value.

Hence ₹ 32000 purchase price can be divided into three amounts for accounting purposes:

Acquired company's owner's equity	₹ 15000
Excess of market value of land	₹ 7000
Goodwill	₹ 10000
Total purchase price	₹ 32000

PQR Ltd. capitalises goodwill and assumes a 10-year period as the economic life of goodwill. The annual accounting entry for goodwill would be:

Journal entry:	Amortisation of goodwill	Dr	1000	
	To goodwill			1000

2. ***Capitalisation and no amortisation:*** This method is most beneficial for a company. The company using this method gets to record the asset in the balance sheet instead of deducting it from owner's equity. As there is no amortisation, there is no yearly reduction of net income. The reason for such a treatment is that goodwill consisting of managerial ability, reputation and experience generally increases in value over time. This method views goodwill as an investment and hence it should stay on the balance sheet amortised.

3. ***Write off method:*** Under this method, goodwill is immediately written off against the equity stockholder's account, generally from retained earnings.

3.10 Summary

- Security analysis comprises of an examination and evaluation of the various factors affecting the value of a security.
- Security analysis is about valuing the assets, debt, warrants, and equity of companies from the perspective of outside investors using publicly available information.
- While there is much overlap between the analystical tools used in security analysis and those used in corporate finance, security analysis tends to take the perspective of potential

Notes

investors, whereas corporate finance tends to take an inside perspective such as that of a corporate financial manager.

- The equity value of a firm is simply its market capitalization, that is, market price per share multiplied by the number of outstanding shares.
- Two types of approaches to valuation are discounted cash flow methods and financial ratio methods.
- The "cash flow to equity" approach to valuation directly discounts the firm's cash flow to the equity owners.
- Free cash flow (FCF) is cash flow available for distribution among all the securities holders of an organization.
- In general, each project's value will be estimated using a discounted cash flow (DCF) valuation, and the opportunity with the highest value, as measured by the resultant net present value (NPV) will be selected.
- This requires estimating the size and timing of all of the incremental cash flows resulting from the project.
- Any outstanding warrants must be considered when valuing the equity of the firm.
- Buyback is reverse of issue of shares by a company where it offers to take back its shares owned by the investors at a specified price; this offer can be binding or optional to the investors.
- Goodwill is considered to be one of the largest intangible assets, the value of which companies want to reflect correctly in their financial statements.
- Accounting for this asset, poses many challenges for accountants, as it is an unidentifiable intangible asset.

3.11 Keywords

Amortisation: The process of increasing, or accounting for, an amount over a period of time.

Asset: Economic resources owned by business or company.

Intrinsic Value: The difference between the exercise (strike) price and the underlying stock price.

Warrants: Securities that entitles the holder to buy stock of the company that issued it at a specified price, which is usually higher than the stock price at time of issue.

3.12 Self Assessment

State whether the following statements are true or false:

1. Security analysis comprises of an examination and distribution of the various factors affecting the value of a security.
2. The enterprise value is the value of all the assets of the firm.
3. A warrant is a security that entitles the holder to buy stock of the company that issued it at a specified price, which is usually higher than the stock price at time of issue.
4. Security analysis tends to take the perspective such as that of a corporate financial manager.

Notes

5. Under excess profits approach, goodwill is taken to be the difference between the purchase price and the fair market value of an acquired company's assets.
6. The enterprise value includes the value of any outstanding warrants.
7. Security analysis is about valuing the assets, debt, warrants, and equity of companies from the perspective of outside investors using publicly available information.
8. Once the valuation calculation is made free cash flow and WACC can be known.
9. Amortisation of recorded goodwill enables the company to match the cost of intangible assets with benefits from their use.
10. The "cash flow to equity" approach to valuation directly discounts the firm's cash flow to the equity owners.
11. The more volatile the underlying instrument, the higher the price of the warrant will be.
12. Time value increases as the expiry of the warrant gets closer.
13. The hurdle rate is the maximum acceptable return on an investment.
14. Hidden assets are always intangible in nature.
15. Companies valuing goodwill, follow the residuum approach to capitalise their assets.

3.13 Review Questions

1. Why do the companies buyback?
2. How do you suggest getting the Buyback value disbursed?
3. A company has purchased the proprietory concern (sale to a co). In this case company paid ₹ 70 lacs as goodwill (as per agreement of sale deed). While finalizing the accounts of the co., how this goodwill be recognized. Proprietory concern is a Hospital.
   (a) Can we treat this goodwill paid in cash as intellectual property?
   (b) Can we capitalize this?
   (c) Can we claim amortisation on this as intangible asset?
4. In you view, what will effect a warrant's time value?
5. The NPV is greatly affected by the discount rate. Comment.
6. What are warrants? How they are traded?
7. Examine the impact of the restrictions on buyback by Indian companies.
8. Why should supplier credit not be considered as a source of financing like bank and other long-term debts or like equity, when calculating WACC?
9. Can a reduction in net financial debt (prompted by a decrease in working capital) reduce WACC? Why/Why not?
10. What do think as the most customary question that security analysis attempts to answer? What is its significance?
11. Investors will act only on the basis of expected returns on bonds of various maturities. IS this statement true or false according to you. Justify your answer with proper reasoning.

Notes

Answers: Self Assessment

1.	False	2.	False
3.	True	4.	False
5.	False	6.	True
7.	True	8.	False
9.	True	10.	True
11.	True	12.	False
13.	False	14.	False
15.	True		

3.14 Further Readings

Books

B. Graham, David Dodd, *Security Analysis: The Classic,* McGraw-Hill Professional.

Thomas E. Copeland, *et al., Valuation: Measuring and Managing the Value of Companies*, McKinsey & Company, Inc.

Online links

www.focusinvestor.com

www.investorwords.com

www.praxiom.org

Unit 4: Fundamental Analysis

Notes

CONTENTS

Objectives

Introduction

4.1 Economy Analysis

4.1.1 Macro Economic Analysis

4.1.2 Investment-making process

4.1.3 Economic Forecasting

4.1.4 Barometric or Indian Approach

4.1.5 Geometric Model Building Approach

4.1.6 Economy and Industry Analysis

4.2 Industry Analysis

4.2.1 Importance of Industry Analysis

4.2.2 Classification of Industries

4.2.3 Key Indicators in Analysis

4.2.4 Forecasting Methods

4.2.5 Conditions and Profitability

4.2.6 Industry Analysis factors

4.2.7 Techniques of Industry Analysis

4.3 Company Analysis

4.3.1 Framework of Company Analysis

4.3.2 Fundamental Analyst's Model

4.3.3 Determining Earnings – Multiplier (P/E) Ratio

4.3.4 Dividend Discount Model of Valuation

4.3.5 Comparative P/E Approach

4.3.6 Growth Stocks

4.3.7 Forecasting Earnings per Share

4.4 Summary

4.5 Keywords

4.6 Self Assessment

4.7 Review Questions

4.8 Further Readings

Notes

Objectives

After studying this unit, you will be able to:

- Discuss the concept of Economic Analysis
- Explain Current State of Economy and Indicators
- Describe tools for economic analysis
- Explain the concept of Industry Analysis
- Discuss Standard Industry Classification
- Analyze Industry Growth Cycle
- Understand tools for Industry Analysis
- Discuss Quantitative Industry Analysis
- Explain concept of company analysis
- Understand the concept of estimation of future price
- Discuss Quantitative Company Analysis
- Explain forecasting earning per share
- Describe traditional and modern methods of forecasting EPS
- Explain tools for Company Analysis

Introduction

In the fundamental approach, an attempt is made to analyze various fundamental or basic factors that affect the risk-return of the securities. The effort here is to identify those securities that one perceives as mispriced in the stock market. The assumption in this case is that the 'market price' of security and the price as justified by its fundamental factors called 'intrinsic value' are different and the marketplace provides an opportunity for a discerning investor to detect such discrepancy. The moment such a description is identified, a decision to invest or disinvest is made. The decision rule under this approach is like this:

If the price of a security at the market place is higher than the one, which is justified by the security fundamentals, sell that security. This is because, it is expected that the market will sooner or later realize its mistake and price the security properly. A deal to sell this security should be based on its fundamentals; it should be both before the market correct its mistake by increasing the price of security in question. The price prevailing in market is called "market price' (MP) and the one justified by its fundamentals is called 'intrinsic value' (IV) session rules/ recommendations.

1. If IV > MP, buy the security
2. If IV < MP, sell the security
3. If IV > MP, no action

The fundamental factors mentioned above may relate to the economy or industry or company or all some of this. Thus, economy fundamentals, industry fundamentals and company fundamentals are considered while prizing the securities for taking investment decision. In fact, the economy-industry-company framework forms integral part of this approach. This framework can be properly utilized by making suitable adjustments in a regular context. A world of caution,

Notes

though. Please remember, the use of an analytical framework does not guarantee an actual decision. However, it does guarantee an informed and considered investment decision, which would hopefully be better as it based on relevant and crucial information.

Fundamental Analysis and Efficient Market

Before elaborating in detail on the economy-industry-company framework, it is pertinent to mention that doubts are expressed about the utility of this approach in the contest of efficient stock market set-up. Briefly, the market efficiency relates to the speed with which the stock market incorporates the information about the economy, industry and company, in the share prices, rather instantaneously. The above given view about share market efficiency implies that no one would be able to make abnormal profits given such a set-up. Some research studies in the literature also support the above view. Practitioners, however, do not agree to such conclusions of an empirical nature.

Fundamental Analysis and Chemistry of Earnings

The logic for fundamental analysis becomes crystal clear once we understand the chemistry of earnings and macro and macro factors which influence the future of earnings.

Table 4.1: Factors Affecting Distributable Earnings

Board Source/Form of Earnings	Company Specific Factors	Industry Factors	Macro- Economic
Sales	Competitive strength	Industry demand/supply	National income, sp. savings, Monetary policy credit, Export-import policies, Population, price level.
Less Costs of sales	Operating efficiency	Industry wage Levels: Industrial Infrastructure Import-export policy	National wage policy price levels, Economic infrastructure, Raw materials production
Earnings Before Interest Depreciation & Taxes (EBIDT) Less Interest	Capital Structure/financial leverage policy	Industry cost of capital	Interest rates in the Economy, Capital conditions
Less Depreciation	Operational leverage policy	Industry practices	Capital goods import
Less Tax	Tax Planning and Management	Industrial lobby	Fiscal Policy
Net Earnings After Tax (NEAT)			
Less (Preference Dividend)	Capital Structure Policy	Industry Practices	Interest Rate Structure, Capital… Conditions
Distributable Earnings Less			

Contd...

Notes

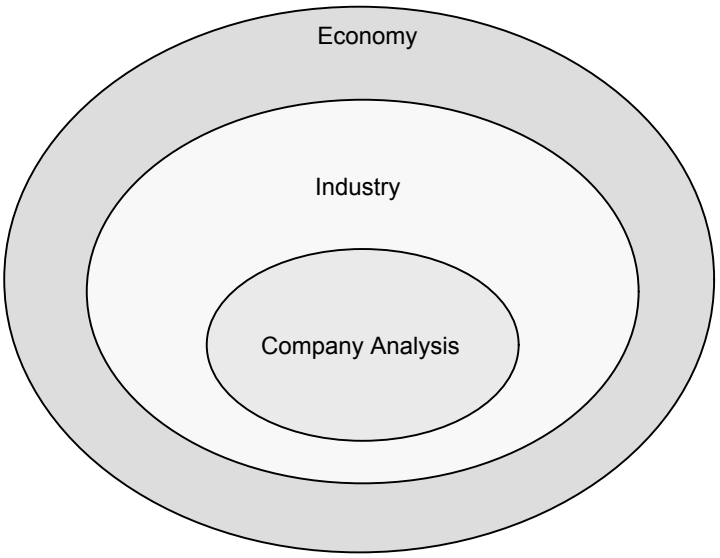
Equity Dividend	Dividend Policy	Industry Practices	Fiscal Policy, Credit Capital Market conditions
Retained Earnings			

The analysis of economy, industry and company fundamentals as mentioned above is the main ingredient of the fundamental approach. The analyst should take into account all the three constituents that form different but special steps in making an investment decision. These can be looked at as different stages in the investment decision-making. Operationally, to base the investment decision on various fundamentals, all the three stages must be taken into account.

4.1 Economy Analysis

In actual practice, you must have noticed that investment decisions of individuals and the institutions made in the economic set-up of a particular country. It becomes essential, therefore, to understand the star economy of that country at the macro level. The analysis of the state of the economy at the macro level incorporates the performance of the economy in the past, how it is performing in the present and how it is expected to perform in future. Also relevant in this context is to know how various sectors of the economy are going to grow in the future.

Figure 4.1



4.1.1 Macro Economic Analysis

The analysis of the following factors indicates the trends in macro economic changes that effect the risk and return on investments.

1. Money supply
2. Industrial production
3. Capacity utilisation
4. Unemployment

Notes

5. Inflation
6. Growth in GDP
7. Institutional lending
8. Stock prices
9. Monsoons
10. Productivity of factors of production
11. Fiscal deficit
12. Credit/Deposit ratio
13. Stock of food grains and essential commodities
14. Industrial wages
15. Foreign trade and balance of payments position
16. Status of political and economic stability
17. Industrial wages
18. Technological innovations
19. Infrastructural facilities
20. Economic and industrial policies of the government
21. Debt recovery and loans outstanding
22. Interest rates
23. Cost of living index
24. Foreign investments
25. Trends in capital market
26. Stage of the business cycle
27. Foreign exchange reserves

Notes In a globalised business environment, the top-down analysis of the prospects of a firm must begin with the global economy. The global economy has a bearing on the export prospects of the firm, the competition it faces from international competitors, and the profitability of its overseas investors.

The government employs two broad classes of macroeconomic policies, viz. demand-side policies and supply-side policies.

Traditionally, the focus was mostly on fiscal and monetary policies, the two major tools of demand-side economics. From the 1980s onward, however, supply-side economics has received a lot of attention.

1. ***Fiscal Policy:*** Fiscal policy is concerned with the spending and tax initiatives of the government. It is the most direct tool to stimulate or dampen the economy.

Notes

An increase in government spending stimulates the demand for goods and services, whereas a decrease deflates the demand for goods and services. By the same token, a decrease in tax rates increases the consumption of goods and services and an increase in tax rates decreases the consumption of goods and services.

2. ***Monetary Policy:*** Monetary policy is concerned with the manipulation of money supply in the economy. Monetary policy affects the economy mainly through its impact on interest rates.

   The main tools of monetary policy are:

   (a) Open market operation

   (b) Bank rate

   (c) Reserve requirements

   (d) Direct credit controls

4.1.2 Investment-making Process

Each of the sectors show sings of stagnation and degradation in the economy. This, we can examine and understand by studying historical performance of various sectors of the economy in the past, their performances at present and then forming the expectation about their performances in the future. It is through this systematic process that one would be able to realise various relevant investment opportunities whenever these arise. Sectoral analysis, therefore, is carried out along with overall economy analysis as the rate of growth in overall economy often differs from the rate within various segments/sectors.

Rationale of the above type of analysis depends on economic considerations too. The way people in general, their income and the way they spend these earnings would in ultimate analysis decide which industry or bunch of industries would grow in the future. Such spending affects corporate profits, dividends and prices of the shares at the many would grow in the future. A research study conducted by King (1966) reinforces the need of economic and industry analysis in this context. According to him on an average, over half the variation in stock returns is attributed to market prices that affect all the market indices. Over and above this, industry specific factors account for approximately 10 to 15 per cent of the variation of stock returns. Thus, taken together, two-third of the variation of stock prices/returns reported to market and industry related factors. King's study, despite the limitations of its period of its publication and use of US-specific data, highlights the importance of economic and industry analyses in making investment decisions. To neglect this analysis while deciding where to invest would be at one's peril.

It must be clear by this now that analysis of historical performance of the economy is a starting point; albeit a portent step. But, for the analyst to decide whether to invest or not, expected future performance of the overall economy along with its various segments is most relevant. Thus, all efforts should be made to forecast the performance of the economy so that the decision to invest or to disinvest the securities can be a beneficial one.

Caution Decisions can be made in the most haphazard manner. Interestingly, this calls for using the same indicators that describe how the economy has shaped up in the past and how it is likely to take shape in the future as compared to the current state of affairs. A healthy outlook about the economy goes a long way in boosting the investment climate in general and investment in securities in particular.

Notes

4.1.3 Economic Forecasting

Still, it must be properly understood at this stage that economic forecasting is a must for making investment decision. It has been mentioned earlier too, that the fortunes of specific industries and the firm depends upon how the economy looks like in the future, both short-term and long-term. Accordingly, forecasting techniques can also be divided and categories: Short-term forecasting techniques are dealt with in detail; these terms should be clearly understood. Short-term refers to a period up to three years. Sometimes, it can also refer to a much shorter period, as a quarter or a few quarters. Intermediate period refers to a period of three to five years. Long-term refers to the forecast made for more than five years. This may mean a period of ten years or more.

Techniques used

1. Economic indicators
2. Diffusion index
3. Surveys
4. Economic Model Building

We shall discuss some short-term forecasting techniques in the following.

At the very outset, let it be mentioned that the central theme of economic forecasting is to forecast national some with its various components. This is because it summarizes the receipts and expenditures of all segments of the economy, be they government, business or households. These macro-economic accounts describe economic activities over a period of time. Not surprisingly, therefore, all the techniques focus on forecast national income and its various components, particularly, those components that have bearing on an industry and the particular industry and the company to be analysed.

GNP is a measure to quantify national income and is the total value of the final output of goods and produced in the economy. It is an important indicator of the level and the rate of growth in the economy, and is of central concern to analysts for forecasting overall as well as various components during a certain period. Following are some of the techniques of short-term economic forecasting.

Anticipatory Surveys

This is very simple method through which investors can form their opinion/expectations with respect to the future state of the economy. As is generally understood, this is a survey of expert opinions of those prominent in the government, business, trade and industry. Generally, it incorporates expert opinion with construction activities, plant and machinery expenditure, level of inventory etc. that are important economic activities. Anticipatory surveys can also incorporate the opinion or future plans of consumers regarding their spending. So long as people plan and budget their expenditure and implement their plans accordingly, such surveys should provide valuable input, as a starting point.

Despite the valuable inputs provided by this method, care must be exercised in using the information obtained through this method. Precautions are needed because:

1. Survey results cannot be regarded as forecasts per se. A consensus of opinion may be used investor in forming his own forecasts.
2. There is no guarantee that the intentions surveyed would certainly materialize. To this extent, they cannot rely solely on these.

Notes

Despite the above limitations, surveys are very popular in practice and used for short-term forecast of course, requires continuous monitoring.

4.1.4 Barometric or Indian Approach

In this approach, various types of indicators are studied to find out how the economy is likely to behave in future. For meaningful interpretations, these indicators are roughly classified into leading, lagging and coincidental indicators.

Leading Indicators: As the name suggests, these are indicators that lead the economic activity in their outcome. That is, these are those time series data of the variables that reach their high points as well low points in advance of the economic activity.

Lagging Indicators: These are time series data of variables that lag behind in their consequences vis-à-vis the economy. That is, these reach their turning points after economy has already reached its own.

In developed countries, data relating to various indicators are published at short intervals.

Example: The Department of Commerce publishes data regarding various indicators in each of the following categories.

1. ***Leading Indicators***
   - (a) Average weekly hours of manufacturing production workers
   - (b) Average weekly in initial unemployment claims
   - (c) Contacts and orders for plant and machinery
   - (d) Index of S&P 500 stock prices
   - (e) Money supply (M2)
   - (f) Change in sensitive material prices
   - (g) Change in manufacture's unfilled orders (durable goods industries)
   - (h) Index of consumer expectations.
2. ***Coincidental Indicators***
   - (a) Index of industrial production
   - (b) Manufacturing and trade sales
   - (c) Employee on non-agricultural payrolls
   - (d) Personal income less transfer payment
3. ***Lagging Indicators***
   - (a) Average duration of unemployment
   - (b) Ratio of manufacturing and trade inventories to sales
   - (c) Average prime rate
   - (d) Outstanding commercial and industrial loans

The above list is not exhaustive. It is only illustrative of various indicators used by investors.

Notes

Caution Forecasting based solely on leading indicators is a hazardous business. One has to be quite careful in using them. There is always a time lag it with result that interpretation can be erroneous, if it is not done well in advance. Interpretation even if performed meticulously, cannot be fruitfully utilized. Further, problems with regard to their interpretation exist as well. Indicators are classified under the broad category of leading indicators. Their various measures may emit conflicting signals about the future direction of the economy; the use of diffusion index or composite index has, thus, been suggested. This deals with the problem by combining several indicators into one index in order to measure the strength or weaknesses of the problem by combining several indicators into one index in order to measure the strength or weaknesses of a particular kind of indicator. Care has to be exercised even in this case as diffusion indices are also without problems.

Apart from the fact that its computations are difficult, it does not eliminate the varying factors in the series. Despite these limitations, indicator approach/diffusion index can be useful tool in the armoury of a skilful forecaster.

Did u know? **What is the role of money supply in determining stock prices?**

Analysts have recognized that money supply in the economy plays a crucial part in the investment decision per se. The rate of change in the money supply in the economy affects the GNP, corporate profits, interest rates and prices. Accordingly, monetarists argue that total money supply in the economy and its rate of change has an important influence the stock prices as a hedge against inflation, and in creases in stock prices sometimes.

Diffusion Index

1. A diffusion index is an indicator of the extensiveness or spread of an expansion or contraction.
2. It has been developed by the National Bureau of Economic Research, USA.
3. There are two main categories of diffusion index

   (a) *Composite or Consensus Index:* It combines several indicators into one single measure, in order to measure the strength or weakness in the movements of these particular time series of data.

   For instance, there are ten leading indicators; out of them four are moving up and others are not. How do we interpret it?

   $$\text{Diffusion Index} = \frac{\text{No. of members in the set in the same direction}}{\text{Total no. of members in the set}}$$

   In the example, diffusion index = 4/10 = 0.4

   Next month, if the index moved to 0.6, it certainly is a strong confirmation of economic advance.

   (b) *Component Evaluation Index:* This is a narrow type of index, one that examines a particular series taking into consideration its components. It measures the breadth of the movement within a particular series.

Notes

4.1.5 Geometric Model Building Approach

This is an approach to determine the precise relationship between the dependent and the independent variables. In fact, econometrics is a discipline wherein application of mathematics and statistical techniques is a part of economic theory. It presupposes the precise and clear relationship between the dependent and independent variables and the onus of such well-defined relationship with its attendant assumptions rests with the analyst. Thus, by geometrics, the analyst is able to forecast a variable more precisely than by any other approach. But this derived approach would be as good as the data inputs used and assumptions made.

Static Model Building or GNP Model Building or Sectoral Analysis is frequently used in particular in the methods discussed earlier. These use national accounting framework in making short-term forecasts. The various steps while using this approach are:

1. Hypothesize the total demand in the economy as measured by its total income (GNP) based on likely conditions in the country like war, peace, political instability, economic changes, level and rate of inflation etc.
2. Forecast the GNP figure by estimating the levels of its various components like:
   (a) Consumption expenditure
   (b) Private cosmetic investment
   (c) Government purchases of goods and services
   (d) Net exports
3. Forecasting the individual components of GNP, the analysis then adds them up to obtain a figure of the GNP.
4. The analyst compares the total of GNP and arrives at an independent estimate appropriately. The forecast of GNP is an overall forecast for internal consistency. This is done to ensure that both his total forecast and permanent forecast make sense and fit together in a reasonable manner.
5. Thus the GNP model building involves all the details described above with a considerable amount of judgment.

Task

What do you think has accounted for this suddenly revived economy? Support your answer with reasons.

Future Scenario

The scenario could emerge strongly bullish if the cut in costs in implementing the finished product is accompanied by a cut in the import tariff for the raw materials as well. Besides, the excise component would have to be lowered as well, resulting in an expansion of demand within the economy. Once this transpires, more goods will be sold, recession will history and if installed capacities fail to meeting the demand, we could even have a temporary shortage in certain areas on our hands.

Given this scenario, only the obstinate would continue to be bearish. It is time perhaps, to overcome the current shorts on the Sensex and place and place all our big chips on the shares of polyesters companies. Stock polyester, Sanghi Polyster, Sanghi Polyster and Haryana Petro look cheap when viewed against projected 1993-94 earnings. With the festive season under way,

Notes

the buoyancy in yarn prices is expected to continue giving investors a turnaround for the first half of the current financial year.

4.1.6 Economy and Industry Analysis

Investment decisions are a part of our economic life, made by almost everybody in different contexts at different times. The highly subjective nature of such decisions and the varying results that they offer therefore, necessitate a further study and analysis into the same.

Long regarded as an art, investment decision-making has only recently been considered as science with an attendant body of literature being developed helping us understand its dynamics. Investment decision-making is now accepted both as an art as well as a science. Decision-makers attempt to update themselves on the characteristics of returns securities, which keep changing. Their understanding needs sustained efforts.

Changes in the management of any particular company or changes in government policy at macro level can bring about changes in the attractiveness of certain securities. For example, before 1992-93, the shares of sugar industry in India did not catching the attention of the investing public. But due to changes in the government policy towards this industry around 1999, sugar industry shares became quite attractive. Policy changes made by the government related to hike in the sugar per sold both in open market as well as through public distribution system, increase in the quantity of sugar for sale in the free market etc. played a very important role in making the shares of sugar companies attractive. There may be other factors too, that are more specific to a particular company or industry.

Table 4.2: Opportunities and Threats in the Macro-economic Environment

S. No.	Economic Indicator	Opportunity	Threat
1.	Economic cycle stage	Boom	Recession
2.	Gross National Product	Growth	Decline
3.	Employment	Increase	Decrease
4.	Aggregate demand	Rise	Fall
5.	Personal disposable income	Increase	Decrease
6.	House construction	Increase	Decrease
7.	Personnel savings during inflation	Increase	Decrease
8.	Rate of interest	Low	High
9.	Corporate taxation	Low	High
10.	Balance of trade	Positive	Negative
11.	Rupee in foreign exchange market	Strong	Weak
12.	Prices	Stable	Unstable

4.2 Industry Analysis

After conducting an analysis of the economy and identifying the direction it is likely to take in the short, interim and long-term, the analyst must look into various sectors of the economy in terms of various industries. An industry is a homogenous group of companies. That is, companies

Notes

with similar characteristic can be divided into one industrial group. There are many bases on which grouping of companies can be done.

Example: Traditional classification is generally done product-wise like pharmaceuticals, cotton textile, synthetic fibre etc.

Such a classification, through useful, does not help much in investment decision-making. Some of the useful bases for classifying industries from the investment decision-point of view are as follows:

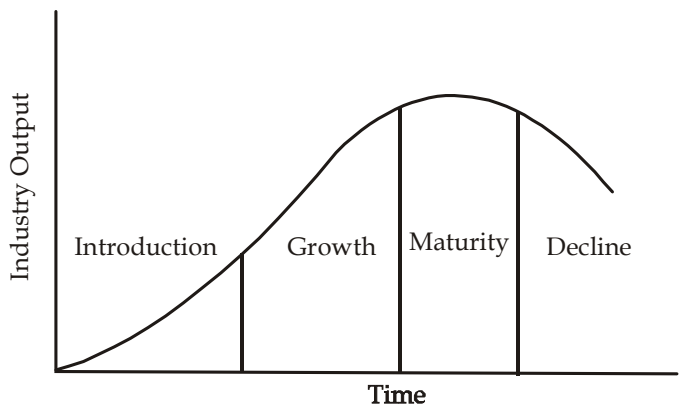
Growth Industry: This is an industry that is expected to grow consistently and its growth may exceed the average growth of the economy.

Cyclical Industry: In this category of the industry, the firms included are those that move closely with the rate of industrial growth of the economy and fluctuate cyclically as the economy fluctuates.

Defensive Industry: It is a grouping that includes firms, which move steadily with the economy and less than the average decline of the economy in a cyclical downturn.

Another useful criterion to classify industries is the various stages of their development. Different stages of their life cycle development exhibit different characteristic. In fact, each development is quite unique. Grouping firms with similar characteristics of development help investors to properly identify different investment opportunities in the companies. Based on the stage in the life cycle, industries are classified as follows:

Figure 4.2: Industry Life Cycle



Pioneering stage: This is the first stage in industrial life cycle of a new industry. In this, technology and its products are relatively new and have not reached a stage of perfection. There is an experimental order both in product and technology. However, there is a demand for its products in the market; the profits opportunities are in plenty. This is a stage where the venture capitalists take a lot of interest, enter the industry and sometimes organize the business. At this stage, the risk commences in this industry and hence, mortality rate is very high. If an industry withstands them, the investors would reap the rewards substantially or else substantial risk of investment exists. A very pertinent example of this stage of industry in India was the leasing industry, which tried to come up during the mid-eighties. There was a mushroom growth of companies in this period. Hundreds of companies came into existence. Initially, lease rental charged by them

Notes

were very high. But as competition grew among firms, lease rentals reduced and came down to a level where it became difficult for a number companies to survive. This period saw many companies that could not survive the onslaught of competition of those firms that could tolerate this onslaught of price war, could remain in the industry. The leasing industry today is much pruned down compared to the mid-eighties.

Fast growing stage: This is the second stage when the chaotic competition and growth that is the hallmark of the first stage is more or less over. Firms that could not survive this onslaught have already died. The surviving large firms now dominate the industry. The demand of their product still grows faster, leading to increasing amount of profits the companies can reap. This is a stage where companies grow rapidly. These companies provide a good investment opportunity to the investors. In fact, as the firms during stage of development grow faster, they sometimes break records in various areas, like payment of dividend and become more and more attractive for investment.

Security and stabilization stage: The third stage where industries grow roughly at the rate of the economy, develop and reach a stage of stabilization. Looked at differently, this is a stage where the ability of the industry appears to have more or less saturated. As compared to the competitive industries, at this stage, the industry faces the problem of what Grodinsky called "latent obsolescence" a term used to a stage where earliest signs of decline have emerged. Investors have to be very cautions to examine those sings before it is too late.

Relative decline stage: The fourth stage of industrial life cycle development is the relative decline The industry has grown old. New products, new technologies have entered the market. Customers have new habits, styles, likes etc. The company's/industry's products are not much in demand as was in the earliest stage. Still, it continues to exist for some more time. Consequently, the industry would grow less than the economy during the best of the times of the economy. But as is expected, the industry's decline is much faster than the decline of the economy in the worst of times.

The characteristics of different stages of life cycle development of industries have a number of implications for decisions. Investment at this stage is quite rewarding. However, for an investor looking for steady forms with risk aversion, it is suggested that he should in general avoid investing at this stage. But if he is still keen to invest, he should try to diversify or disperse his investment price the risk. It would be quite prudent on this part to look for companies that are in the second date i.e., fast growth. This probably explains the prevalent higher stock prices of the companies of this industry.

From the investment point of view, selection of the industries at the third stage of development is quite crucial. It is the growth of the industry that is relevant and not its past performance. There are a number of cases where the share prices of a company in a declining industry have been artificially hiked up in the market, on the basis of its good performance. But the fact of the matter is that a company in such an industry would sooner or later feel the pinch of its decline and an investor investing in such companies experiences a reduction in the value of his investment in due course.

Having discussed various investment implications, it may be pointed out that one should be careful while classifying them. This is because the above discussion assumes that the investor would be able to identify the industrial life cycle. In practice, it is very difficult to detect which stage of the industry is at. Needless to say, it is only a general framework that is presented above. One can spangle this analysis with suitable modifications. In order to strengthen the analysis further, it is essential to outline the features of the industry in detail. Due to its unique characteristic, unless the specific industry is analysed properly and in depth with regard to these, it will be very difficult to form an opinion for profitable investment opportunities.

Notes

1. There is competition among domestic and foreign firms, both in the domestic and the foreign markets. How do firms perform here?
2. Many types of products are manufactured in this industry. Are these homogenous in nature or highly heterogeneous?
3. What is the nature and prospect of demand for the industry? Are these homogenous in nature or highly heterogeneous?
4. This may also incorporate the analysis of the markets of its products, customer-wise and geographical area-wise, identifying various determinants of this type of industry its growth, cyclical, defensive or relative decline industry.

4.2.1 Importance of Industry Analysis

Why should a security analyst carry out industry analysis?

To answer this question, logically, two arguments are presented:

1. Firms in each different industry typically experience similar levels of risk and similar rates of return. As such, industry analysis can also be useful in knowing the investment-Worthiness of a firm.
2. Mediocre stocks in a growth industry usually outperform the best stocks in a stagnant industry. This points out the need for knowing not only company prospects but also industry prospects.

Risk-return patterns: Economic theory points out that competitive firms in an industry try to maximize their profits by adopting fairly similar policies with respect to the following:

1. The labour-capital ratio utilized by each firm.
2. Mark ups, profit margins and selling prices.
3. Advertising and promotional programmes.
4. Research and development expenditures.
5. Protective measures of the government.

At such, they have the same risk level as well as rates of return, on an average. Empirical evidence shown by research done by Fabozzi and Francis supports this argument.

Growth Factor: All industries do not have equally good or equally bad experiences and expectations; their fortunes keep on changing. It implies that the past is not a good indicator of the future – if one looks very far into the future.

This view is well supported by research. Researchers have ranked the performance of different industries over a period of one year and then ranked the performance of the same industries over subsequent periods of years. They compared the ranking and obtained near zero correlations. It implies that an industry that was good during one period of time cannot continue to be good in all periods.

Another observation is every industry passes through four distinct phases of the life cycle. The stages may be termed as pioneering, expansion, stagnation and decline. Different industries may be in different stages. Consequently their prospects vary. As such, separate industry analysis is essential.

Notes

4.2.2 Classification of Industries

There are different ways of classifying industrial enterprises.

1. ***Classification by Reporting Agencies:*** In India, the Reserve Bank of India has classified industries into 32 groups. Stock exchanges have made a broad classification of industry into 10 groups.

   Business media have their own classification. The Economic Times classifies industry into 10 groups and the Financial Express into 19 groups. The groups are further sub-divided.

2. ***Classification by Business Cycle:*** The general classification in this framework is growth, cyclical, defensive and cyclical growth. Growth industries are characterized by high rates of earnings expansion, often independent of business cycles. These industries are pioneers of a major change in the state of the art i.e., innovation diffusing concerns. The ongoing revolution in the electronics industry and communications equipments is an example of this kind.

Cyclical industries are closely related to business cycles. Prosperity provides consumers purchasing power and boom to industry whereas depression adversely affects them. Consumer durables are subject to these kinds of changes.

Defensive industries are those the products of which have relatively inelastic demand. Food processing industry is an example.

Cyclical growth industries are those that are greatly influenced by technological and economic changes. The airline industry can be cited as an example.

4.2.3 Key Indicators in Analysis

The analyst is free to choose his or her own indicators for analyzing the prospects of an industry. However, many commonly adopt the following indicators.

1. ***Performance Factors*** like:
   (a) Past sales
   (b) Past earnings
2. ***Environment Factors*** like:
   (a) Attitude of government
   (b) Labour conditions
   (c) Competitive conditions
   (d) Technological progress
3. ***Outcome Factors*** like:
   (a) Industry share prices
   (b) Price earnings multiples with reference to these key factors, evaluations shall be done to identify.
   (c) Strengths and weaknesses
   (d) Opportunities and threats

Some relevant questions that may be asked in this connection are given here. They are only illustrative and not exhaustive.

Notes

1. Are the sales of industry growing in relation to the growth in Gross National Product (GNP)?
2. What is overall return on investment (ROI)?
3. What is the cost structure of the industry?
4. Is the industry in a stable position? Does the success or failure of the industry depend upon any single critical factor?
5. What is the impact of taxation upon the industry?
6. Are there any statutory controls in matters of raw materials allotment, prices and distribution? Are they protective or crippling?
7. What is the industrial relations scenario of the industry?
8. Is the industry highly competitive? Is it dominated by one or two major companies? Are they Indian or foreign? Is there sufficient export potential? Are international prices comparable to domestic prices?
9. Is the industry highly technology-based? At what pace technological advancements are taking place?
10. How does the stock market evaluate the industry? How are the leading scrips in the industry evaluated by the stock market?

4.2.4 Forecasting Methods

The techniques for analyzing information about industry within a time framework are briefly explained in this section.

1. ***The Market Profile:*** A market profile consists of those endogenous characteristics that have a significant bearing on demand or the way in which it can be developed.

   Its basic elements are:

   (a) Number of establishments

   (b) Geographical location of establishment

   (c) Number of employees

   (d) Value of sales

   (e) Value added by manufacturing

   (f) Capital expenditures

   (g) Degree to which establishments are specialized

   (h) Importance of their output in the national total

   The trend of these elements when analysed, reveal vital information about the position and progress of the industry. Illustratively some lead points are given here:

   (a) A decrease in number of establishments and employment accompanied by an increase in the other elements of the profile means increased automation.

   (b) An increase in value of sales, unaccompanied by an increase in value added and capital expenditure signifies rising prices.

Notes

(c) An increase in value added without an increase in capital expenditure signifies increase in labour productivity.

(d) A fall in the share of industry in national total implies decline of industry.

2. ***Cumulative Methods:*** These are based either on market surveys or statistical measurements,

(a) *Surveys:* Surveys are carried out by research agencies, consultants, industry association and the research bureau of media. These surveys generally study the current facilities and demand, future demand and proposed investment, and thereby the expansion prospects vis-à-vis demand gap. Other factors like, strengths and weaknesses of the organization, environmental forces are also brought into focus to evaluate the future of the industry.

Surveys adopt the methodology of inquiry, through questionnaires and interviews. The subjects will be either manufacturer or dealers/end users.

(b) *Correlation and Regression analysis:* Statistical methods like correlation and regression analysis can be of much help in demand measurement. The following steps have general application.

(i) Determine the total requirement for the type of product in question by present customers in each industry classification.

This can be done by asking the customer or obtaining the estimate from the salesmen, or by comparing with other customers of same size and class.

(ii) Correlation product requirement of customer establishments with a variable to output for which accurate published data are available. Generally, employment is the most useful variable.

The correlation can be observed by preparing a scatter diagram, as shown in figure or calculating mathematically, using the formula given below:

$$\text{Degree of relationship (r)} = \frac{N\Sigma(xy) - (\Sigma x)(\Sigma y)}{[n\Sigma x^2 - (\Sigma x)^2][N\Sigma x^2 - (\Sigma y)^2]}$$

Where, X = Number of employees

Y = Number product items

… observation

The nearer the correlate n coefficient is to +1 or – 1, the closer the relationship of the two variables under study.

The significance of the relationship can be determined using hypothesis testing procedure.

(iii) Apply the relationship to estimate demand. If the degree of correlation between purchases of a given product by present customers and their employment size is considered significant, the demand estimation can be done as follows:

(1) Computing the average number of items purchased per employee and applying this ratio to total employment.

(2) Formulating an estimating equation through regression method.

$$\Sigma y = Na + b\ \Sigma x$$

$$x\Sigma y = a\ \Sigma x + b\ \Sigma x$$

Notes

Where, a equals the number of products purchased when employment is zero and b equals the amount of change in the number of products purchased with every change in total employment.

The latter method is more accurate because it is more sensitive to the influence of independent variable on dependent variable.

Multiple regression analysis facilitates the study of impact of more than one independent variable on the dependent variable.

$$Y = a + b\,x_1 + c\,x_2 + d\,x_3 + e\,x_4 + f\,x_5$$

Where, Y = Yearly sales in lakhs of rupees;

x_1 = yearly sales (lagged one year) in lakhs of rupees

x_2 = yearly advertising expenditure in lakhs of rupees

x_3 = a dummy variable

x_4 = year

x_5 = disposable personal income in lakhs of current rupees

(c) *Time series analysis:* Time series analysis consists of decomposing the original sales series over a period of time. The elements derived are:

Trend (T): It is the result of basic developments in population, capital formation, and technology. It is found by fitting a straight or curved line through past sales.

Cycle (C): It captures the wave-like movement of sales. Many sales are affected by swings in general economic activity, which tends to be somewhat periodic. The cyclical component can be useful in intermediate range forecasting.

Season (S): It refers to a consistent pattern of sales movements within the year. The term season describes any recurrent sales pattern. The seasonal component may be related to weather factors, holidays, and trade customs. The seasonal pattern provides a norm for forecasting short-range sales.

Erratic Events (E): It refers to the unpredictable sales caused by unforeseen events like strikes, riots, war scares, floods, and other disturbances.

Another time series technique is exponential smoothing. For industries with several items in product line, this technique is useful to produce efficient and economical short-run forecasts. It requires only three pieces of information.

(i) This period's actual sales (Q_t)

(ii) This period's smoothed sales (Q_t)

(iii) A smoothing parameter (a), where

Sales forecast for next period $(Q_t + 1) = Q_t + (1 - a)Q_t$

The initial level of smoothed sales can simply be the average sales for the last few periods. The smoothing constant is derived by trial and error testing of different smoothing constants between zero and one, to find the constant that produces the best fit of past sales.

Notes

4.2.5 Conditions and Profitability

The worth of a share depends on its return, which in turn depends on the profitability of the company. It is interesting that growth is an essential variable but its mere presence does not guarantee profitability. Profitability depends upon the state of competition prevalent in the industry. Cost control measures adopted by its units and the growth in demand for its products. While conducting an analysis from the point of view of profitability, some relevant aspects to be investigated are:

1. How is the cost allocation done among various heads like raw materials, wages and overheads? Knowledge about the distribution of costs under various heads is very essential as this gives an idea to investors about the controllability of costs. Some industries have much higher overhead costs than others. Labour cost is another area that requires close scrutiny. This is because finally whether labour is cheap or expensive depends on the wage level and labour productivity. Labour that apparently look cheaper may turn out to be when its productivity is taken into account.
2. Price of the product of the industry
3. Capacity of production-installed, used, unused etc.
4. Level of capital expenditure required to maintain or increase the productive efficiency of the industry.

Profitability is another area that calls for a thorough analysis on the part of investors. No industry can survive in the long run if it is not making profits. This requires thorough investigation into various aspects of profitability. However, such an analysis can begin by having a bird's eye view of the situation. In this context, ratio analysis has been found quite useful. Some of the important often used are:

1. Gross Profit Margin ratio
2. Operating Profit Margin ratio
3. Rate of Return on Equity
4. Rate of Return on Total Capital

Ratios are not an end in themselves. But they do indicate possible areas for further investigation.

Technology and Research

Due to increasing competition in general, technology and research play a crucial part in the growth and survival of a particular industry. However, technology itself is subject to change; sometimes, very fast, and can lead obsolescence. Thus only those industries, which update themselves in the field of technology, can attain competitive advantage over others in terms of the quality, pricing of products etc.

The relevant questions to be probed further by the analyst in this respect could include the following:

1. What is the nature and type of technology used in the industry?
2. Are there any expected changes in the technology in terms of offering new products in the market to increase in sales?
3. What has been the relationship of capital expenditure and the sales over time?
4. Whether more capital expenditure has led to increase in sales or not.

Notes

5. What has been the amount of money spent in the research and development activities of the firm? Did amount on the research and development in the industry relate to its redundancy or otherwise?
6. What is the assessment of this industry in terms of its sales and profitability in the short, intermediate and long run?

The impact of all these factors have to be finally translated in terms of two most crucial numbers i.e. profitability - their level and expected rate of change during short, intermediate and long run.

4.2.6 Industry Analysis Factors

The securities analyst will take into consideration the following factors into account in assessing the industry potential in making investments:

1. Post-sales and earnings performance
2. The government's attitude towards industry
3. Labour conditions
4. Competitive conditions
5. Performance of the industry
6. Industry share prices relative to industry earnings
7. Stage of the industry life cycle
8. Industry trade cycle
9. Inventories build-up in the industry
10. Investors' preference over the industry
11. Technological innovations

4.2.7 Techniques of Industry Analysis

So far, we have discussed about various factors that are to be taken into account while conducting industry analysis. Now, we turn our attention towards various techniques that help us evaluate the factors mentioned above.

End Use and Regression Analysis: It is the process whereby the analyst or investor attempts to dial the factor that determines the demand for the output of the industry. This is also known as end-use demand analysis. In this process, the investor hopes to uncover the factors that explain the demand. Some of the factors are found to be powerful in explaining the demand for the product, like disposable income per capital consumption, price elasticity of demand and per capital income. In order to identify the factors that affect demand, statistical techniques like regression analysis and correlation have often been used. These help identify the important factors/variables. However, one should be aware of their limitations.

Input Output Analysis: This analysis helps us understand demand analysis in greater detail. Input of analysis is a very useful technique that reflects the flow of goods and services through the economy, including intermediate steps in the production process as the goods proceed from the raw material stage through to consumption. This information is reflected in the input-output table that reflects the pattern of consumption at all stages, not at the final stage of consumption of final goods. This is done to detect any changing patterns. It might also indicate the growth or decline of industries.

Notes

4.3 Company Analysis

We have discussed the relevance of economy and industry analysis and the manner in which it is conducted. In this unit, we will discuss the company level analyses. In order to provide a proper perspective to this analysis, let us begin by discussing the way investor makes investment decisions given his goal maximization. For earning profits, investors apply a simple and common sense decision rule of maximization. That is:

1. Buy the share at a low price
2. Sell the share at a high price

The above decision rule is very simple to understand, but difficult to apply in actual practice. Huge efforts are made to operationalise it by using a proper formal and analytical framework. To begin with, problems faced by the investor are: how to find out whether the price of a company's share is high or low? What is the benchmark used to compare the price of the share? The first question becomes easier if some benefits are agreed upon with which the prevailing market price can be compared. In this respect, fundamental analysis provides the investor a real benchmark in terms of intrinsic value. This value is dependent upon industry and company fundamentals. Out of these three, company level analysis provides a direct link to investor's action and his investment goal in operational terms. This is because an investor buys the equivalent of a company and not that of industry and economy. This framework indeed provides him with a proper background, with which he buys the shares of a particular company. A careful examination of the company's quantitative and qualitative fundamentals is, therefore, very essential. As Fischer and Jordan have aptly put it: "If the economic outlook suggests purchase at the time, the industry analysis will aid the investor in selecting the proper industry in which to invest. Nonetheless, when to invest and in which industry is not enough. It is also necessary to know which companies industries should be selected."

The real test of an analyst's competence lies in his ability to see not only the forest but also the trees. Superior judgment is an outcome of intelligence, synthesis and inference drawing. That is why, besides economic analysis and industry analysis, individual company analysis is important.

4.3.1 Framework of Company Analysis

The two major components of company analysis are:

1. Financial
2. Non-financial

A good analyst gives proper weightage to both these aspects and tries to make an appropriate judgment. In the process of evaluating the investment-worthiness of a company's securities, the analyst will be concerned with two broad categories information: (i) internal and (ii) external. Internal information consists the data and events relating to the enterprise as publicized by it. External information comprises the reports and analyses made by sources outside the company viz. media and research agencies.

1. ***Non-financial Aspects:*** A general impressionistic view is also important in evaluating the worth of a company for investing in securities. This could be obtained by gathering and analyzing information about companies, publicized in the media, the stock exchange directory, annual reports and prospectus.
   (a) History and business of the company
   (b) Top management team

Notes

(c) Collaboration agreements

(d) Product range

(e) Future plans of expansion/diversification

(f) R&D

(g) Market standing – competition and market share

(h) Corporate social responsibility

(i) Industrial relations scenario

(j) Corporate image etc.

Besides these internal factors, the external environment related to the company survival and image:

(a) Statutory controls

(b) Government policy

(c) Industry life cycle stage

(d) Business cycle stage

(e) Environmentalism

(f) Consumerism, etc.

2. ***Financial Aspects:*** Financial analysts interested in making investments in equality shares of a company will be concerned with the prospects of rise in value of the firm.

Asset value vs. Earnings value: The asset value of a security is determined by estimating the liquidating value of the firm, deducting the claims of firm's creditors and allocating the remaining net asset value of the firm over the outstanding shares of stock. The asset value is usually estimated by consultation with:

A specialist who appraises asset values and/or

An accountant who gives book value of the firm.

This method is suitable only for companies heading towards bankruptcy. For them, the firm's income and dividends will be declining and discontinuous. Hence, they will have negligible value. On the other hand, for going concerns, the intrinsic value far exceeds the value of the firm's physical assets. There is a definite lack of relationship between book value and real value, in the case of prosperous firms.

Therefore, investment analysis focus their attention on the trends of earnings and the related factors like dividends, bonus issues, rights shares, and appreciation of the market value of the share. It is believed that the appropriate indices for a company's performance are Market price Per Share (MPS) and Earnings Per Share (EPS).

4.3.2 Fundamental Analyst's Model

The true economic value or intrinsic value of a share of common stock. Like the value of bond or other assets it is equal to the present value of all cash flows from the asset.

$$P_{io} = \sum_{t=1}^{\infty} \frac{d_{it}}{(1+k_i)^t}$$

Notes

$$= \sum_{t=1}^{\infty} \frac{d_o(1 = g_i)^t}{(1 + k_i)^t}$$

$$= \frac{d_{i1}}{k - g}$$

Where, P_{io} = Value of share i

D_{it} = Dividends of share i in the t th period

K_1 = Equity capitalization rate

G_{it} = Growth rate of dividends of share i (a constant)

This value is obtained by stock analysts y multiplying the 'i' the stock's normalized earnings per share (e) with price-earnings ratio or earnings multiplier (m)

P_{io} = e_{io}. M_{io}

Where, P_{io} = Value of share 'i'

e_{io} = Earning of share 'c'

m_{io} = Earnings multiplier of share 'i'

The ratio of d_{io}/e_{io} is known as dividend payout ratio. From the above model it is obvious that, to determine the appropriate earnings multiplier an analysis must consider the following:

1. Earnings of the security
2. Risk of the security
3. Growth rate of the dividend stream
4. Duration of the expected growth and
5. Dividend payout ratio

Earnings Analysis

As seen earlier, to value common stocks or other risky assets, the present value model is employed.

Present value = AQ

Where t = time period

This model gives rise to two questions.

1. How does the investor measure the income from the common stocks?
2. What discount or capitalization rate should be used?

The income question is discussed here:

Income concepts: Accountants and economists have provided two different concepts of income.

Accountant's income is the revenue over the above all the costs incurred. Economists define the income of a firm as the maximum amount, which can be consumed by the owners of the firm in any period without decreasing their future consumption opportunities.

Adjusting for economic income: Since income, which is very important is determining the value of a security, is vaguely reported by accountants, it is necessary to adjust or normalize it in a consistent manner.

Notes

Fundamental analysts find it necessary to significantly alter the income statements, to obtain estimates for two reasons.

1. The accountant has used an accounting procedure, which is inappropriate for the relevant economic transaction and/or
2. The accountant, perhaps under the pressure of top management, has adopted a procedure to minimise the firm's income taxes or window dress the firm's financial statements.

We will now discuss the differences in accounting procedures. These are only illustrative of the controversy in reporting incomes.

1. ***Sales – Revenue Recognition Principle:*** Sales can be either cash sales or credit sales. Sales can be recognized as early as the date the sale order is signed. However, in the case of long-term construction contracts the sale may not be recognized until as late as the day the cash is fully paid. Between these two extremes, the accountant may choose a suitable time point to recognize the sales revenue in the financial statements. He may do it either in an attempt to improve current income or because he has grown confident about its collectability. In the case of credit sales, companies may factor their accounts receivable and realize cash proceeds. One firm may recognize this immediately, whereas another firm may wait until the customer's final cash payment is actually received.
2. ***Inventory:***

   Inventory valuation is done based on two methods

   FIFO – First in, first out method

   LIFO – Last in, first our method
3. ***Depreciation:*** Several depreciation methods may be used in financial statements that a firm to the public.

   (a) Straight line method

   (b) Sum-of-digit method

   (c) Double declining balance method

   (d) Units of production method

   The second and third methods are accelerated methods of deprecation. The second method may be used to accelerate depreciation during a period of rapid production.

Accounting Income Effect on Balance Sheet

A balance sheet is a summary of account balance carried after the appropriate closing of the books. Income statements deal with flows, whereas balance sheet deals with stocks. Since stocks are accumulations of flows, vagaries that undermine the estimates of accounting income are cumulated in certain sheet items.

Example: The impact of inflation should be considered to make the balance sheet items realistic. Measures suggested are.

1. ***Assets Side:***

   (a) Report marketable securities at current value.

   (b) Inventory should be valued at replacement cost.

Notes

(c) Land and natural resources to be shown at net realizable value (current market price-future development, selling or interest costs.

(d) Plant & machinery at replacement cost.

(e) Goodwill

(f) R & D expenses

2. ***Liabilities Side:***

(a) Debt. In future, at the time of maturity it is repaid in cheaper money units (rupees). It is a gain to shareholders.

(b) Deferred taxes.

(c) Retained earnings.

3. ***Forecasting Earnings:*** It is necessary to estimate a stock's future income because the value of the share is the present value of its future income. This can be done by focussing on:

(a) Identification of variables which will have impact on income, and

(b) Determining the extent of change in income due to change in the identified variables, by employing appropriate method of forecasting.

(a) *Identification of variables:* Basically changes in income result from changes in:

(i) Operations and Earnings: The operating cycle of a firm starts with cash converted into inventory. Inventory turns into sale and accounts receivables, which finally become cash.

Return on investment (ROI) is the measure of the firm's operating result.

$$\text{ROI} = \frac{\text{EBIT}}{\text{Investment}} = \frac{\text{EBIT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Investment}}$$

There are two products

(a) Profit margins on sale, and (b) Turnover of assets

(ii) Financing and Earnings: The two main sources of financing an enterprise are

(1) Borrowings

(2) Issue of new shares.

Debt financing provides leverage to common shareholders. It raised the earnings per share but also risk. Equity financing is advisable where new shares can be sold at a price in excess of asset value per share, as it improves EPS. This is possible only when the company management can maintain a reasonably higher ROI.

From the above, it is clear that EPS and changes in earnings are function of

(1) Turnover of investment

(2) Margin on sales

(3) Effective interest rate (cost of borrowed funds)

(4) Debt equity ratio

(5) Equity base

(6) Effective tax rate.

Notes

(b) *Determining the extent of change method:* Different methods of forecasting earnings are available. The two categories into which the methods fall are given below with a brief list of some of the methods.

(i) Earlier methods

(1) Earnings methods

(2) Market share/profit margin approach (breakeven analysis)

(ii) Modern techniques

(1) Regression and correlation analysis

(2) Trend analysis (time series analysis)

(3) Decision trees

(4) Simulation

The methods are briefly explained in the following sections:

(i) Earnings model: The ROI method which has been earlier introduced as a device for analyzing the effects of and interaction between the earnings and assets can be used as a forecasting tool. If predicted data relating to assets, operating income, interest, depreciation and forces are available the new values can be substituted in the model and EAT can be forecasted.

(ii) Market share/profit margin approach: This is derivative of industry forecast of market. Once the total market is known, the market share of the individual company can be determined either using historical tract second or subjective probabilities. The next step is estimating net income after taxes and dividends. This can be done by cost analysis and estimates in relation to quantity of sales or operating capacity. Breakeven analysis is the appropriate tool to carry out such an analysis.

(iii) Projected financial statement: This method makes an item-wise analysis of revenues and expenses and predicts them over a number of years, based on the variations in the key determining variables. It is possible only when the forecaster has through information about the inner working of the company.

A simplified approach involves consideration of branch/divisional total in place of item-wise amounts.

The above three approaches are not mutually exclusive. They are not without shortcomings. They are based on subjective evaluations made at various stages of the analysis.

(iv) Regression and correlation analysis: These methods as applicable to industry analysis can be used at company level. The methods permit analyzing the relationships between several variables of company, industry and economy to develop more accurate forecasts.

Because of the facility of considering many variables and analysing them, this method is more advantageous.

(1) Analysts are forced to think through various problems of company and the various interrelationships, internal and external variables and company revenues and expenses.

(2) Analysts can clearly explain the causal variables of changes and improve the confidence in forecasts.

Notes

(v) Trend analysis: Trend analysis is a time series analysis that permits identification of seasonal, cyclical and erratic fluctuations of the variables under consideration over a time period. Analysts employ trends analysed by plotting the data on a special kind of graph paper, semi-logarithmic or semi-log paper, in order to reveal starkly different growth rates.

(vi) Decision trees: This can be used to forecast earnings and security values. Decision tree is an advanced technique because it considers possible outcomes with their probabilities and analyses them.

A decision tree contains branches, each one representing a possible outcome. Probabilities of the end points of the branches add up to 1.

The decision tree of security analysis starts with sale. If sales are expected at two levels, high and low, there will be two branches; on the other hand if medium level sales are included, there will be three branches. Each one indicates expected sales and their probabilities. For each sale branch, different levels of earnings expected can be given with their probabilities. Finally, for each of the earnings branch, different expected P/E ratios can be presented. Based on the data MPS can be calculated for each alternative course of events and outcomes.

The advantages of this method are:

(1) Stage-wise analysis of probable events and outcomes help improve accuracy in forecasting, and

(2) Final recommendations can be made with more understanding and confidence.

(vii) Simulation: This method can be applied to forecast earnings and also security values. Simulation is a technique that systematically repeats the application of a rule or formula to know outcomes indifferent situations. It answers the question – what happens to the outcome, if one or more variables influencing it change?

All that is to be done is to set up the formulae

Example:

$$\text{EPS} = \frac{\text{Sales} \times \text{Margin (\%)}}{\text{No. of shares outstanding}}$$

$$\text{MPS} = \text{EPS} \times \text{P/E}$$

Now, data relating to variables viz., Sales, profit margin, number of shares outstanding and P/E ratio are generated along with their probability distributions as in the case of decision tree.

The formula is applied to compute MPS under varying conditions. Computer programming will help analyse security values rapidly and accurately.

4.3.3 Determining Earnings – Multiplier (P/E) Ratio

So far, the focus has been on determining Earnings Per Shares (EPS). This is to be translated into market price per share (MPS). As such, most of the fundamental security analysis work centres on determining the appropriate multiplier.

Research Findings: Bing carried out a survey of practitioners' stocks evaluation methods and found that several approaches were in vogue. He found that analysts (1) used time horizon from

Notes

1 to 3 years and (2) preferred to use several techniques in combinations. Seventy-five per cent of the analysts followed rules of thumb to normalize P/E ratios.

1. They compared current actual P/E with what they considered normal for the stock in question.
2. They compared price times estimated future earnings (1 to 3 years out) with what they considered normal for the stock in questions.
3. They compared the multiplier and growth or earnings of individual stocks with industry group multiple and earnings growth.

With and Kisor based on their study of a number of stocks, opined that differences in P/Es between stocks were due to projected earnings growth, expected dividend payout, and variation in rate of earnings growth or growth risk. Bower and Bower came up with similar conclusion.

They divided risk into marketability of stock, price variability, and conformity with market behaviour. Malkiel and Cragg found positive effect of earnings growth on P/E. They further found that dividend payout effect was not clear.

4.3.4 Dividend Discount Model of Valuation

In determination of the P/E ratio, the factors to be considered are

1. Capitalization rate (K)
2. Growth rate of dividend stream (g) and
3. Dividend pay-out ratio (d/e)

1. ***Capitalization rate (k):*** Capitalization rates vary with the firm's risk-class and the prevailing market conditions. Three risk classes may be considered for analysis – high, medium and negligible. Based on market level and directions of change, markets can be classified as:

   (a) *Normal market:* In which most securities prices are experiencing slow steady growth and the average price-earnings ratio is the low mid teens (13-18 times).

   (b) *Bear market:* When average earnings multipliers drop below 13 times, many market prices are deflated.

   (c) *Bull market:* When average earnings multipliers rise above approximately 18, many stocks are over-priced.

   Since future expectations are influenced by past experience, a good way to estimate a firm's risk-class is to examine historical data. Capital Asset Pricing Model (CAPM) or Security Market Line (SML) depicts the risk return relationships based on historical data. It illustrates the positive relationship between assets, undiversifiable (as measured ROR) for the asset. The fundamental analyst can measure the risk of the company in recent periods, adjust it for anticipated changes and then us, these forecasted risk statistics to obtain capitalization rates. Also adjustment upward or downward is to be made in earnings multipliers in line with prevailing conditions, i.e., depressed or inflated.

2. ***Growth rate (g):*** Next step is determination of growth rates of earnings. If payout ratio in constant, the multiplier is influenced by growth rate (g) conditions viz., zero growth, perpetual growth and temporary growth.

3. ***Payout ratio (d/e):*** The effects of changes in dividend payout ratio (d/e) are direct and proportional, direct as can be observed from the P/E model. The EPS and DPS are not

Notes

equal, for the reason some companies prefer a stable dividend policy and some others retain earnings and maintain low dividend pay out ratios. It implies that analysts have to study the history of dividends announcements by the firm to make proper prediction of future pay out ratios.

Empirical studies have produced the following relevant findings:

1. Companies seem to have a predetermined payout ratio that they appear to adhere to over the long run.
2. Dividends are raised only if corporate management feels that a new higher level of earnings can be supported in the future; and
3. Managements are extremely reluctant to cut the absolute monetary amount of cash dividends.

It gives price earrings ratios or various risk classes and various rates of dividends or earnings growth in normal market along with formulae for computing value of stocks.

Example: A firm's earnings per share are ₹ 8. Dividend payout ratio is 0.5; systematic risk coefficient is 0.1. What will be the firm's share value when the growth rate is zero?

Solution: The firm's normalized EPS (e) = ₹ 8

Average payout ratio d/e = 50%

Beta Coefficient (B) = 0.1

Capitalisation rate (k) = 10%

(i) When growth rate (g) is zero

$$\text{Earnings multiplier} = \frac{di/e}{k-g}$$

When g = 0 earnings multiplier = $\frac{d\,i/e}{k} = \frac{0.5}{0.10} = 5$

Firm's share value = 7 × 5 = ₹ 40

4.3.5 Comparative P/E Approach

Comparative or relative valuation makes use of the average P/E of market or industry to determine the P/E for an individual stock. The procedure is as follows:

1. Determine the market P/E using dividend discount model.
2. Determine the market pay back period based on earnings growth rate of market. (How many years it takes to obtain market P/E at the given growth factor?)
3. Assign P/E to the stock based on its growth rate and market payback period.
4. Make adjustments for dividend pay out ratio and earnings volatility.
5. Find volume of stock by multiplying normal earnings with the determined P/E.

Notes

Example: The market P/E is 10 and earnings (dividend) growth rate is 9%. If individual stocks were to grow at 12%, normal earnings at the end of financial year were ₹ 4, projected earnings volatility was 10% and projected dividend pay out ratio was 15%, determine the value of the stock.

Solution:

1. Market P/E = 10
2. Market payback period

   Given a growth rate of 9% expected earnings stream would be 1.09, 1.88, 2.95 and 29 on. It will add up to ₹ 10 in 6.99 years.
3. Individual stock growth rate = 12%

   In 6.99 years, it is worth 11.3 /(expected earnings stream would be (1.12, 1.25, 1.40 and so on).
4. Projected earnings volatility = 10%

   Premium for earnings volatility = + 15%

   Discount for dividend payout ratio = $\frac{-13.6\%}{+1.4\%}$

   Net premium
5. Adjusted stock P/E = 11.3 × 101.4/100 = 11.45
6. Normal value of stock = Normal Earnings × P/E

   = 4 × 11.45 = ₹ 45.8

4.3.6 Growth Stocks

Investors are interested in not only current dividends but also in future earnings through dividends and capital gains.

Characteristics of Growth Stocks

The following features help identify growth stocks.

1. Substantial and steady growth in EPS
2. Low current DPS, because retained earnings are high and reinvested.
3. High returns on book value
4. Emphasis on R&D
5. Diversification plans for strategic competitive advantage
6. Marketing competence and edge.

Benefits

Investment in growth stocks would benefit investors in many ways.

1. The market value goes up at a rate much faster than the rate of inflation.
2. Higher capital gains.
3. Long range tension free holding without any need for sell & buy operations and associated problems.

Notes

Valuation

The investor interested in growth shares can either employ (1) Comparative P/E ratios approach or (2) Dividend Discount model for valuation of the stocks.

Guidelines for Investment

The following guidelines will be helpful to investors interested in growth stocks.

1. Tuning is not very important, but with appropriate timing one may be able to pick up shares at the threshold of high growth rate.
2. Choice of stock should not be based on simple factor. Multiple criteria using different appraisal techniques may be employed.
3. It is better to diversify investment in growth stocks industry-wise. Because different industries grow at different by evening out differences.
4. One should hold the stock for more than 5 years to gain advantage.

Estimation of Future Price

Before attempting to discuss the approach that can be adopted for company level analysis, let us about the objective of investor and how it can be quantified. It is to reiterate the proposition that an investor looks for increasing his returns from the investment. Returns are composed of capital gains and a stream of income in the form of dividends. Assuming he has equity shares for a period of one year (known as holding period), i.e., he sells it at the end of the year, the total returns obtained by him would be equal to capital gains plus dividends received at the end of the year.

Where, $R_1 = (P_1 - P_{1-1}) + D_t$

P_1 = Price of the share at the end of the year

P_{1-1} = Price of the share at the beginning of the year

D_1 = Dividend received at the end of the year

R_1 = Return for the holding period, t

In order to calculate the return received by him on his original investment (i.e. purchase price), total should be divided by $P_t - 1$. These are expressed in percentage terms and known as holding period yield. Thus,

$$\text{HRY (\%)} = \frac{(P_1 - P_1 - 1) + D_1}{P_1 - 1}$$

The above computation is quite simple as long as the value of the variables is available. In reality, however, the investor would know the beginning price of the share (called purchase price) as this is the price paid to buy the shares, but the price at the end of the year (i.e. selling price) as well as dividend income received would have to be estimated. This is where the problem lies. How to estimate the future price of the share as well as dividends? This becomes the main challenge. The series data relating to dividends paid by companies provide us useful clues in estimating the dividends likely to be declared by companies. There is, it seems, a dividends policy followed by most firms in general. Thus, an investor would be able to estimate dividend for the year with reasonable degree of accuracy under normal circumstances.

It has been found the management is very conservative in increasing the amount of dividend paid to shareholders. Managements generally do not increase the dividend unless this increase is sustainable in the long run. This is to avoid further cuts if need count of dividend, in actual

Notes

practice, does not form large part of the total returns of the investor. It is an important constraint, as indicated above.

Estimation of future price of the share that contributes a major portion in the total returns of the investor is the problematic and is discussed in detail in the following section. In order to estimate future price of share, you may adopt two approaches, namely Quantitative analysis and attractive analysis. Let us elaborate each of the two approaches.

Quantitative Analysis

This approach helps us to provide a measure of future value of equity share based on quantitative factors. The methods commonly used under this approach are

1. Dividend discounted method, and
2. Price-earnings ratio method

Dividend Discounted Method

Dividend discounted method is based on the premise that the value of an investment is the present value, its future returns. The present value (PV) calculated by discounting the future returns, which are divided in the formula, thus, is

$$PV = \frac{D_1}{(1+K)} + \frac{D_1}{(1+K)^2} + \frac{D_1}{(1+K)^3}$$

Under the constant growth assumption, this boils down to

$$PV = \frac{D_1}{K - g}$$

K = Discount rate, g = Growth rate

DPS = EPS × (1 – b)

DPS = Dividend Per Share

b = Proportion of earnings retained such that (1 – b) is the dividend payout

Substituting the above in the formula, it becomes

$$\frac{EPS\,(1 - b)}{K - g}$$

On the basis of the above model, the following inferences can be drawn

1. Higher the EPS, other things like b, k, g remaining the same, higher would be value of the share.
2. Higher the b, retention rate, or lower the 1-b, i.e., g remaining the same, higher would be value of the share.
3. Higher the k, i.e., discount rate, other things like b, g remaining the same, higher would be value of a equity.
4. Higher the growth rate, other things like EPS, b, k remaining constant, higher would be value of the share.

Notes

These inferences clearly highlight the effect of different variables on the future price of equity shares.

When applying this approach, one has to be careful about using discount rate k. A higher value of discount could unnecessary reduce the value of share and equity, while a lower value unreasonably increase it; this will induce a complication to invest/disinvest the shares. A discount rate is based on the risk rate and risk premium. That is

Discount risk free rate + Risk premium

$$K = r_1 + r_2$$

Where, r_t = Risk free rate of return

r_2 = Risk premium

Thus, higher the risk free interest rate with rp remaining the same would increase the discount rate, which in turn would decrease the value of the equity. In the same way, higher risk premium with of remaining the same increase the overall discount rate and decrease the value of the equity. Like discount rate, growth equally critical variable in this method of share valuation. It may be pointed out that growth from internal of it depends on the amount of earnings retained and return on equity. Thus, higher is the retention rate, highly be the value of the firm, other things remaining constant.

Price Earnings Approach

According to this method, the future price of an equity share is calculated by multiplying the P/E ratio by the price. Thus,

$$P = EPS \times P/E \text{ ratio}$$

The P/E ratio or multiple is an important ratio frequently used by analyst in determining the value of an equity share. It is frequently reported in the financial press and widely quoted in the investment community. In India, we can gauge its popularity by looking at various financial magazines and newspapers.

This approach seems quite straight and simple. There are, however, important problems with respect calculation of both P/E ratio and EPS. Pertinent questions often asked are

1. How to calculate the P/E ratio?
2. What is the normal P/E ratio?
3. What determines P/E ratio?
4. How to relate company P/E ratio to market P/E ratio?

The problems often confronted in calculating this ratio are: which of the earnings – past, present or future to be taken into account in the denominator of this ratio? Likewise, which price should be put in the numerator ratio? These questions need to be answered while using this method.

Indeed, both these methods are inter-related. In fact, if we divide the equation of dividend discounted made under constant growth assumption by E_0 (Earnings per shares), we get

$$\frac{P_0/E_0 = D_0/E_0(1 + g)}{K - g}$$

Here $D_0(1 + g) - D_1$

Notes

Notes

Decision Rules

1. Higher the P/E ratio, other things remaining the same, higher would be the value of an equity share.
2. Lower the P/E ratio, other things remaining the same, lower would be the value of an equity share.

Looking at the above decision rules, it is not uncommon to find that investor prefer shares of companies higher P/E multiple.

You will appreciate that the usefulness of the above model lies in understanding the various factors determine P/E ratio is broadly determined by:

1. Dividend payout
2. Growth
3. Risk free rate
4. Business risk
5. Financial risk

Thus, other things remaining the same

1. Higher would be the P/E ratio, if higher is the growth rate or dividend or both
2. Lower would be P/E ratio, if higher is
   (a) Risk-free rate
   (b) Business risk
   (c) Financial risk

The foregoing presentation helps us provide a quantity measure of the value of equity share. However, there remains the problem of estimating earning per share, which has been used in both the methods discussed. This is a key number, which is being quoted, reported and used most often by company management analysts, financial press etc. It is this number everybody is attempting to forecast. The starting point to earnings per share, however, is to understand the chemistry of earnings as described in the previous unit. We describe various approaches to forecast earnings per share in the following sections.

4.3.7 Forecasting Earnings per Share

Things are the most important number in the arsenal of the investor. The most important and the principal is getting information about the earnings of the company is its financial statements. The analyst must remember the fact that there is more to the financial statements than what meets his eyes. Out of the two statements, balance sheet and income statement, it is the income statement that is more often used in order to gauge the future state of the firm. Research studies have indicated the significance of this number in influencing prices and dividends. The research study conducted by Niederhoffer and Regan for example, found that the prices are strongly dependent on the changes in the earnings, both absolute and relative to the analysis.

The above study and some others indicate the importance of the forecast of earnings as the most important variable to work on in the investment decision-making process. The critical aspects of the earnings are its level, trend and stability.

Notes

There are various methods employed to assess the future outlook of the revenue, expenses and the earnings from given the economic and industry outlook. These methods can be broadly classified into two categories, traditional and modern. Under the traditional approach, the forecaster obtains the estimate of the single value variable. While in the case of modern approach, he obtains the range of values with the probability of each. Let us discuss these two approaches in detail.

Traditional Methods of Forecasting EPS

Under the traditional approach the following methods of forecasting are adopted.

1. ROI approach
2. Market share approach
3. Independent estimates approach

Beginning the discussion on the forecasting techniques, it will not be out of place to briefly mention that the earnings per share are measured from the financial statement. This will provide us an understanding of its changes. Broadly, changes in earnings are affected by operating and financing decisions. Both these decisions are, however, interdependent. Various companies do this by presenting the information in the income statement reflecting both types of decisions. Given below is the format, which analyses:

Income Statement for the year ended……..

1. Sales revenue
2. Less interest expenses
3. Earnings before interest and tax (EBIT)
4. Less interest expenses
5. Earnings before tax (EBT)
6. Number of shares outstanding
7. Earning after tax (EAT)
8. Number of shares outstanding
9. EPS = EAT/number of shares outstanding

Let us now explain the ROI approach to forecast earnings per share

ROI Approach

Under this approach, attempts are made to relate the productivity of assets with the earnings. That is, returns on the total investment (assets) are calculated and estimates regarding per share are made stated.

Return on Assets = EBIT/Assets

Return on assets is a function of the two important variables viz., turnover of assets, and margin of profit

Return on Assets = Assets Turnover × Profit Margin

Notes

4.4 Summary

- A commonly advocated procedure for fundamental analysis involves a 3-step analysis: macro-economic analysis, industry analysis, and company analysis.
- In a globalised business environment, the top-down analysis of the prospects of a firm must begin with the global economy.
- There are two broad classes of macroeconomic policies, viz. demand side policies and supply side policies.
- Fiscal and monetary policies are the two major tools of demand side economics.
- Fiscal policy is concerned with the spending and tax initiatives of the government.
- Monetary policy is concerned with money supply and interest rates.
- The macro-economy is the overall economic environment in which all firms operate.
- After conducting analysis of the economy and identifying the direction, it is likely to take in the short intermediate and long term, the analyst must look into various sectors of the economy in terms of various industries. An industry is a homogenous group of companies.
- That is, companies with the similar characteristics can be divided in to one industrial group.
- There are many bases on which grouping of companies can be done.
- The securities analyst will take into consideration the following factors into account in assessing the industry potential in making investments.
- Post-sales and earnings performance, the government's attitude towards industry, labour conditions and competitive conditions are the various factors that are to be taken into account while conducting industry analysis.
- For earning profits, investors apply a simple and common sense decision rule, that is, maximization.
- A careful examination of the company quantitative and qualitative fundamentals is, therefore, very essential.
- As Fischer and Jordan have aptly put it: "If the economic outlook suggests purchase at the time, the economic analysis of the industry analysis will aid the investor selecting their proper industry in which to invest. Nonetheless, when to invest and in which industry is not enough. It is also necessary to know which companies industries should be selected".

4.5 Keywords

Cyclical Industry: In this category of the industry, the firms included are those that move closely with the rate of industrial growth of the economy and fluctuate cyclically as the economy fluctuates.

Defensive Industry: It is a grouping that includes firms, which move steadily with the economy and less than the average decline of the economy in a cyclical downturn.

End Use and Regression Analysis: It is the process whereby the analyst or investor attempts to dial the factor that determines the demand for the output of the industry. This is also known as end-use demand analysis.

Notes

Erratic Events: It refers to the unpredictable sales caused by unforeseen events like strikes, riots, war scares, floods, and other disturbances.

Growth Industry: This is an industry that is expected to grow consistently and its growth may exceed the average growth of the economy.

Net Asset Value: Net asset value (NAV) is a term used to describe the value of an entity's assets less the value of its liabilities.

4.6 Self Assessment

Fill in the blanks:

1. The security price prevailing in market is called .....
2. The price of a security justified by its fundamentals is called .....
3. The market ..... relates to the speed with which the stock market incorporates the information about the economy, industry and company, in the share prices, rather instantaneously.
4. The government employs two broad classes of macroeconomic policies, viz. ..... policies and ..... policies.
5. ..... is the total value of the final output of goods and services produced in the economy.
6. ..... surveys can incorporate the opinion or future plans of consumers regarding their spending.
7. There is always a ..... with result that interpretation can be erroneous, if it is not done well in advance.
8. A ..... is an indicator of the extensiveness or spread of an expansion or contraction.
9. ..... Index is a narrow type of index.
10. Econometrics is a discipline wherein application of ..... and ..... techniques is a part of economic theory.
11. Firms in each different industry typically experience similar levels of ..... and similar rates of .....
12. Every industry passes through four distinct phases of the life cycle, viz. ....., ..., ... and .....
13. The internal analysis can be done periodically to evaluate ..... and ..... of the company.
14. Surveys generally study the current ..... and demand, future ..... and proposed ....., and thereby the expansion prospects vis-à-vis .....
15. ..... analysis provides a direct link to investor's action and his investment goal in operational terms.
16. The asset value of a security is determined by estimating the ..... value of the firm, ... the claims of firm's creditors and allocating the remaining ..... asset value of the firm over the ..... shares of stock.
17. A balance sheet is a summary of ..... carried after the appropriate closing of the books.

Notes

18. Decision tree considers possible ..... with their ..... and analyses them.

19. ..... is a technique that systematically repeats the application of a rule or formula to know outcomes indifferent situations.

4.7 Review Questions

1. What are the opportunities and threats in the macro-economic environment? Explain in detail.
2. Why should a security analyst carry out industry analysis?
3. Why does portfolio manager do the industry analysis?
4. What is the need of company analysis? Do we need the company analysis?
5. Is it possible to estimate historic profitability of the collective set of liquidity providers in a specific futures market? Why/ why not?
6. How might individual investors extrapolate from the past?
7. How do you estimate future market size of an industry undergoing change?
8. What are the factors that you think influence the industry analysis?
9. Why should one read an annual report?
10. National City Corporation, a bank holding company, reported earnings per share of ₹ 2.40 cr in 1993, and paid dividends per share of ₹ 1.06 cr. The earnings had grown 7.5% a year over the prior five years, and were expected to grow 6% a year in the long term (starting in 1994). The stock had a beta of 1.05 and traded for ten times earnings. The treasury bond rate was 7%.
    (a) Estimate the P/E Ratio for National City Corporation.
    (b) What long term growth rate is implied in the firm's current P/E ratio?
11. International Flavors and Fragrances, a leading creator and manufacturer of flavors and fragrances, paid out dividends of ₹ 91 per share on earnings per share of ₹ 164 in 1992. The firm is expected to have a return on equity of 20% between 1993 and 1997, after which the firm is expected to have stable growth of 6% a year (the return on equity is expected to drop to 15% in the stable growth phase.) The dividend payout ratio is expected to remain at the current level from 1993 to 1997. The stock has a beta of 1.10, which is not expected to change. The treasury bond rate is 7%.
    (a) Estimate the P/E ratio for International Flavors, based upon fundamentals.
    (b) Estimate how much of this P/E ratio can be ascribed to the extraordinary growth in earnings that the firm expects to have between 1993 and 1997.
12. Cracker Barrel, which operates restaurants and gift shops, reported dramatic growth in earnings and revenues between 1983 and 1992. During this period, earnings grew from ₹ 8 per share in 1983 to ₹ 78 per share in 1993. The dividends paid in 1993 amounted to only ₹ 2 per share. The earnings growth rate was expected to ease to 15% a year from 1994 to 1998, and to 6% a year after that. The payout ratio is expected to increase to 10% from 1994 to 1998, and to 50% after that. The beta of the stock is currently 1.55, but it is expected to decline to 1.25 for the 1994-98 time period and to 1.10 after that. The treasury bond rate is 7%.
    (a) Estimate the P/E ratio for Cracker Barrel.

Notes

(b) Estimate how much higher the P/E ratio would have been, if it had been able to maintain the growth rate in earnings that it had posted between 1983 and 1993. (Assume that the dividend payout ratios are unaffected.)

(c) Now assume that disappointing earnings reports in the near future lower the expected growth rate between 1994 and 1998 to 10%. Estimate the P/E ratio. (Again, assume that the dividend payout ratio is unaffected.)

13. What will the capitalisation rate mean for realty sector?

Answers: Self Assessment

1.	"market price' (MP)	2.	'intrinsic value' (IV)
3.	efficiency	4.	demand-side, supply-side
5.	GNP	6.	Anticipatory
7.	time lag	8.	diffusion index
9.	Component Evaluation	10.	mathematics, statistical
11.	risk, return	12.	pioneering, expansion, stagnation, decline
13.	strengths, weaknesses		
14.	facilities, demand, investment, demand gap		
15.	Company level	16.	liquidating, deducting, net, outstanding
17.	account balance	18.	outcomes, probabilities
19.	Simulation		

4.8 Further Readings

Books

Huang, Stanley S.C., *Investment Analysis and Management*, Cambridge, Winthrop, 1981.

Hull J.C., *Introduction to Futures & Options Markets*, Prentice Hall, Englewood Cliffs, New Jersey, 1995.

Jean, William H., *Analytical Theory of Finance: A study of the investment decisions process*, Jessup.

Kaufman, George, G., *Money: The Financial System and the Economy*, 2nd ed.; Chicago, Rand McNally & Co.1977.

Paul F., *Competing for Stock Market Profits,* N.Y., Wiley, 1974. Johnson.

Prime, John H., *Investment Analysis*, New Jersey, Prentice Hall, 1967.

Quirin, G. David., *Capital Expenditure Decision*, Homewood, Illinois, Irwin, 1967.

Timothy E., *Investment Principles*, NJ Prentice Hall, 1978.

Notes

Unit 5: Equity Valuation Models

CONTENTS

Objectives

Introduction

5.1 Balance Sheet Valuation

5.2 Dividend Discount Model

5.3 Free Cash Flow Models

5.4 Earnings

5.5 Summary

5.6 Keywords

5.7 Self Assessment

5.8 Review Questions

5.9 Further Readings

Objectives

After studying this unit, you will be able to:

- Discuss Concept of Equity Valuation
- Know balance sheet valuation
- Understand dividend discount model
- Show free cash flow models
- Explain earnings

Introduction

Determining the total value of a company involves more than reviewing assets and revenue figures. An equity valuation takes several financial indicators into account; these include both tangible and intangible assets, and provide prospective investors, creditors or shareholders with an accurate perspective of the true value of a company at any given time.

Investors who are considering multiple investments or outlining an investment strategy may request equity valuations of a company, to make the most informed investment decision. Valuation methods based on the equity of a company typically include a thorough analysis of cash accounts, as well as a forecast or projection of future dividends, future earnings (revenue) and the distribution of dividends.

A thorough analysis of tangible and intangible assets allows prospective investors, shareholders and financial managers of a company to obtain critical performance data about the company's business operations. The equity valuation method takes several types of data into account, and can be used as part of a prediction model to determine the economic future of the company. The valuation also provides some indication of the level of risk involved in investing in the company.

Notes

5.1 Balance Sheet Valuation

The objective of balance sheet valuation is the calculation of material prices for subsequent use in external or internal balance sheets, typically for valuation of the stocks of current assets.

Generally, the conditions include meeting legal requirements, complying with corporate group guidelines, and implementing internal company objectives regarding accounting policy. In this context, the company code is regarded as an independent accounting unit.

1. ***Book Value:*** To clearly distinguish the market price of shares from the core ownership equity or shareholders' equity, the term 'book value' is often used since it focuses on the values that have been added and subtracted in the accounting books of a business (assets - liabilities). The term is also used to distinguish between the market price of any asset and its accounting value which depends more on historical cost and depreciation. It may be used interchangeably with carrying value. While it can be used to refer to the business' total equity, it is most often used:

   (a) *as a 'per share value':* The balance sheet Equity value is divided by the number of shares outstanding at the date of the balance sheet (not the average o/s in the period).

   (b) *as a 'diluted per share value':* The Equity is bumped up by the exercise price of the options, warrants or preferred shares. Then it is divided by the number of shares that has been increased by those added.

   Uses

   Book value is used in the financial ratio price/book. It is a valuation metric that sets the floor for stock prices under a worst-case scenario.

> *Notes* When a business is liquidated, the book value is what may be left over for the owners after all the debts are paid.

   Paying only a price/book = 1 means the investor will get all his investment back, assuming assets can be resold at their book value. Shares of capital intensive industries trade at lower price/book ratios because they generate lower earnings per dollar of assets. Business depending on human capital will generate higher earnings per dollar of assets, so will trade at higher price/book ratios.

   Book value per share can be used to generate a measure of comprehensive earnings, when the opening and closing values are reconciled. Book Value Per Share, beginning of year - Dividends + Share Issue Premium + Comprehensive EPS = Book Value Per Share, end of year.

   Changes are caused by

   (a) The sale of shares/units by the business increases the total book value. Book value per share will increase if the additional shares are issued at a price higher than the pre-existing book value per share.

   (b) The purchase of its own shares by the business will decrease total book value. Book value per share will decrease if more is paid for them than was received when originally issued (pre-existing book value per share).

   (c) Dividends paid out will decrease book value and book value per share.

Notes

(d) Comprehensive earnings/losses will increase/decrease book value and book value per share. Comprehensive earnings, in this case, includes net income from the Income Statement, foreign exchange translation changes to Balance Sheet items, accounting changes applied retroactively, and the opportunity cost of options exercised.

New share issues and dilution

The issue of more shares does not necessarily decrease the value of the current owner. While it is correct that when the number of shares is doubled the EPS will be cut in half, it is too simple to be the full story. It all depends on how much was paid for the new shares and what return the new capital earns once invested.

Net book value of long-term assets

Book value is often used interchangeably with "net book value" or "carrying value," which is the original acquisition cost less accumulated depreciation, depletion or amortization.

2. ***Adjusted Book Value:*** Adjusted Book Value can be defined as the book value on a company's balance sheet after assets and liabilities are adjusted to market value. It is also called modified book value.

   The value of some assets, such as buildings, equipment and furniture/fixtures, may be overstated on the books, and may not reflect the maintenance and/or replacement costs for older assets. As a result, some business valuation experts will use an adjusted book value.

3. ***Liquidation Value:*** Liquidation literally means turning a business's assets into readily available cash. This approach is similar to the book valuation method, except that the value of assets at liquidation is used instead of the book or market value of the assets. Using this approach, the liabilities of the business are deducted from the liquidation value of the assets to determine the liquidation value of the business. The overall value of a business using this method should be lower than a valuation reached using the standard book or adjusted book methods.

4. ***Replacement Value:*** The term replacement cost or replacement value refers to the amount that an entity would have to pay, at the present time, to replace any one of its assets.

   Replacement value includes not only the cost of acquiring or replicating the property, but also all the relevant costs associated with replacement. These other costs may include all applicable taxes and duties, framing and transportation.

5.2 Dividend Discount Model

A difficult problem in using the dividend valuation model is the timing of cash flows from dividends. Since equity shares have no finite measure, the investor must forecast all future dividends. This might imply a forecast of intently long stream of dividends. Clearly, this would be almost impossible. And therefore, in order to manage the problem, assumptions are made with regard to the future growth of the dividend of the immediately previous period available at the time the investor wants to determine the intrinsic value of his/her equity shares. The assumptions can be:

1. Dividends do not grow in future, i.e., the constant or zero growth assumption.
2. Dividends grow at a constant rate in future, i.e., the constant assumption.
3. Dividends grow at varying rates in the future time period, i.e., multiple growth assumption.

The dividend valuation model is now discussed with these assumptions.

Notes

The Zero-growth Case

The growth rate of dividend D at time 't' will be known by solving for 'g' in the following

$$D_t = D_t - 1\,(1 + g_t) \qquad \text{.....(1)}$$

$$\text{Or,} \quad D_t = \frac{D_t - 1(1 + g_t)}{D_1 - 1} \qquad \text{.....(2)}$$

You can easily see that when $g_t = 0$, 3 equation (1) will yield $D_t = D_t - 1$, which means all future dividends would equal to be current dividend (i.e., the dividend of the immediately preceding period available as on date)

Now, the present value of dividends for an infinite future period would be

$$V = \frac{D_0}{1+k} + \frac{D_1}{(1+k)^2} + \frac{D_2}{(1+k)^3} + \infty \qquad \text{.....(3)}$$

Since, $D_0 = D_1 = D_2 = D_3$, under the zero-grown assumption, the numerator D_1 in equation (3) is replaced D_0.

You will appreciate that discounting cash flows over a very distant long future period would be meaningless. Mathematics tells us that if K > 0 then the value of an infinite series like the one in equation (4) is reduced so that the equation (4) results in following

$$V_0 = \frac{D_0}{K} 1 = \frac{D_0}{K_0} \qquad \text{.....(4)}$$

And since $D_0 = D_1$, equation 5 can also be written as

$$V = \frac{D_1}{K} \qquad \text{.....(5)}$$

You may recall that the same equation was used for the valuation of preference shares. This is one case for application of the zero-growth assumption.

The calculation underlying the zero-growth model can be illustrated.

Example: Consider a preference share on which the company expects to pay a cash dividend of RKV ₹ 9 per share for an indefinite future period. The required rate return is 10% and the current market price is ₹ 80.00. Would you buy the share at its current price?

Solution:

This is a zero-growth case because the dividend per share remains ₹ 9 for all future time periods. You find the intrinsic value of the share using equation

V = ₹ 9.00/.10 = ₹ 90

The intrinsic value of ₹ 90 is more than the market price of ₹ 80. You would consider buying the share.

Example: Assume that the dividend per share is estimated to be ₹ 4.00 per year indefinitely and the investor requires a 20% of return.

Notes

Solution:

The intrinsic value of the equity share is ₹ 4/.20 = ₹ 20. (This model is more appropriate for an analysis of preference shares because of the constant dividend assumption).

Constant Growth Case

When dividends grow in all future periods at a uniform rate 'g'

$$D_t = D_t - 1\ (1 + g)^t \qquad \ldots(1)$$

Substituting 'D_0' in equation (1) by the value of D_1 , we get

$$v = \sum_{t=0}^{\infty} \frac{D_0(1+g)^t}{(1+K)^t} \qquad \ldots(2)$$

For a constant amount 'D_0' can be written out of summation to obtain the following equation

$$v = D_0 \sum_{t=0}^{\infty} \frac{D_0(1+g)^t}{(1+K)^t} \qquad \ldots(3)$$

Constant amount, 'D_0' can be written out of summation to obtain the following equation

$$v = \sum_{t=0}^{\infty} \frac{(1+g)^t}{(1+K)^t} = \frac{1+g}{K-g} \qquad \ldots(4)$$

Substituting mathematical properties of infinite series, if K > g, it can then be shown that

$$V = \frac{D_0(1+g)}{(K-g)} \qquad \ldots(5)$$

which can be re-written as follows:

$$V = \frac{D_0(1+g)}{(K-g)} = \frac{D_1}{K-g} \qquad \ldots(6)$$

Example: Dabba Ltd. paid a dividend of ₹ 2.00 per share for the year ending March 31, 1991. A constant growth of 10% income has been forecast for an indefinite future period. Investors' required rate of return has been estimated to 15%. You want to buy the share at a market price quoted on July 1, 1991 in the stock market at ₹ 60.00. What would be your decision?

Solution:

This is a case of constant-growth-rate situation. Let us now find out the intrinsic value of the equity share as under

$$V = \frac{D_1}{(K - g)} = \frac{₹2(1.10)}{.15 - .10} = \frac{₹\ 2.20}{.05} = ₹\ 44.00$$

The intrinsic value of ₹ 44 is less than the market price of ₹ 60.00. Hence, the share is overvalued and you should not buy.

Example: The company paid its first cash dividend of ₹ 2.50 today and dividends are expected to grow at a rate of 30% per year for the next three years. Thereafter, cash dividends will grow at a 10% rate per year. Shareholders expect to earn a 15% return on their investments. Calculate the present value of dividend.

Notes

Solution:

STEP 1: Calculate the present value of dividends for the first three years.

$$\sum_{t=1}^{n} D_0(1 + g_x)t/(1+K)^t = ₹\ 8.3473$$

Year	Dividend Do $(1+g_x)^t$	x Capitalisation Rate × k = 0.15	= Present Value
	₹ 2.50(1+0.30)^t		
(1)	(2)	(3)	(4) = (2) × (3)
0	2.500		
1	3.250	0.870	3.7356
2	4.225	0.756	5.5886
3	5.493	0.658	8.3473

STEP 2: Value at the end of three years for the remaining life of the company

Dividend in 4th year D_4 $= D_3\ (1 + gy)$

$= ₹\ 5.493\ (1 + 0.10) = ₹\ 6.0423$

Value at the end of the third year

$V_3 = D_4/(k - g_y)$

$V_3 = 6.0423/(0.15 - 0.10)$

$= ₹\ 120.846$

STEP 3: The present value at the end of three years (V_3) discounted by the required rate of return k = 0.15

$(V_3) \times 1/(1 + k)^3$

$= ₹\ 120.846\ (0.658)$

$= ₹\ 79.516668$

STEP 4: The value per share today equals the present value of dividends for the first three years (Step-1) plus the present value of the share price at the end of year 3 (Step-3)

Step 1	Step 2
Vo =₹ 8.343 +	₹ 79.516668
= ₹ 87.8639668	

STEP 5: Multiply the number of shares by the price per share to determine the total value of the equity. If there are 10,00,000 ordinary shares the total value of the firm is ₹ 8,78,63,967.

The Multiple-growth Case

The multiple-growth assumption has to be made in a vast number of practical situations. The infinite future period is viewed as divisible into two or more different growth segments. The investor must forecast the time to which growth would be variable and after which only the growth rate would show a pattern and would be constant. This would mean that present value calculations will have to be spread over two phases viz., one phase would last until time 'T' and other would begin after 'T' in infinity.

Notes

The present value of all dividends forecasts up to and including time 'T' $V_{T(i)}$ would be

$$V_{T(i)} \sum_{t=1}^{T} \frac{D_t}{(1+K)^t} \quad \ldots(i)$$

The second phase present value is denoted by $V_{T(2)}$ and would based on constant-growth dividend forecast after time 'T'. The position of the investor at time 'T' after which the second phase commences is viewed as a point in time when he is forecasting a stream of dividends for time periods T + 1, T+2, T+3 and so on, which grow at a constant rate. The second phase dividends would be

$$D_{T+1} = D_T(1+g)$$

$$D_{T+2} = D_{T+1}(1+g) = D_T(1+g)^2 \quad \ldots(ii)$$

$$D_{T+3} = D_{T+2}(1+g) = D_T(1+g)^3$$

And so on. The present value of the second phase stream of dividends can, therefore, be estimated using each (i) and at time 'T'

$$V_T = D_{T+1} \frac{1}{K-g} \quad \ldots(iii)$$

You may note 'V_T' given by equation (iii) is the present value at time 'T' of all future expected dividends. Hence, when this value has to be viewed at time 'zero', it must be discounted to provide the present value at time for the second phase present value. The latter can also be viewed at time 'zero' as a series of each dividend that grow at a constant rate as already stated. The resulting second phase value $V_{T(2)}$ will give the following.

$$V_{T(2)} = V_{T+1} \frac{1}{(K-g)^T} \quad \ldots(iv)$$

$$V_{T(2)} = V_{T+1} \frac{D_{T+1}}{(K-g)(1+K)T}$$

Now, the two present values of phases 1 and 2 can be added to estimate the intrinsic value of an equal that will pass through a multiple growth situation. The following describes the summation of the two phases.

$$V_{T(2)} = V_{T(1)} + V_{T(2)}$$

$$\sum_{t=1}^{T} \frac{D_t}{(1+K)t} + \frac{D_{T+1}}{(K-g)(1+K)^T}$$

Example: RKV Ltd., paid dividends amounting to ₹ 0.75 per share during the last year. The company is to pay ₹ 2.00 per share curing the next year. Investors forecast a dividend of ₹ 3.00 per share in that year. At this time, the forecast is that dividends will grow at 10% per year into an indefinite future. Would you sell the share if the current price is ₹ 54.00? The required rate of return is 15%.

Solution: This is a case of multiple growth. Growth rates for the first phase must be worked out and the time between the two phases established. It is clear that 'T' = 2 years. Hence, this becomes the time-partition. Rates before 'T' are:

$$g_1 = \frac{D_1 - D_g}{D_0} = \frac{₹\ 2.00 - ₹\ 0.75}{₹\ 0.75} = 167\%$$

Notes

$$g_2 = \frac{D_2 - D_1}{D_1} = \frac{₹\ 3.00 - ₹\ 2.00}{₹\ 0.75} = 50\%$$

The values $V_{T(1)} + V_{T(2)}$ can be calculated as follows:

$$V_{T(1)} = \frac{₹\ 2.0}{(1+15)^t} + \frac{₹\ 3.0}{(1+15)^2} = ₹\ 4.01$$

$$V_{T(1)} = \frac{₹\ 3.30}{(.15+.10)^t} + \frac{₹\ 49.91}{(1+.15)^2}$$

Since $V_0 = V_{T(1)} + V_{T(2)}$ the two values can be summed to find the intrinsic value of a Cromecon equity share time 'zero'.

This is given below:

$$V_0 = ₹\ 4.01 + ₹\ 49.91 = ₹\ 53.92$$

At the current price of ₹ 54.00, the share is fairly priced and hence you won't trade.

5.3 Free Cash Flow Models

Free cash flow (FCF) is cash flow available for distribution among all the securities holders of an organization. They include equity holders, debt holders, preferred stock holders, convertible security holders, and so on.

Free Cash Flows to Equity

To estimate how much cash a firm can afford to return to its stockholders, we begin with the net income – the accounting measure of the stockholders' earnings during the period – and convert it to a cash flow by subtracting out a firm's reinvestment needs.

First, any capital expenditures, defined broadly to include acquisitions, are subtracted from the net income, since they represent cash outflows. Depreciation and amortization, on the other hand, are added back in because they are non-cash charges. The difference between capital expenditures and depreciation is referred to as net capital expenditures and is usually a function of the growth characteristics of the firm. High-growth firms tend to have high net capital expenditures relative to earnings, whereas low-growth firms may have low, and sometimes even negative, net capital expenditures.

Second, increases in working capital drain a firm's cash flows, while decreases in working capital increase the cash flows available to equity investors. Firms that are growing fast, in industries with high working capital requirements (retailing, for instance), Typically have large increases in working capital. Since we are interested in the cash flow effects, we consider only changes in non-cash working capital in this analysis.

Finally, equity investors also have to consider the effect of changes in the levels of debt on their cash flows. Repaying the principal on existing debt represents a cash outflow; but the debt repayment may be fully or partially financed by the issue of new debt, which is a cash inflow. Again, netting the repayment of old debt against the new debt issues provides a measure of the cash flow effects of changes in debt.

Allowing for the cash flow effects of net capital expenditures, changes in working capital and net changes in debt on equity investors, we can define the cash flows left over after these changes as the free cash flow to equity (FCFE).

Notes

Free Cash Flow to Equity (FCFE) = Net Income - (Capital Expenditures - Depreciation) - (Change in Non-cash Working Capital) + (New Debt Issued – Debt Repayments)

This is the cash flow available to be paid out as dividends or stock buybacks. This calculation can be simplified if we assume that the net capital expenditures and working capital changes are financed using a fixed mix1 of debt and equity. If δ is the proportion of the net capital expenditures and working capital changes that is raised from debt financing, the effect on cash flows to equity of these items can be represented as follows:

Equity Cash Flows associated with Capital Expenditure Needs

$$= -(\text{Capital Expenditures} - \text{Depreciation})(1 - \delta)$$

Equity Cash Flows associated with Working Capital Needs

$$= -(\Delta \text{ Working Capital})(1 - \delta)$$

Accordingly, the cash flow available for equity investors after meeting capital expenditure and working capital needs, assuming the book value of debt and equity mixture is constant, is:

Free Cash Flow to Equity = Net Income - (Capital Expenditures - Depreciation)$(1 - \delta)$ - $(\Delta$ Working Capital$)(1 - \delta)$

Caution The net debt payment item is eliminated, because debt repayments are financed with new debt issues to keep the debt ratio fixed. It is particularly useful to assume that a specified proportion of net capital expenditures and working capital needs will be financed with debt if the target or optimal debt ratio of the firm is used to forecast the free cash flow to equity that will be available in future periods. Alternatively, in examining past periods, we can use the firm's average debt ratio over the period to arrive at approximate free cash flows to equity.

What about Preferred Dividends?

In both the long and short formulations of free cashflows to equity described in the section above, we have assumed that there are no preferred dividends paid. Since the equity that we value is only common equity, you would need to modify the formulae slightly for the existence of preferred stock and dividends. In particular, you would subtract out the preferred dividends to arrive at the free cashflow to equity.

Free Cash Flow to Equity (FCFE) = Net Income - (Capital Expenditures -Depreciation) - (Change in Non-cash Working Capital) - (Preferred Dividends + New Preferred Stock Issued) + (New Debt Issued - Debt Repayments)

In the short form, you would obtain the following:

Free Cash Flow to Equity = Net Income - Preferred Dividend - (Capital Expenditures - Depreciation)$(1 - \delta)$ - $(\Delta$ Working Capital$)(1 - \delta)$

The non-equity financial ratio (δ) would then have to include the expected financing from new preferred stock issues.

Notes

Task Will Equity Value be the same under Firm and Equity Valuation? Discuss with reasons.

5.4 Earnings

1. ***The P/E approach to Equity Valuation:*** The first step here consists of estimating future earning per share. Next, the normal price-earnings ratio will be estimated. Product of these two estimates will give the expected price. For a single year holding period, with D_1 as the referred dividends in the coming year, the expected return of an investor can be found as under.

$$\text{Expected Return} = \frac{D_1(p_1 - P)}{P} \quad ....(1)$$

Stagnating normal price-earning ratio is central to the P/E approach for valuing equity shares. The procedure has been described in the following paragraphs.

You may go back to original equation and introduce the earnings variable in it by expressing

$$D_t = p_1 - E_1 \quad ....(2)$$

Where P_1 = pay-out ratio, and E_t = earnings per share in time 't' so, if you forecast earnings per share and layout ratio you have in fact forecast dividends per share. Now, the above equations to restore following:

$$V = \frac{D_1}{1+K} + \frac{D_1}{(1+K)^2} + \frac{D_1}{(1+K)^3} + ... \quad .....(3)$$

$$= \frac{p_1E_1}{1+K} + \frac{p_2E_2}{(1+K)^2} + \frac{p_3E_3}{(1+K)^3} \quad .....(4)$$

$$= \sum_{t=1}^{\alpha} \frac{P_1E_1}{(1+K)^1} \quad .....(5)$$

Now, if earnings like dividends also grow at a rate 'ge' in future time periods as

$$E_1 = E_{t-1}\,(1+g_{et}) \quad .....(6)$$

And which would also imply that

$$E_1 = E_{t-1}(1+g_{et})$$

$$E_2 = E_1(1+g_{et}) = E_0(1+g_{e1})\,(1+g_{e2})$$

$$E_3 = E_2(1+g_{e3}) = E_0(1+g_{e3})\,(1+g_{e3})$$

and so, on where E_0 is the actual level of earnings per share over the past year, E_1 is the expected level of earnings per share for the year after E_1 and E_2 is expected level of earnings per share for the year after E_2.

Substituting these equations in equation (4), we get

$$V = \frac{P_1[E_0(1+g_{e1})]}{1+K} + \frac{P_2[E_0(1+g_{e1})+(1+g_{e2})]}{(1+K)^2} + \frac{P_2[E_0(1+g_{e1})+(1+g_{e2})+(1+g_{e3})]}{(1+K)^3} + ... \quad .....(7)$$

Notes

now you may recall that 'V' is the intrinsic value or the price at which the share would sell if it were priced. Then, V/E_0 would be the price-earnings ratio that must prevail if the share were fairly priced. In other words, V/E_0 would be the normal price-earnings ratio. To obtain a normal price-earnings ratio from equation (7), divide both sides of the equation by E_0 and simplify. The resultant equation would be

$$\frac{V}{E_0} = \frac{P_1(1+g_{e1})}{1+K} + \frac{P_2(1+g_{e1})+(1+g_{e2})}{(1+K)^2} + \frac{P_2(1+g_{e1})+(1+g_{e2})+(1+g_{e3})}{(1+K)^3} + \ldots \qquad \ldots(8)$$

You can now interpret equation (8) to show that a share's normal price-earnings ratio will be higher: (g_{e1}, g_{e1}, g_{e1}……); the smaller the required rate of return (K).

The above relationships are qualified by the phrase "other things being equal", which means no change in variables. For example, the normal price earnings ratio would increase with increase with increase in payout ratio but no company can ever achieve this result concentrating on an increase in the payout ratio. What happens with an increased payout ratio is a corresponding decrease in reinvestment of earnings and consequently a diminution in the growth rate; increased payout would neutralized by decreased growth so on. Consequently, intrinsic value and therefore the normal price-earnings will not increase.

Second, equation (8) is based on the infinite series of dividends in the growth situations. The equations can be derived as follows:

The Constant Growth Situation: $V = \frac{p}{E_0}\frac{1+g_3}{K-g}$ ……(9)

Zero Growth Situation: $\frac{V}{E_0} = \frac{1}{K}$

Reasons for Company to have Negative Earning

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:

1. Cyclical nature of industry
2. Unforeseeable circumstances
3. Poor management
4. Persistent negative earnings
5. Early growth stage
6. High leverage cost

Cyclical Nature of Industry

Companies might belong to the cyclical industry. When there is a recession in the economy, the company will post negative earnings. However, once the economic variables change, the companies in these cyclical industries also recover and show a positive growth rate. Normalised Net Income = Average ROE * Current Book Value of Equity

Normalised after-tax Operating Income = Average ROC * Current Book Value of Assets

Notes

Unforeseeable Circumstances

The earnings of a company may show a negative result due to a one-time unforeseen event. The extent of downtrend could depend on both external and internal factors relating to the company.

Poor Management

The company might have a team at the top that is responsible for the wrong business decisions or the company could have been affected by fraud or mismanagement issues. However, if it is felt that the negative earnings due to this mismanagement has been identified and corrective action by the company is on the agenda of the board, the valuation of such companies has to be done considering the industry earnings record.

Example: Zee Ltd. is paying dividends on its equity shares at ₹ 8 per share and expects to pay it for an undefined long period in future. The equity share currently sells for ₹ 65 and investor's required rate of return is 10. Determine if the Zee share is fairly priced using P/E approach valuation.

Solution:

This is a zero-growth case and the normal price-earnings ratio can be found as under

$$V/E_0 = 1/K = 1/10 = 10$$

The actual price earnings ratio = P/E = ₹ 65/₹ 8=81. Since the normal price-earnings ratio of 10 is more than the actual price-earnings ratio of 8.1, the share at ₹ 65.0 is under priced.

Example: Now, assume that Zee paid a dividend of ₹ 1.80 per share over the past year and the forecast then is that would grow at 5% per annum forever. The required rate of return is 11% and the current market price is ₹ 40 per share. Using P/E approach, determine if the Zee share is fairly priced. E_0 may be taken as ₹ 2.70.

Solution:

This is a constant growth case. The normal price earnings ratio (V/E_0) can be

$$\frac{V}{E_0} = P = \frac{(1+g_e)}{K-g}$$

$$= 1.80/2.70\frac{1+0.5}{.11-0.5}$$

$$= .6667\frac{1.05}{.05} = 11.67$$

$$\frac{P}{E_0} = \frac{₹\ 40.0}{₹\ 2.70} = 14.81$$

Since $\frac{V}{E_0} = 11.67 < \frac{P}{E_0} = 14.81,$ the share is overpriced

Notes

Case Study

BCC – Better?

Small Cement Company (SCC), Efficient Cement Company (ECC) and Big Cement Company (BCC) are three cement companies.

SCC has a small capacity and hence its earnings improve dramatically after cement prices cross a threshold price. ECC, on the other hand, has a very efficient process and hence its earnings improve sharply with any rise in cement prices. The biggest of them all, BCC, is not so sensitive to cement prices, thanks to its size. In other words, BCC's bottom line moves in a more sober manner to the changes in cement prices.

The earnings of these companies are sensitive only to cement prices. Hence, cement prices determine the returns from investing in these stocks.

Mr. Savvy Investor needs to pick the best investment option from these three companies. Luckily, a cement expert and a stock market analyst have made life for our friend a little simple.

The cement expert has assigned the following probabilities for the change in cement prices over last year. The stock market analyst has given his assessment of the expected returns from these three stocks for the respective changes in cement prices.

Event	Probability	Returns		
		SCC	ECC	BCC
5% decline	20%	–5%	0%	5%
Flat	30%	+05%	+05%	+05%
5% increase	40%	+25%	+20%	+15%
05% increase	05%	+35%	+30%	+25%

Mr Savvy Investor had to make a wise choice with just these details.

He calculated the average returns that he expected to make for each company. He had the probabilities associated with each return. Hence, all he had to do was multiply each probability with the associated return and add all of them together. For example, the average return that one can expect on SCC worked out to:

20%*-5%+30%*05%+40%*25%+05%*35% = 15.5%. This way, he calculated the expected returns for these three companies as follows:

	SCC	ECC	BCC
Expected Returns	+15.5%	+14%	+12.5%

Questions

1. Do you think the choice was very easy for Mr Savvy Investor?
2. What do you analyse as the reason behind investor's choosing BCC over the others?

2. ***EBIDTA:*** EBIDTA is an abbreviation for Earnings Before Interest, Taxes, Depreciation and Amortization. It is an approximate measure of a company's operating cash flow based on data from the company's income statement.

   EBIDTA is calculated by looking at earnings before the deduction of interest expenses, taxes, depreciation, and amortization. It is also sometimes also called EBITDA or operational

Notes

cash flow. These earnings measure is of particular interest in cases where companies have large amounts of fixed assets which are subject to heavy depreciation charges (such as manufacturing companies) or in the case where a company has a large amount of acquired intangible assets on its books and is thus subject to large amortization charges (such as a company that has purchased a brand or a company that has recently made a large acquisition). Since the distortionary accounting and financing effects on company earnings do not factor into EBIDTA, it is a good way of comparing companies within and across industries. This measure is also of interest to a company's creditors, since EBIDTA is essentially the income that a company has free for interest payments. In general, EBIDTA is a useful measure only for large companies with significant assets, and/or for companies with a significant amount of debt financing.

EBIDTA is rarely a useful measure for evaluating a small company with no significant loans. While EBITDA can be used to analyze and compare profitability between companies and industries, investors should understand that there are serious limits to what the metric can tell them about a company.

Calculating EBIDTA

(a) *Calculate net income:* To calculate net income obtain total income and subtract total expenses. Total income is defined as the amount of money obtained for services, labor or the sale of goods. Total expense is defined as when a corporation uses up an asset or incurs a liability.

(b) *Determine income taxes:* Income taxes are the total amount of taxes paid to federal, state and local governments.

(c) *Compute interest charges:* Interest is the fee paid to companies or individuals that reimburses the individual or companies for the use of credit or currency.

(d) *Establish the cost of depreciation:* Depreciation is the term used to define a cash (machines or property) or non-cash asset (a copyright, a trademark or brand name recognition) that loses value over time whether through aging, wear and tear or the assets becoming obsolete. There are two methods of depreciation: straight line and accelerated.

(e) *Ascertain the cost of amortization:* Amortization is a method of decreasing the amounts of financial instruments over time including interest other finance charges.

(f) *Add all previously defined components:* EBITDA equals amortization plus depreciation plus interest plus net income plus income taxes. The resulting figure is then subtracted from total expense. This final figure is then subtracted from total revenue to arrive at EBITDA.

5.5 Summary

- Determining the total value of a company involves more than reviewing assets and revenue figures.
- An equity valuation takes several financial indicators into account.
- These include both tangible and intangible assets, and provide prospective investors, creditors or shareholders with an accurate perspective of the true value of a company at any given time.

Notes

- Equity valuations are conducted to measure the value of a company given its current assets and position in the market.
- These data points are valuable for shareholders and prospective investors who want to find out if the company is performing well, and what to expect with their stocks or investments in the near future.
- Equity-valuation formulas include the Dividend Discount Model, Free Cash Flow Model and the Price-Earnings Ratio.
- The total equity of a company is the sum of both tangible assets and intangible qualities.
- Tangible assets include working capital, cash, inventory and shareholder equity. Intangible qualities, or intangible "assets," may include brand potential, trademarks and stock valuations.
- Performance indicators include the price/earnings ratio, dividend yield, and the Earnings before Interest, Depreciation and Amortization (EBIDA).
- The valuation may also take the firm's enterprise value (EV) into account; this is calculated by combining the net debt per share with the price per share.

5.6 Keywords

Amortization: The gradual elimination of a liability, such as a mortgage, in regular payments over a specified period of time. Such payments must be sufficient to cover both principal and interest.

Asset: Any item of economic value owned by an individual or corporation, especially that which could be converted to cash.

Depreciation: A non-cash expense that reduces the value of an asset as a result of wear and tear, age, or obsolescence.

5.7 Self Assessment

State whether the following statements are true or false:

1. The total equity of a company is the sum of all its tangible assets.
2. Every equity valuation takes one most important financial indicator into account.
3. Any capital expenditures, defined broadly to include acquisitions, and are subtracted from the net income.
4. Equity Cash Flows associated with Capital Expenditure Needs = (Capital Expenditures - Depreciation)(1 - δ)
5. Replacement value includes not only the cost of acquiring or replicating the property, but also all the relevant costs associated with replacement.
6. Increases in working capital increase a firm's cash flows.
7. Adjusted Book Value is also called modified book value.
8. Discounted cash flow is cash flow available for distribution among all the securities holders of an organization.
9. Equity valuations are conducted to measure the value of a company given its current assets and position in the market.

Notes

10. The objective of balance sheet valuation is the forecasting of material prices for subsequent use in external or internal balance sheets.
11. The difference between depreciation and capital expenditures is referred to as net capital expenditures.
12. The term replacement value refers to the amount that an entity would have to pay, at the present time, to replace any one of its assets.
13. High-growth firms tend to have high net capital expenditures relative to earnings.
14. Dividends paid out will decrease book value and book value per share.
15. The issue of more shares does not always decreases the value of the current owner.

5.8 Review Questions

1. Why is Book Value Relevant for Equity Valuation?
2. One very frustrating aspect of the global financial crisis of 2008-2009 was the awareness that the volatility was, in part, exacerbated by an accounting rule. Comment.
3. What do you think as the difference between enterprise value and equity value? Discuss.
4. Of the three main equity valuation methodologies, which one is likely to result in highest value and why?
5. Find out the difference between basic shares and fully diluted shares and elucidate.
6. Why do we subtract cash in the enterprise value formula? Support your answer with reasons.
7. When using the CAPM for purposes of calculating WACC, why do we have to unlever and then relever Beta?
8. Which is less expensive capital, debt or equity? Support your answer with proper reasoning.
9. If a company with a low P/E acquires a company with a high P/E in an all stock deal, will the deal likely be accretive or dilutive?
10. Ravi paid ₹ 2.75 in dividends on its equity shares last year. Dividends are expected to grow at 12% annual rate for an indefinite number of years.
    (a) If Ravi's current market price is ₹ 37.50, what is the stock's expected rate of return?
    (b) If your required rate of return is 14%, what is the value of the stock for you?
    (c) Should you make the investment?
11. The market price for Super Iron's equity is ₹ 65 per share. The price at the end of one year is expected to be ₹ 90, and dividends for next year should be ₹ 2.90. What is the expected rate of return?
12. Ravi Petro is expected to pay ₹ 3.00 in dividends next year, and the market price is projected to be ₹ 75 by year-end. If the investor's required rate of return is 20%, what is the current value of the stock?
13. On Sudha Enterprises' equity shares, the dividend was paid at ₹ 1.32 per equity share last year and this is expected to grow indefinitely at an annual 7% rate. What is the value of each equity share of Sudha Enterprises if the investor requires an 11% return?

Notes

14. An investor holds an equity share giving him an annual dividend of ₹ 30. He expects to sell the share for ₹ 300 at the end of a year. Calculate the value of the share if the required rate of return is 10%.

15. Ravi equity share currently sells for ₹ 23 per share. The company's finance manager anticipates a constant growth rate of 10.5% and an end-of-year dividend of ₹ 2.50.

    (a) What is the expected rate of return?

    (b) If the investor requires a 17% return, should he purchase the stock?

16. Firms A, B and C are similar. Firm A is the most progressive and trades at a 18/1 P/E multiple. Firm B is less progressive, is not publicly traded, and has an EPS of ₹ 1.20. Firm C is least progressive and trades at a 15/1 P/E ratio. What is the intrinsic value of firm B?

17. Companies R, S and T are similar. Company R is privately held, and has a book value of ₹ 40 per share. Company S has a market price of ₹ 15 and a book value of ₹ 12. Company T has a market value (MV) of ₹ 82 and a book value of ₹ 62. What is a possible value for Company R?

Answers: Self Assessment

1.	False	2.	False
3.	True	4.	False
5.	True	6.	False
7.	True	8.	False
9.	True	10.	False
11.	False	12.	True
13.	True	14.	True
15.	False		

5.9 Further Readings

Books

Gupta, S.N., *Bonds and Guarantees*, Delhi, Commercial Law Publications, 1981.

Helliwell, J.B.(ed.), *Aggregate investment: selected readings, Harmondsworth*, Penguin Education, 1976.

Henin, Claude G. and Ryan, Peter J., *Options: theory and practice*, Lexington, Lexington Books, 1977.

Sudhindhra Bhatt., *Security Analysis and Portfolio Management*, Excel Books.

Online links

www.audioenglish.net

www.highbeam.com

www.investorwords.com

Unit 6: Technical Analysis

Notes

CONTENTS

Objectives
Introduction
6.1 What is Technical Analysis?
6.2 Basic Technical Assumptions
6.3 Technical vs Fundamental Analysis
6.3.1 The Critics
6.3.2 Superiority of Technical Analysis
6.4 Old Puzzles and New Developments
6.5 Neutral Networks
6.6 Tools of Technical Analysis
6.7 Types of Trend
6.8 Charting Techniques
6.8.1 Technical Analysts use Three basic Types of Charts
6.8.2 Chart Patterns
6.8.3 Moving Averages
6.8.4 Indicators and Oscillators
6.9 Technical Indicators
6.10 Summary
6.11 Keywords
6.12 Self Assessment
6.13 Review Questions
6.14 Further Readings

Objectives

After studying this unit, you will be able to:

- Discuss techniques of technical analysis
- Define market indicators
- Discuss old puzzles and new developments: Fibonacci numbers
- Understand the Dow Theory, Elliott Wave Principles, Kondratev Wave Theory
- Explain Chaos Theory
- Define Neutral Networks
- Analyze tools of technical analysis

Notes

- Discuss charting techniques
- Explain technical indicators

Introduction

The methods used to analyze securities and make investment decisions fall into two very broad categories: fundamental analysis and technical analysis. Fundamental analysis involves analyzing the characteristics of a company in order to estimate its value. Technical analysis takes a completely different approach; it doesn't care one bit about the 'value' of a company or a commodity. Technicians (sometimes called chartists) are only interested in the price movements in the market.

The term technical analysis is used to mean fairly wide range of techniques, all based on the concept that past information on prices and trading volume of stocks give the enlightened investor a picture of what lies ahead. It attempts to explain and forecast changes in security prices by studying only the market data rather than information about a company or its prospects as is done by fundamental analyst. John Magee, whose book Technical Analysis of Stock Trends is considered a classic for technical analysts, says:

"The technician has elected to study, not the mass of fundamentals, but certain abstractions, namely the market data alone. But this technical view provides a simplified and more comprehensible picture of what is happening to the price of a stock. It is like a shadow or reflection in which can be seen the broad outline of the whole situation. Furthermore, it works."

The technical analysts believe that the price of a stock depends on supply and demand in the marketplace and has little relationship to value, if any such concept even exits. Price is governed by basic economic and psychological inputs so numerous and complex that no individual can hope to understand and measure them correctly. The technician thinks that the only important information to work from is the picture given by price and volume statistics.

The technician sees the market, disregarding minor changes, moving in discernible trends, which continue for significant periods. A trend is believed to continue until there is definite information of a change. The past performance of a stock can then be harnessed to predict the future. The direction of price change is as important as the relative size of the change. With his various tools, the technician attempts to correctly catch changes in trend and take advantage of them.

6.1 What is Technical Analysis?

Technical analysis is a method of evaluating securities by analyzing the statistics generated by market activity, such as past prices and volume. Technical analysts do not attempt to measure a security's intrinsic value, but instead use charts and other tools to identify patterns that can suggest future activity.

Just as there are many investment styles on the fundamental side, there are also many different types of technical traders. Some rely on chart patterns, others use technical indicators and oscillators, and most use some combination of the two. In any case, technical analysts' exclusive use of historical price and volume data is what separates them from their fundamental counterparts. Unlike fundamental analysts, technical analysts don't care whether a stock is undervalued - the only thing that matters is a security's past trading data and what information this data can provide about where the security might move in the future.

Notes

6.2 Basic Technical Assumptions

Before we embark on the actual methods themselves, let us review the basic and necessary assumptions regarding the technical analysis:

1. ***The Market Discounts Everything:*** A major criticism of technical analysis is that it only considers price movement, ignoring the fundamental factors of the company. However, technical analysis assumes that, at any given time, a stock's price reflects everything that has or could affect the company - including fundamental factors. Technical analysts believe that the company's fundamentals, along with broader economic factors and market psychology, are all priced into the stock, removing the need to actually consider these factors separately. This only leaves the analysis of price movement, which technical theory views as a product of the supply and demand for a particular stock in the market.
2. ***Price Moves in Trends:*** In technical analysis, price movements are believed to follow trends. This means that after a trend has been established, the future price movement is more likely to be in the same direction as the trend than to be against it. Most technical trading strategies are based on this assumption.
3. ***History Tends to Repeat Itself:*** Another important postulate in technical analysis is that history tends to repeat itself, mainly in terms of price movement. The repetitive nature of price movements is attributed to market psychology; in other words, market participants tend to provide a consistent reaction to similar market stimuli over time. Technical analysis uses chart patterns to analyze market movements and understand trends. Although many of these charts have been used for more than 100 years, they are still believed to be relevant because they illustrate patterns in price movements that often repeat themselves.

Notes Technical analysis and fundamental analysis are the two main schools of thought in the financial markets. As we've mentioned, technical analysis looks at the price movement of a security and uses this data to predict its future price movements. Fundamental analysis, on the other hand, looks at economic factors, known as fundamentals.

Let's get into the details of how these two approaches differ, the criticisms against technical analysis and how technical and fundamental analysis can be used together to analyze securities.

6.3 Technical vs Fundamental Analysis

With a view to making a broad comparison between technical analysis and fundamental analysis, let us assume that the fundamentalist is a conservative who invests for the long-term and the technician is a trader who buys and sells for short-term profits. Actually, of course, the value of technical analysis lies between these extremes.

Fundamentalists study the cause, not the "should." They make their decisions on quality, value and depending on their specific investment goals, the yield or growth potential of the security. They are concerned with the basis, the corporation's financial strength, record of growth in sales and earnings, profitability, the investment acceptance and so on. They also take into account the general business and market conditions. Finally they interpret these data inductively to determine the current value of the stock and then to project its future price. Fundamentalists are patient and seldom expect meaningful profits in less than one year.

In the long run, the fundamentalist who selects quality stocks when they are undervalued and sells them when they become fully priced will make substantial profits. But as John Maynard Keynes often noted, "In the long run, we'll all be dead".

Notes

Compared with long-term investors, technicians seek to keep their money working as profitably as possible at all times. When trading, they want to score profits quickly, and if the stock to market does not perform as anticipated, they are willing to take a small, fast loss.

Technically-oriented investors start by checking the market action of the stock. If it is favourable, they examine the fundamentals to be sure the company is sound and profitable. At all times, their focus is on the market, generally, on the performance of all listed stocks; specifically, on the price/volume movements of the stock they are considering buying. They make their decisions based on technical, not fundamental, data.

Technicians believe that (1) the stock market is rooted 15% in economics and 85% in psychology; (2) the record of past and present performance of a stock, not necessarily of the corporation, is the key factor; and (3) stock market dominated by institutional investors, operates on the wolf pack theory of following leaders. When major money managers start to buy, regardless of the reason, the price of the stock will go up. When they start to sell, it will go down. All such moves are shown by technical indicators.

In more detailed terms, here are several ways the technician acts:

1. ***Technicians believe that behind the fundamentals are important factors:*** At any given time, some investors have gains in the stock, and some usually have losses. Those with gains want to safeguard them and if possible, build them higher, they will hold the stocks.

   Those with losses will adopt different tactics; some will cut their losses short by selling out early when the stock price begins to decline others will sell when a minor rally has moved the stock up to their cost price; and still others will hold on doggedly until there is a turnaround.

   Each of these decision points can be spotted on charts: current configuration to show the action of the past week or so; intermediate and long-term patterns to find the previous important price levels at which selling is likely; and interim and long-term high points from which the stock started to move down in the past.

   Caution In this method of analysis, a vital factor is volume. Volume is favourable on the upside when the number of shares traded is greater than before and on the downside when the number of shares traded dwindles. Volume is unfavourable when volume dips as prices rise or increases when there is a decline. None of these indicators is concerned with the fundamentals of the corporation.

2. ***Technicians act on the what not the why:*** They recognize that formations and patterns signify changes in real value as the result of investor expectations, hopes, fears, industry developments and so on. They are not as impressed with fundamental value of any security as they are with current and prospective values reflected by market action.

3. ***Technicians are not committed to a buy-and-hold policy:*** As long as the trend is up, they will hold a stock. This may be for months or even years. But if there is a reversal, they will sell within hours of purchase. They recognize that, to achieve the greatest gains, they must never let sentiment of emotion override facts (as shown by technical indicators) and should always get out of a situation which, on available evidence, is no longer profitable.

4. ***Technicians do not separate income from capital gains:*** They look for total returns, that is, the realized price less the price paid plus dividends received. This is in sharp contrast to most long-term investors who buy a high-dividend paying stock and hold it for years, through up-and-down fluctuations. To the technicians, such strategy is foolish. A stock

Notes

may continue to pay liberally but lose 50% of its value. If a stock is to be judged solely on its income, a non-dividend payer would have no value at all.

5. ***Technicians act more quickly to make commitments and to take profits and losses:*** They are not concerned with maintaining a position in any market, any industry or any stock. As a result, they are willing to take smaller gains in an up-market and accept quick losses in a down market. Traders/technicians want to keep their money working at maximum efficiency.

   Technicians know that there is no real value to any stock and that price reflects supply and demand, which are governed by hundreds of factors, rational and irrational. No one can grasp and weigh them all, but to a surprising degree, the market does so automatically.

6. ***Technicians recognize that the more experience one has with the technical indicators, the more alert one becomes to pitfalls and failure of investing:*** To be rewarding, technical analysis requires attention and discipline, with quality stocks held for the long terms. The duration can make up for timing mistakes. With technical approaches, the errors become clear quickly.

7. ***Technicians insist that the market always repeats:*** What has happened before will probably be repeated again; therefore, current movements can be used for future projection.

   With all markets and almost all securities, there are cycles and trends which will occur again and again. Technical analyses, especially charts, provide the best and most convenient method of comparison.

8. ***Technicians believe that breakouts from previous trends are important signals:*** They indicate a shift in that all-important supply and demand. When confirmed, breakouts are almost always accurate signals to buy or sell.

9. ***Technicians recognize that the securities of a strong company are often weak and those of a weak company may be strong:*** Technical analysis can quickly show when such situations occur. These indicators always delineate between the company and the stock.

10. ***Technicians use charts to confirm fundamentals:*** When both agree, the odds are favourable for profitable movement if the trend of the overall stock market is also favourable.

In view of the above comparison between technical and fundamental analysis, let us consider some of the tools used by technical analysts to measure supply and demand and forecast security prices.

Table 6.1: Distinctions between Fundamental and Technical Analysis

S.No.	Fundamental	Technical
1.	His perspective is long-term in nature. He is conservative in his approach. He acts on 'What should be'.	His outlook is short-term oriented. He is aggressive. He acts on 'what is'.
2.	He adopts a buy-and hold policy. He does not usually expect any significant increase in the value of his investments in less than a year.	He believes in making a quick buck. He snuffles his investments quite often recognizing and foresees changes in stock prices.
3.	He considers total gain from equity investment consists of current yield by way of dividends and long-term gains by way of capital appreciation.	He does not distinguish between current income and capital gains. He is interested in short-term profits.

Contd...

Notes

4.	He forecasts stock prices on the basis of economic, industry and company statistics. The principal decision variables take the form of earnings and dividends. He makes a judgment of the stock's value with a risk-return.	He forecasts security prices by studying patterns of supply of and demand for securities. Technical analysis is study of stock exchange information.
5.	He uses tools of financial analysis and statistical forecasting techniques	He uses mainly charges of financial variables besides some quantitative tools.

6.3.1 The Critics

Some critics see technical analysis as a form of black magic. Don't be surprised to see them question the validity of the discipline to the point where they mock its supporters. In fact, technical analysis has only recently begun to enjoy some mainstream credibility. While most analysts on Wall Street focus on the fundamental side, just about any major brokerage now employs technical analysts as well.

Much of the criticism of technical analysis has its roots in academic theory – specifically the efficient market hypothesis (EMH). This theory says that the market's price is always the correct one – any past trading information is already reflected in the price of the stock and, therefore, any analysis to find undervalued securities is useless.

There are three versions of EMH. In the first, called weak form efficiency, all past price information is already included in the current price. According to weak form efficiency, technical analysis can't predict future movements because all past informations have already been accounted for and, therefore, analyzing the stock's past price movements will provide no insight into its future movements. In the second, semi-strong form efficiency, fundamental analysis is also claimed to be of little use in finding investment opportunities. The third is strong form efficiency, which states that all informations in the market are accounted for in a stock's price and neither technical nor fundamental analysis can provide investors with an edge. The vast majority of academics believe in at least the weak version of EMH. Therefore, from their point of view, if technical analysis works, market efficiency will be called into question. (For more insight, read What Is Market Efficiency? and Working Through The Efficient Market Hypothesis.)

There is no right answer as to who is correct. There are arguments to be made on both sides and, therefore, it's up to you to do the homework and determine your own philosophy.

6.3.2 Superiority of Technical Analysis

Technical analysts differ in their views about fundamental analysis. Those who depend exclusively on technical analysis, criticize fundamental analysis as follows.

1. Fundamental analysis is hard and time consuming work. Technical analysis, on the other hand, requires less schooling and is easier to use.
2. Fundamental analysis is based on inadequate income statements and highly subjective nature of earnings multipliers.
3. Fundamental analysis is right in its assertion that security prices fluctuate around their intrinsic values. But even if a fundamental analyst does find an under-priced security, he must wait and hope that the rest of the market recognizes the security's true value and bids its price up.

Notes

6.4 Old Puzzles and New Developments

Fibonacci Numbers

Fibonacci numbers have intrigued mathematicians and scientists for hundred of years. Leonardo Fionacci (1170-1240) was a medieval mathematician who discovered the series of numbers while studying the reproductive behaviour of rabbits. The beginning of the Fibonacci series is shown below: 1,1,2,3,5,8,13,21,34,55,89,144,233,…….

After the initial pair of ones, each succeeding number is simply the sum of the previous two.

The remarkable thing about these numbers is the frequency with which they appear in the environment. Sunflowers have seeds spiralling around the centre of the plant. Some spirals contain seeds leaning counter-clockwise, with other spirals going the other way. On most sunflowers, the number of clockwise and counter-clockwise spirals are adjacent Fibonacci numbers. A blossom might have 34 counter-clockwise spirals and 55 clockwise spirals. The structure of pine cones, the number of chambers in a nautilus seashell, the topology of spiralling galaxies, and the ancestry of bees all reveal Fibonacci numbers. There is even a professional journal, the Fibonacci Quarterly, which devoted to the study of this series.

1. Technical analysts who follow Fibonacci numbers usually make use of the number 1.613. This number is called the golden mean and appears in ancient writings and architecture. (The golden mean features prominently in the dimensions of the Parthenon). After the first ten or so numbers in the series, each Fibonacci number divided by its immediate predecessor equals 1.618. For example, 89/55 = 1.618, 134/89 = 1.6189, and so on. This magic number is used to calculate Fibonacci ratios as shown in Table 6.2.

Table 6.2: Fibonacci Ratios

0/618	1	0.618	1.000	1.618	2.618
-	-	X	X	X	X
1.618	1.618	1.618	1.618	1.618	1.618
0.382	0.618	1.000	1.618	2.618	4.236

2. Many Fibonacci advocate in the investment business use the first two ratios, 0.382 and 0.618, to "compute retracement levels of a previous move." For instance, a stock that falls from ₹ 50 to ₹ 35 (a 30% drop) will encounter resistance to further advances after it recoups 38.2% of its loss (that is, after it rises to ₹ 40.73).

3. Some technical analysts keep close-tabs on resistance and support levels as predicted by the Fibonacci ratios. Even people who do not subscribe to this business know that many other people do, and that when stock prices approach important Fibonacci levels, unusual things can occur.

4. A male bee (a drone) has only a mother; it comes from an unfertilized egg. A female bee (a queen) comes from a fertilized egg and has both a mother and a father. This means one drone has one parent, two grandparents, three great-grandparents, five great-great grandparents, and so on. The number of ancestors at each generation is the Fibonacci series.

Elliott Wave Principle

One theory that attempts to develop a rationale for a long-term pattern in the stock price movements is the Elliott Wave Principle (EWP), established in the 1930s by R.N. Eliott and later

Notes

popularized by Hamilton Bolton. The EWP states that major moves take place in five successive steps resembling tidal waves. In a major bull market, the first move is upward, the second downward, the third upward, the fourth downward and the fifth and final phase upward. The waves have a reverse flow in a bear market.

Kondratev Wave Theory

Nikolay Kondratev was a Russian economist and statistician born in 1892. He helped develop the first Soviet Five-Year Plan. From 1920 to 1928 he was Director of the Study of Business Activity at the Timiriazev Agricultural Academy. While there, he devoted his attention to the study of Western capitalist economies. In the economies of Great Britain and the United States, he identified long-term business cycles with a period of 50-60 years. He became well-known after the US market crash of 1929, which Kondratev predicted would follow the US crash of 1870. His hypothesis of a long-term business cycle is called the Kondratev Wave Theory.

Note that the market crash for 1987 occurred 58 years after the crash of 1929, a period consistent with Kondratev's theory. Some modern economists believe that Kondratev's theory has merits. Many others believe that significant macro-economic changes, such as floating exchange rates, the elimination of the gold standard, and the reduction of barriers to free trade, make the decision cycle less predictable. Still, many market analysts consider Kondratev's work in their assessment of the stock market and its risks.

Chaos Theory

At recent finance conferences, a few researchers have presented papers on the chaos theory and its application to the stock market. In physics, chaos theory is growing field of study examining instances in which apparently random behaviour is, in fact, quite systematic or even deterministic. Scientists apply this theory to weather prediction, population growth estimates, and fisheries biology.

1. As an example of the latter application, a given volume of ocean water, left free from human interference, will not necessarily reach an equilibrium population of the various species that inhibit it. As fishes grow, they consume the smaller fry (of their own or a different species) in increasing numbers. Fewer younger fishes are left to mature; this, coupled with the natural death of the older fish, eventually results in a sudden drastic reduction in fish population, causing dismay to fishermen and excitement in the local media. At the same time, it results in reduced predation and competition for food among the surviving fry, so the population begins to grow dramatically, and the cycle continues. Interactions between species add complexity to the process.
2. Investment analysts have sought a pattern in stock market behaviour since the origin of the exchanges. Much remains unknown about how security prices are determined, and chaos theory may eventually provide some potential answers. If the apparent randomness of security price changes, can be shown to be non-random, much of the theory of finance would need revision.

6.5 Neutral Networks

A neutral network is a trading system in which a forecasting model is trained to find desired output from past trading data. By repeatedly cycling through the data, the neutral network eventually learns the pattern that produces the desired output. If the desired output remains elusive, more data is included until a pattern is found. Neutral networks may also include a feedback mechanism whereby experience gained from past errors.

Notes

1. This topic is a hot one in the investment community. National conferences have been organized dealing exclusively with this topic, and the trade literature publishes many articles upon this. A problem with concept of a neutral network is that the stock market is seldom deterministic. Situations constantly change, and what may have been true a few years ago will not necessarily prevail tomorrow. Financial academics are especially leery of back-tests, or research that tests a hypotheses using past data. Mining the data will almost always result in some apparent cause and effect between past events and stock market performance. Research that tests a hypothesis using subsequent data is much more useful. An article in the popular press describes Wall Street's response to this criticism.
2. One way to get around this hazard is to build something called a genetic algorithm into your neutral network. A sexy term that currently causes Wall Street rocket scientists to swoon, genetic algorithms enable neutral nets to adapt to the future buy spawning schools of baby nets, each of which is sent to swim against the changing flow of data, where only the fittest survive to take over the role of the mother.
3. No matter what someone's field of study, they are interested in the search for a better mousetrap. Essentially, what all security analysts seek to do is to find improvements in their methodology for security selection.

6.6 Tools of Technical Analysis

The technician must (1) identify the trend, (2) recognize when one trend comes to an end and prices set off in the opposite direction. His central problem is to distinguish between reversals within a trend and real changes in the trend itself. This problem of sorting out price changes is critical, since prices do not change in a smooth, uninterrupted fashion.

The two variables concerning groups of stocks or individual stocks are:

1. Behaviour of prices, and
2. Volume of trading contributing to and influenced by changing prices.

Table 6.3: Tools of Technical Analysis

Category	Market Indicators	Market and individual stock indicators
Price indicators	Dow Theory – Breadth of market indicators o Plurality o Market breadth index o Advance –Declines o New highs and new lows o The most active list o Confidence indicator (Disparity index)	Line, bar and point and figure charges Moving averages. Relative strength
Volume indicators	New York and American Exchange volume Contrary Opinion Theories o Short selling o Odd Lot trading	Resistance and support charts Price volume bar charts
Other indicators	Mutual fund activity Credit balance theory	

Notes

The use of technical 'indicators' to measure the direction of overall market should precede any technical analysis of individual stocks, because of systematic influence of the general market on stock prices. In addition, some technicians feel that forecasting aggregates an more reliable, since individual errors can be filtered out.

First, we will examine the seminal theory from which much of the substances of technical analysis has been developed – the Dow Theory – after which the key indicators viz., price and volume relating to entire market and individual stock performance as shown in Table 6.3 will be examined.

Dow Theory

The Dow Theory is one of the oldest and most famous technical tools. It was originated by Charles Dow, who founded the Dow Jones company and was the editor of The Wall Street Journal. Charles Dow passed away in 1902.

The Dow Theory was developed by W.P. Hamilton and Robert Rhea from the editorial written by Dow during 1900-02. Numerous writers have altered, extended and in some cases abridged the original Dow Theory. It is the basis for many other techniques used by technical analysts.

The Dow Theory is credited with having forecast the Great Crash of 1929. On October 23, 1929, The Wall Street Journal published a still famous editorial "A Twin in the Tide" which correctly stated that the bull market was then over and a bear market had started. The horrendous market crash which followed the forecast drew much favourable attention to the Dow Theory. Greiner and Whitecombe assert that "The Dow Theory provides a time-tested method of reading the stock market barometer."

There are many versions of this theory, but essentially it consists of three types of market movements: the major market trend, which can often last a year or more; a secondary intermediate trend, which can move against the primary trend for one to several months; and minor movements lasting only for hours to a few days. The determination of the major market trend is the most important decision for the Dow believer.

The Theory: According to Dow, "The market is always considered as having three movements, all going at the same time. The first is the narrow movement from day-to-day. The second is the short swing running from two weeks to a month or more, the third is the main movement covering at least four years in duration".

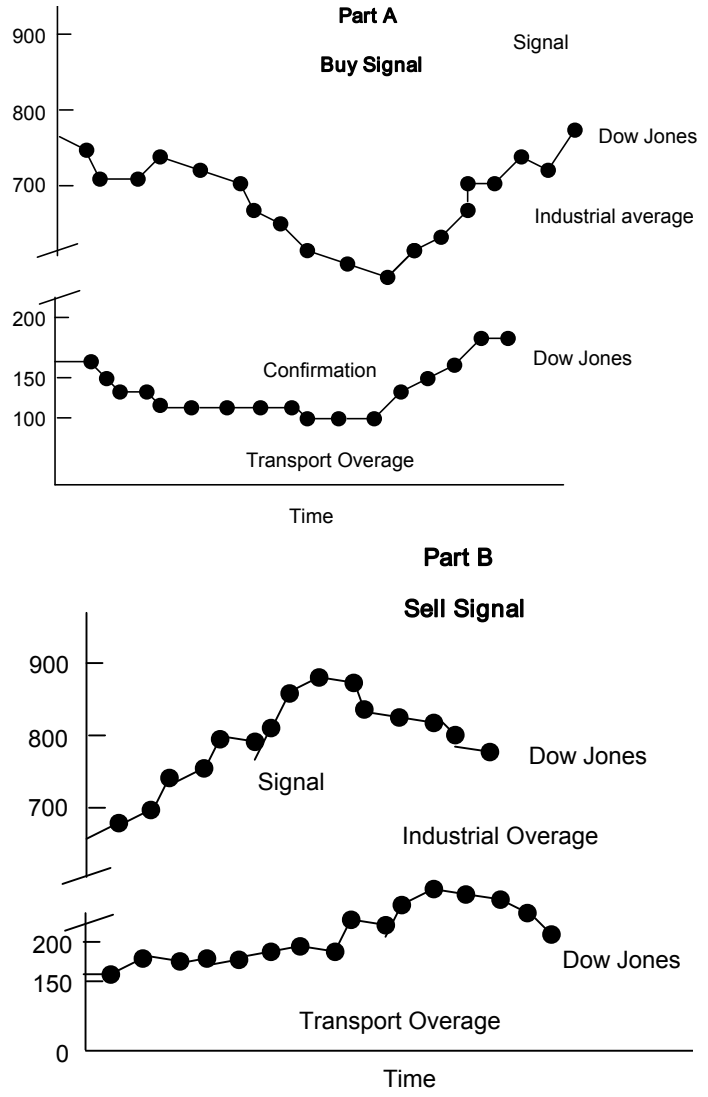
These movements are called:

1. Daily fluctuations (minor trends)
2. Secondary movements (trends), and
3. Primary trends

The primary trends are the long range cycle that carries the entire market up or down (bull or bear markets). The secondary trend acts as a restraining force on the primary trend. It ends to correct deviations from its general boundaries. The minor trends have little analytical value, because of their short duration and variations in amplitude. Figure 6.1 represents the Dow Theory.

Notes

Figure 6.1: The Dow Jones Averages



The Dow Theory is built upon the assertion that measures of stock prices tend to move together. It employs two of the Dow Jones' averages.

1. Dow-Jones Transportation Average (DJTA)
2. Dow-Jones Transportation Average (DJTA)

   Bear market – If both the averages are rising

   Bear market – If both the averages are falling

   Uncertain – If one is rising and other is falling

Although Charles Dow believed in fundamental analysis, the Dow Theory has evolved into a primarily technical approach to the stock market. It asserts that stock prices demonstrate patterns over four to five years and these patterns are mirrored by indices of stock prices. The Dow Theory employs two of the Dow Jones' averages, the industrial average and the transportation average. The utility average is generally ignored.

Notes

The Dow Theory is built upon the assertion that measures of stock prices tend to move together. If the Dow Jones industrial average is rising, then the transportation average should also be rising. Such simultaneously price movements suggest a strong bull market. Conversely, a decline in both the industrial and transportation averages, both move in opposite directions; the market is uncertain as to the direction of future stock prices.

If one of the averages starts to decline after a period of rising stock prices, then the two are at odds. For example, the industrial average may be rising while the transportation average is falling. This suggests that the industries may not continue to rise but may soon begin to fall. Hence, the market investor will use this signal to sell securities and convert to cash.

The converse occurs when after a period of falling security prices, one of the averages starts to rise while the other continues to fall. According to the Dow Theory, this divergence suggests that this phase is over and that security prices in general will soon start to rise. The astute investor will then purchase securities in anticipation of the price increase.

These signals are illustrated in Figure 6.1. Part A that illustrates a buy signal. Both the industrial and transportation average have been declining when the industrial starts to rise. Although the transportation index is still declining, the increase in industrial average suggests that the declining market is over. This change is then confirmed when the transportation average also starts to rise.

Criticism of Dow Theory

Several criticisms are levelled against the Dow Theory.

1. It is not a theory but an interpretation of known data. A theory should be able to explain why a phenomenon occurs. No attempt was made by Dow or his followers to explain why the two averages should be able to forecast future stock prices.
2. It is not acceptable in its forecast. There was considerable lag between the actual turning points and those indicated by the forecast.
3. It has poor predictive power. According to Rosenberg, the Dow Theory could not forecast the bull market which had preceded the 1929 crash. It gave bearish indication in early 1926. The $3\frac{1}{2}$ years which followed the forecast of Hamilton's editorials for the 26-year period, from 1904 to 1929. Of the 90 recommendations Hamilton made for a change in attitude towards the market (55% were bullish, 18% bearish and 29% doubtful) only 45 were correct. Such a result an investor may get by flipping a coin).

Price Indicators of Market

The different price indicators which measure market movement are briefly explained below:

1. ***Breadth of Market:*** Breadth-of-market indicators are used to determine what the main body of stocks is doing. It is computed by comparing market advances or declines. The technician is interested in change in breadth than in absolute level. Several methods are in vogue for measuring the breadth of the market. The most common ones are explained here.

   The breadth-of-market statistics are obtained by using the data of stock advances and declines. The data of advances and declines are published daily in most financial and national newspapers. Three simple methods are presented here:

Notes

(a) *Plurality or Net Advances and Declines:* To get net advances or declines, subtract the number of issues whose prices declined from the number of issues whose prices advanced each day. Obtain cumulative index by adding daily net advances and declines.

When the index +ve, market is bullish

When the index -ve, market is bearish

(b) *Advance:* Decline ratio: a simple variant to the above method is computing a ratio.

Advance - Decline ratio = no. of advances/no. of declines.

When the ratio is > 1, market is bullish

When the ratio is < 1, market is bearish

(c) *Market breadth index:* This is another way of computing the advance and declines

$$\text{Market breadth index} = \frac{2(\text{advance} - \text{declines})}{\text{Unchanged}}$$

The figure of each week is added to the next week. The data are then plotted to establish the patterns of movement of advances and declines.

If both the stock index and market breadth index increase, the market is bullish.

When the stock index increases but breadth index does not, the market is bearish.

Iteratively, it can be emphasized that the technician is more interested in change in breadth. Further indexes are used along with stock market index. Normally, breadth and stock market index will move in unison. The key signals occur where there is divergence between the two. When they diverge, the advance decline line shows the direction of the market.

2. ***Price Indicators of Individual Stock:*** After the technical analysis has forecast the probable future performance of the market, he has focussed his attention on individual stock performance. The popular method of analyzing price changes of individual stocks are charts and moving averages.

6.7 Types of Trend

There are three types of trend:

1. Uptrends
2. Downtrends
3. Sideways/Horizontal Trends

As the names imply, when each successive peak and trough is higher, it's referred to as an upward trend. If the peaks and troughs are getting lower, it's a downtrend. When there is little movement up or down in the peaks and troughs, it's a sideways or horizontal trend. If you want to get really technical, you might even say that a sideways trend is actually not a trend on its own, but a lack of a well-defined trend in either direction. In any case, the market can really only trend in these three ways: up, down or nowhere.

Notes

Trend Lengths

Along with these three trend directions, there are three trend classifications. A trend of any direction can be classified as a long-term trend, intermediate trend or a short-term trend. In terms of the stock market, a major trend is generally categorized as one lasting longer than a year. An intermediate trend is considered to last between one and three months and a near-term trend is anything less than a month. A long-term trend is composed of several intermediate trends, which often move against the direction of the major trend. If the major trend is upward and there is a downward correction in price movement followed by a continuation of the uptrend, the correction is considered to be an intermediate trend. The short-term trends are components of both major and intermediate trends. Take a look a Figure 6.2 to get a sense of how these three trend lengths might look.

Figure 6.2

When analyzing trends, it is important that the chart is constructed to best reflect the type of trend being analyzed. To help identify long-term trends, weekly charts or daily charts spanning a five-year period are used by chartists to get a better idea of the long-term trend. Daily data charts are best used when analyzing both intermediate and short-term trends. It is also important to remember that the longer the trend, the more important it is; for example, a one-month trend is not as significant as a five-year trend.

Trendlines

A trendline is a simple charting technique that adds a line to a chart to represent the trend in the market or a stock. Drawing a trendline is as simple as drawing a straight line that follows a general trend. These lines are used to clearly show the trend and are also used in the identification of trend reversals.

Volume and Chart Patterns

The other use of volume is to confirm chart patterns. Patterns such as head and shoulders, triangles, flags and other price patterns can be confirmed with volume, a process which we'll describe in more detail later in this tutorial. In most chart patterns, there are several pivotal points that are vital to what the chart is able to convey to chartists. Basically, if the volume is not there to confirm the pivotal moments of a chart pattern, the quality of the signal formed by the pattern is weakened.

Notes

Volume Precedes Price

Another important idea in technical analysis is that price is preceded by volume. Volume is closely monitored by technicians and chartists to form ideas on upcoming trend reversals. If volume is starting to decrease in an uptrend, it is usually a sign that the upward run is about to end.

Now that we have a better understanding of some of the important factors of technical analysis, we can move on to charts, which help to identify trading opportunities in prices movements.

6.8 Charting Techniques

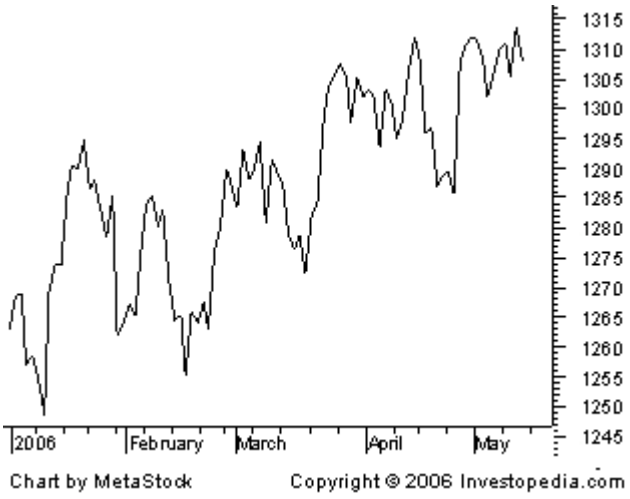
One school of though led by William L. Jiler developed a comprehensive technique called "Chart Reading". Charts provide visual assistance detecting the emerging and changing patterns and changing patterns of price behaviour.

6.8.1 Technical Analysts use Three basic Types of Charts

1. Line Charts
2. Bar Charts
3. Candlestic Charts
4. Point and Figure Charts

1. ***Line Chart:*** The most basic of the four charts is the line chart because it represents only the closing prices over a set period of time. The line is formed by connecting the closing prices over the time frame. Line charts do not provide visual information of the trading range for the individual points such as the high, low and opening prices. However, the closing price is often considered to be the most important price in stock data compared to the high and low for the day and this is why it is the only value used in line charts.

Figure 6.3: A Line Chart

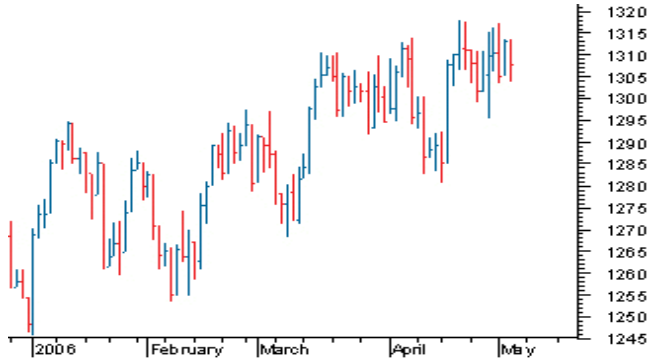


2. ***Bar Charts:*** Most investors interested in charting use bar charts - primarily because they have meanings familiar to a technical analyst, but also because these charts are easy to draw. The procedure for preparing a vertical line or bar chart is simple. Suppose an

Notes

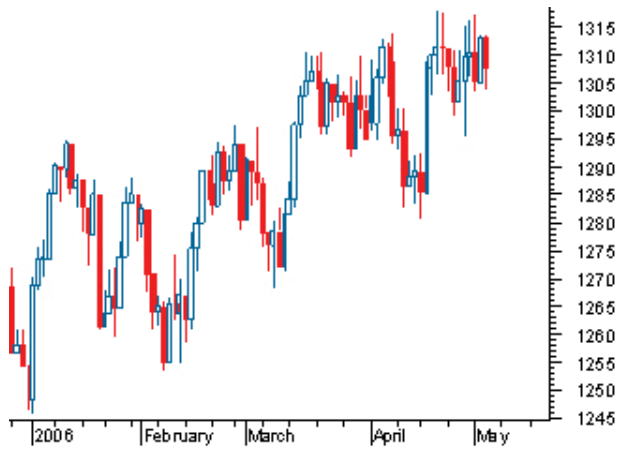
investor is to draw on graph on logarithmic paper a series of vertical lines, each line representing the price movements for a time period – a day, a week, or even a year The vertical dimensions of the line represent price; the horizontal dimension indicates the time involved by the chart as a whole. In a daily chart, for example, each vertical line represents the range of each day's price activity, and the chart as a whole may extend for a month. For this, extend the line on the graph paper from the highest transaction of each day drawn to the lowest and make a cross mark to indicate the closing price.

Figure 6.4: A Bar Chart



3. ***Candlestick Charts:*** The Candlestick chart is similar to a bar chart, but it differs in the way that it is visually constructed. Similar to the bar chart, the candlestick also has a thin vertical line showing the period's trading range. The difference comes in the formation of a wide bar on the vertical line, which illustrates the difference between the open and close. And, like bar charts, candlesticks also rely heavily on the use of colours to explain what has happened during the trading period. A major problem with the candlestick colour configuration, however, is that different sites use different standards; therefore, it is important to understand the candlestick configuration used at the chart site you are working with. There are two colour constructs for days up and one for days that the price falls. When the price of the stock is up and closes above the opening trade, the candlestick will usually be white or clear. If the stock has traded down for the period, then the candlestick will usually be red or black, depending on the site. If the stock's price has closed above the previous day's close but below the day's open, the candlestick will be black or filled with the colour that is used to indicate an up day.

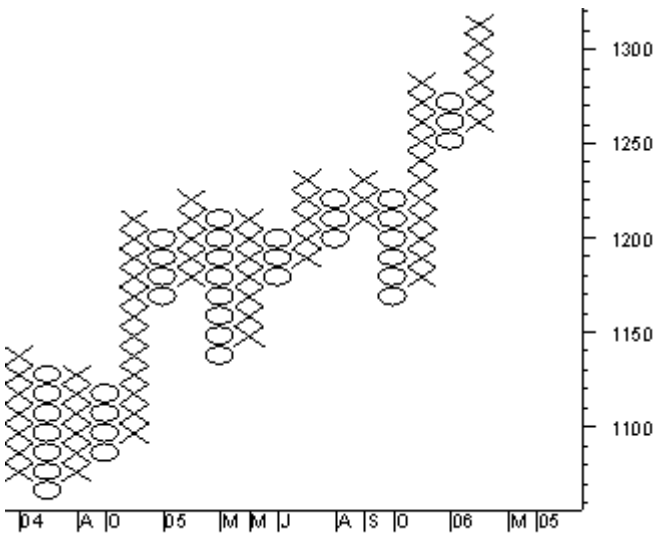
Figure 6.5: A Candlestick Chart



Notes

4. ***Point - and - Figure Chart:*** Bar chartists count on discovering certain buying and selling forces in the market, on the basis of which they predict future price trends. These forces consist of three factors – time, volume and price. Members of another school, known as the point-and-figure chartists, question the usefulness of the first two factors. They argue that the way to predict future price fluctuations is to analyze price changes only. Consequently, they assert, no volume action need be recorded, and the time dimension (day, week, or month) should also be ignored. If only significant price changes are important, then one need only capture the significant (say, one point or more, ignoring all fractions) price changes in a stock, no matter how long it takes for the stock to register this change.

Figure 6.6: A Point and Figure Chart



Charts are one of the most fundamental aspects of technical analysis. It is important that you clearly understand what is being shown on a chart and the information that it provides. Now that we have an idea of how charts are constructed, we can move on to the different types of chart patterns.

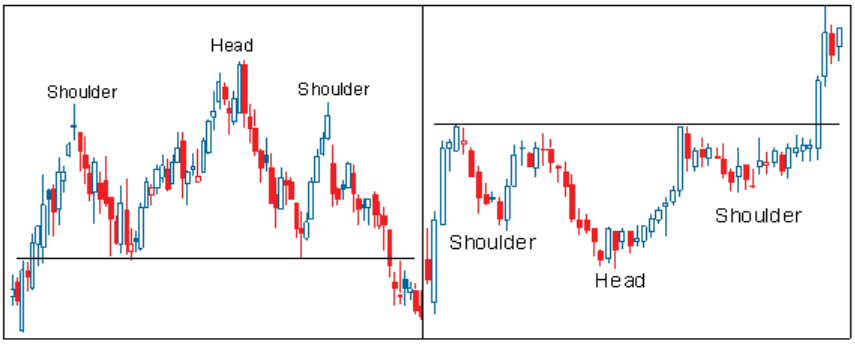
6.8.2 Chart Patterns

A chart pattern is a distinct formation on a stock chart that creates a trading signal, or a sign of future price movements. Chartists use these patterns to identify current trends and trend reversals and to trigger buy and sell signals.

1. ***Head and Shoulders:*** This is one of the most popular and reliable chart patterns in technical analysis. Head and shoulders are a reversal chart pattern that when formed, signals that the security is likely to move against the previous trend. As you can see in Figure 6.7, there are two versions of the head and shoulders chart pattern. Head and shoulders top (shown on the left) is a chart pattern that is formed at the high of an upward movement and signals that the upward trend is about to end. Head and shoulders bottom, also known as inverse head and shoulders. Head and shoulders top is shown on the left. Head and shoulders bottom, or inverse head and shoulders, are on the right.

Notes

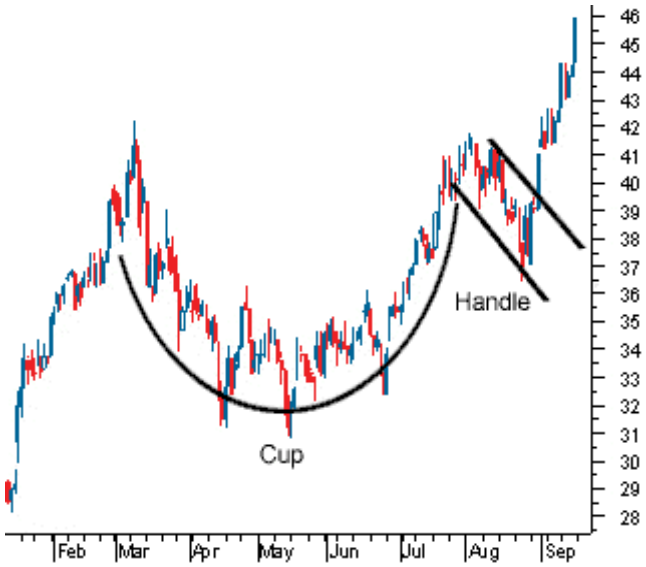
Figure 6.7



2. ***Cup and Handle:*** A cup and handle chart is a bullish continuation pattern in which the upward trend has paused but will continue in an upward direction once the pattern is confirmed.

As you can see from the below, this price pattern forms what looks like a cup, which is preceded by an upward trend. The handle follows the cup formation and is formed by a generally downward/sideways movement in the security's price. Once the price movement pushes above the resistance lines formed in the handle, the upward trend can continue. There is a wide-ranging time frame for this type of pattern, with the span ranging from several months to more than a year.

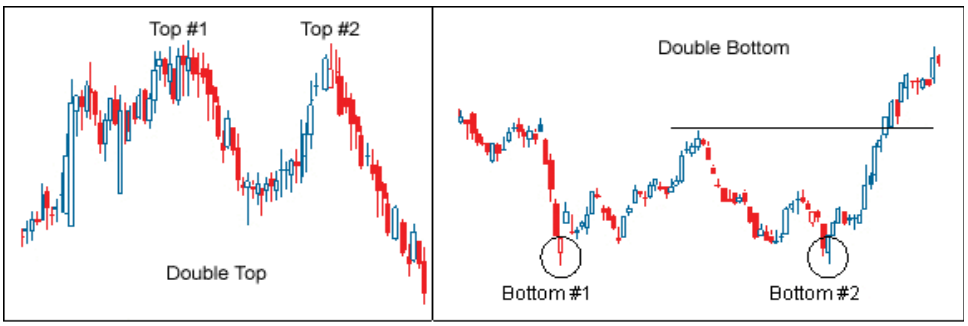
Figure 6.8



3. ***Double Tops and Bottoms:*** This chart pattern is another well-known pattern that signals a trend reversal - it is considered to be one of the most reliable and is commonly used. These patterns are formed after a sustained trend and signal to chartists that the trend is about to reverse. The pattern is created when a price movement tests support or resistance levels twice and is unable to break through. This pattern is often used to signal intermediate and long-term trend reversals.

Notes

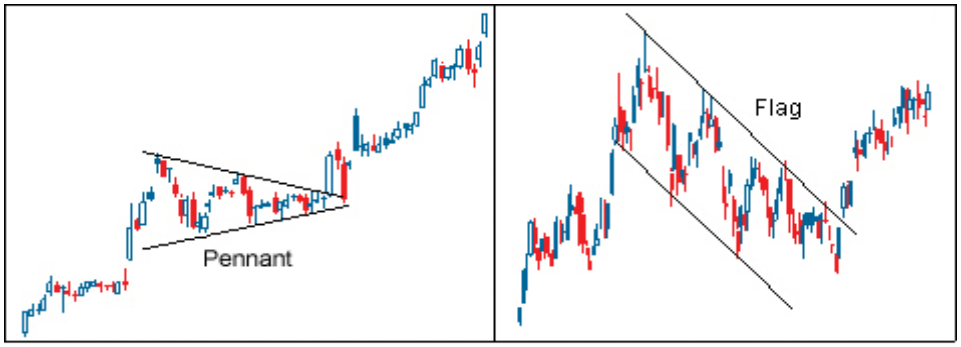
Figure 6.9



A double top pattern is shown on the left, while a double bottom pattern is shown on the right.

4. ***Flag and Pennant:*** These two short-term chart patterns are continuation patterns that are formed when there is a sharp price movement followed by a generally sideways price movement. This pattern is then completed upon another sharp price movement in the same direction as the move that started the trend. The patterns are generally thought to last from one to three weeks.

Figure 6.10

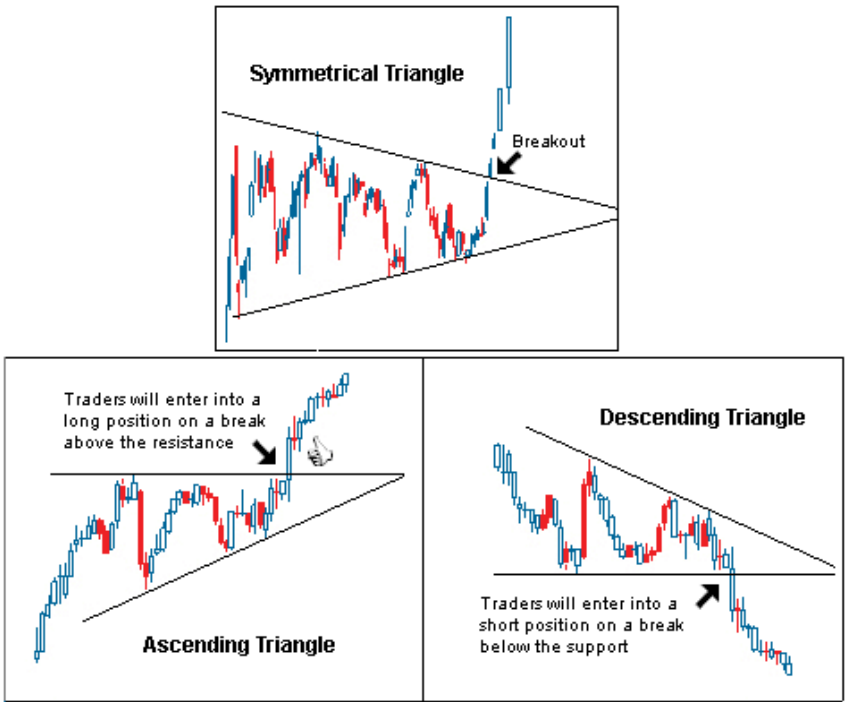


As you can see in the above figure, there is little difference between a pennant and a flag. The main difference between these price movements can be seen in the middle section of the chart pattern. In a pennant, the middle section is characterized by converging trendlines, much like what is seen in a symmetrical triangle. The middle section on the flag pattern, on the other hand, shows a channel pattern, with no convergence between the trendlines. In both cases, the trend is expected to continue when the price moves above the upper trendline.

5. ***Triangles:*** Triangles are some of the most well-known chart patterns used in technical analysis. The three types of triangles, which vary in construct and implication, are the symmetrical triangle, ascending and descending triangle. These chart patterns are considered to last anywhere from a couple of weeks to several months.

Notes

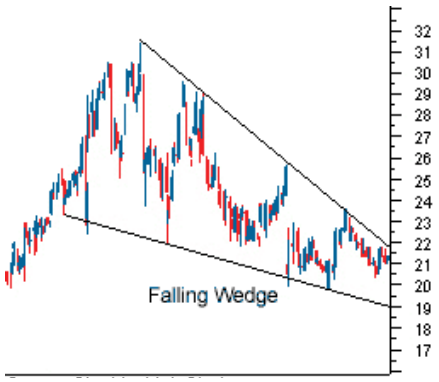
Figure 6.11



The symmetrical triangle is a pattern in which two trendlines converge toward each other. This pattern is neutral in that a breakout to the upside or downside is a confirmation of a trend in that direction. In an ascending triangle, the upper trendline is flat, while the bottom trendline is upward sloping. This is generally thought of as a bullish pattern in which chartists look for an upside breakout. In a descending triangle, the lower trendline is flat and the upper trendline is descending. This is generally seen as a bearish pattern where chartists look for a downside breakout.

6. *Wedge:* The wedge chart pattern can be either a continuation or reversal pattern. It is similar to a symmetrical triangle except that the wedge pattern slants in an upward or downward direction, while the symmetrical triangle generally shows a sideways movement. The other difference is that wedges tend to form over longer periods, usually between three and six months.

Figure 6.12



Notes

7. ***Rounding Bottom:*** A rounding bottom, also referred to as a saucer bottom, is a long-term reversal pattern that signals a shift from a downward trend to an upward trend. This pattern is traditionally thought to last anywhere from several months to several years.

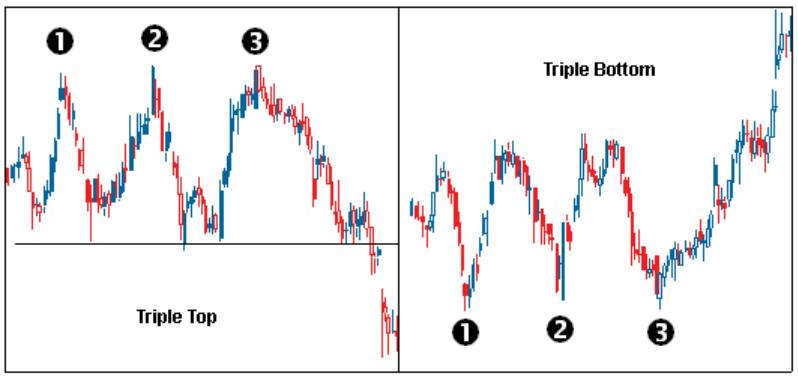
Figure 6.13

A rounding bottom chart pattern looks similar to a cup and handle pattern but without the handle. The long-term nature of this pattern and the lack of a confirmation trigger, such as the handle in the cup and handle, make it a difficult pattern to trade.

8. ***Gaps:*** A gap in a chart is an empty space between a trading period and the following trading period. This occurs when there is a large difference in prices between two sequential trading periods.

9. ***Triple Tops and Bottoms:*** Triple tops and triple bottoms are another type of reversal chart pattern in chart analysis. These are not as prevalent in charts as head and shoulders and double tops and bottoms, but they act in a similar fashion. These two chart patterns are formed when the price movement tests a level of support or resistance three times and is unable to break through; this signals a reversal of the prior trend.

Figure 6.14



Confusion can form with triple tops and bottoms during the formation of the pattern because they can look similar to other chart patterns. After the first two support/resistance tests are formed in the price movement, the pattern will look like a double top or bottom, which could lead a chartist to enter a reversal position too soon.

Notes

6.8.3 Moving Averages

Most chart patterns show a lot of variation in price movement. This can make it difficult for traders to get an idea of a security's overall trend. One simple method traders use to combat this is to apply moving averages.

A moving average is the average price of a security over a set amount of time. By plotting a security's average price, the price movement is smoothed out. Once the day-to-day fluctuations are removed, traders are better able to identify the true trend and increase the probability that it will work in their favour.

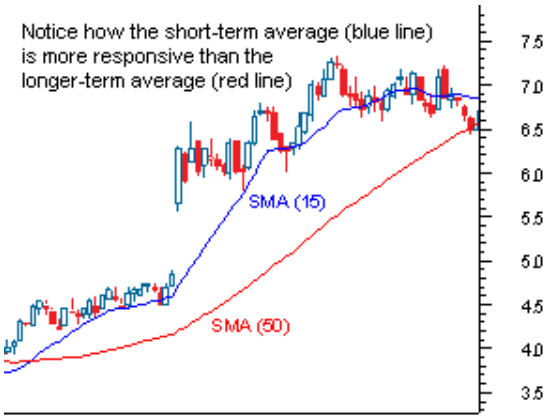
Types of Moving Averages

Moving Averages may be of following types

1. ***Simple Moving Average (SMA):*** This is the most common method used to calculate the moving average of prices. It simply takes the sum of all of the past closing prices over the time period and divides the result by the number of prices used in the calculation.

   For an instance, in a 10-day moving average, the last 10 closing prices are added together and then divided by 10. As you can see in Figure 6.15, a trader is able to make the average less responsive to changing prices by increasing the number of periods used in the calculation. Increasing the number of time periods in the calculation is one of the best ways to gauge the strength of the long-term trend and the likelihood that it will reverse.

Figure 6.15



2. ***Exponential Moving Average (EMA):*** This moving average calculation uses a smoothing factor to place a higher weight on recent data points and is regarded as much more efficient than the linear weighted average. Having an understanding of the calculation is not generally required for most traders because most charting packages do the calculation for you. The most important thing to remember about the exponential moving average is that it is more responsive to new information relative to the simple moving average. This responsiveness is one of the key factors of why this is the moving average of choice among many technical traders.

   (a) *Linear Weighted Average:* This moving average indicator is the least common out of the three and is used to address the problem of the equal weighting. The linear weighted moving average is calculated by taking the sum of all the closing prices over a certain time period and multiplying them by the position of the data point and then dividing by the sum of the number of periods.

Notes

For instance, in a five-day linear weighted average, today's closing price is multiplied by five, yesterday's by four and so on, until the first day in the period range is reached. These numbers are then added together and divided by the sum of the multipliers.

(b) *Moving Average Convergence Divergence (MACD):* The moving average convergence divergence (MACD) is one of the most well-known and used indicators in technical analysis. This indicator is comprised of two exponential moving averages, which help to measure momentum in the security. The MACD is simply the difference between these two moving averages plotted against a centreline. The centreline is the point at which the two moving averages are equal. Along with the MACD and the centreline, an exponential moving average of the MACD itself is plotted on the chart. The idea behind this momentum indicator is to measure short-term momentum compared to the longer term momentum to help signal the current direction of momentum.

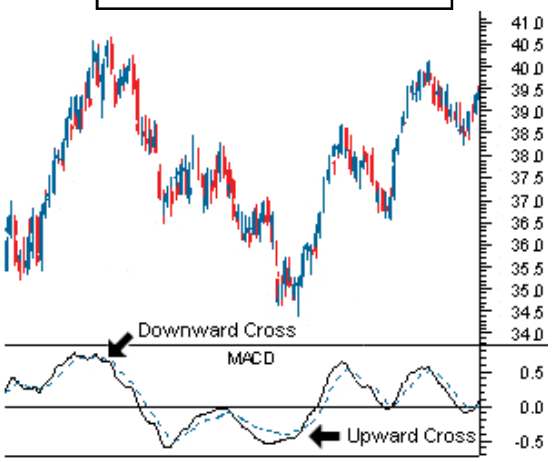
MACD = shorter-term moving average – longer-term moving average

When the MACD is positive, it signals that the shorter-term moving average is above the longer-term moving average and suggests upward momentum. The opposite holds true when the MACD is negative – this signals that the shorter-term is below the longer and suggest downward momentum. When the MACD line crosses over the centreline, it signals a crossing in the moving averages. The most common moving average values used in the calculation are the 26-day and 12-day exponential moving averages. The signal line is commonly created by using a nine-day exponential moving average of the MACD values. These values can be adjusted to meet the needs of the technician and the security. For more volatile securities, shorter-term averages are used, while less volatile securities should have longer averages.

Another aspect to the MACD indicator that is often found on charts is the MACD histogram. The histogram is plotted on the centreline and represented by bars. Each bar is the difference between the MACD and the signal line or, in most cases, the nine-day exponential moving average. The higher the bars are in either direction, the more momentum behind the direction in which the bars point.

As you can see in Figure below, one of the most common buy signals is generated when the MACD crosses above the signal line (blue dotted line), while sell signals often occur when the MACD crosses below the signal.

Figure 6.16



Notes

Did u know?

Major Uses of Moving Averages

1. Moving averages are used to identify current trends and trend reversals as well as to set up support and resistance levels.
2. Moving averages can be used to quickly identify whether a security is moving in an uptrend or a downtrend depending on the direction of the moving average.

6.8.4 Indicators and Oscillators

Indicators are calculations based on the price and the volume of a security that measure such things as money flow, trends, volatility and momentum. Indicators are used as a secondary measure to the actual price movements and add additional information to the analysis of securities. Indicators are used in two main ways: to confirm price movement and the quality of chart patterns, and to form buy and sell signals.

There are two main types of indicators: leading and lagging. A leading indicator precedes price movements, giving them a predictive quality, while a lagging indicator is a confirmation tool because it follows price movement. A leading indicator is thought to be the strongest during periods of sideways or non-trending trading ranges, while the lagging indicators are still useful during trending periods.

Aroon Oscillator

An expansion of the Aroon is the Aroon oscillator, which simply plots the difference between the Aroon up and down lines by subtracting the two lines. This line is then plotted between a range of -100 and 100. The centreline at zero in the oscillator is considered to be a major signal line determining the trend. The higher the value of the oscillator from the centreline point, the more upward strength there is in the security; the lower the oscillator's value is from the centreline, the more downward the pressure.

Relative Strength Index

The relative strength index (RSI) is another one of the most used and well-known momentum indicators in technical analysis. RSI helps to signal overbought and oversold conditions in a security. The indicator is plotted in a range between zero and 100. A reading above 70 is used to suggest that a security is overbought, while a reading below 30 is used to suggest that it is oversold. This indicator helps traders to identify whether a security's price has been unreasonably pushed to current levels and whether a reversal may be on the way.

Figure 6.17

Notes

Task What do you see as the limitation of Charts. Discuss.

6.9 Technical Indicators

Most of the technical indicators make sense when examined individually but when one examines many technical indicators simultaneously, the interpretation of their collective meaning is often contradictory and confusing. Once technical analyst issued the following report:

The breadth of the market remains pretty bearish, but the odd-lot index is still in balance and is more bullish than bearish. While the short interest is not bearish, brokers loans are at a dangerously high level. Business indices are beginning to turn sharply upward and most psychological indicators are generally uptrend. The index of 20 low-priced stocks remains in a general upward trend, but the confidence index still is in a long-term downtrend. The Canadian gold price index is still in a downtrend, which normally implies a higher stock market ahead. Professional and public opinion remains cautiously optimistic, which is also an indication of a higher stock market, but on a decline below 800, the Dow Jones Industrial averages would emit a definite sell signal.

The author of this technical report presented numerous technical indicators that collectively add up to organized confusion. Some of the major technical indicators are described in the following sections. Each indicator makes sense by itself, but interpreting all of them at the same time may yield the same type of confusion found in the passage quoted above.

1. ***The Short Interest Ratio Theory:*** The short interest ratio is derived by dividing the reported short interest or the number of shares sold short, by the average volume for about 30 days. When short sales increase relative to total volume, the indicator rises. A ratio above 150% is considered bullish, and a ratio below 100% is considered bearish.

   The logic behind this ratio is that speculators and other investor sell stocks at high price in anticipation of buying them back at lower prices. Thus, increasing short selling is viewed as a sign of general market weakness, and short covering (as evidenced by decreasing short positions) as a sign of strength. An existing large short interest is considered a sign of strength, since the cover (buying) is yet to come; whereas an established slight short interest is considered a sign of weakness (more short sales are to come).

2. ***Confidence Index:*** It is the ratio of a group of lower-grade bonds to a group of higher-grade bonds. According to the theory underlying this index, when the ratio is high, investors' confidence is likewise high, as reflected by their purchase of relatively more of the lower-grade securities. When they buy relatively more of the higher-grade securities, this is taken as an indication that confidence is low, and is reflected in a low ratio.

3. ***Spreads:*** Large spreads between yields indicate low confidence and are bearish; the market appears to require a large compensation for business, financial and inflation risks. Small spreads indicate high confidence and are bullish. In short, the larger the spreads, the lower the ratio and the less the confidence. The smaller the spreads, the greater the ratio, indicating greater confidence.

4. ***Advance - Decline ratio:*** The index-relating advance to decline is called the advance decline ratio. When advances persistently outnumber declines, the ratio increases. A bullish condition is said to exist, and vice versa. Thus, an advance decline ratio tries to capture the market's underlying strength by taking into account the number of advancing and declining issues.

Notes

5. ***Market Breadth Index:*** The market breadth index is a variant of the advance decline ratio. To compute it, we take the net difference between the number of stocks rising and the number of stocks falling, added (or subtracted) to the previous.

Example: If in a given week 600 shares advanced, 200 shares declined, and 200 were unchanged, the breadth would be 2[9600-200)/200]. The figure of each week is added to previous week's figure. These data are then plotted to establish the pattern of movement of advance and declines.

The purpose of the market breadth index is to indicate whether a confirmation of some index has occurred. If both the stock index and the market breadth index increase, the market is bullish; when the stock index increase but the breadth index does not, the market is bearish.

6. ***The Odd-Lot Ratio:*** Odd-lot transactions are measured by odd-lot changes in index. Odd-lots are stock transactions of less than, say, 100 shares. The odd-lot ratio is sometimes referred to as a yardstick of uniformed sentiment or an index of contrary opinion because the odd-lot theory assumes that small buyers or sellers are not very bright especially at tops and bottoms when they need to be the brightest. The odd-lot short ratio theory assumes that the odd-lot short sellers are even more likely to be wrong than odd-lotters in general. This indicator relates odd-lot sales to purchases.

7. ***Insider Transactions:*** The hypothesis that insider activity may be indicative of future stock prices has received some support in academic literature. Since insiders may have the best picture of how the firm is faring, some believers of technical analysis feel that these inside transactions offer a clue, to future earnings, dividend and stock price performance. If the insiders are selling heavily, it is considered a bearish indicator and vice versa. Stockholders do not like to hear that the president of a company is selling large blocks of stock of the company. Although the president's reason for selling the stock may not be related to the future growth of the company, it is still considered bearish as investors figure the president, as an insider, must know something bad about the company that they, as outsiders, do not know.

Case Study

ALERT - Citigroup Silently Moving Up behind the Headlines

Stocks of Citigroup (C) have been moving up silently behind the headlines for much of August, amidst news of how more and more banks are being shut across the nation. The number of bank failures this year now stands at 84 amid the poor economy and rising loan defaults.

So how safe, really, is Citigroup?

From a fundamentals perspective, it is interesting to note that Citigroup has been listed on the S&P 4 STAR Portfolio. In a report dated Aug 22, 2009, the analyst from S&P noted that:

"City has restructured its business into Citicorp and Citi Holdings, with Citi Holdings carrying mostly non-core and distressed assets. The plan is ultimately to unwind Citi Holdings, which should lead to a more stable revenue stream. With the government and public and private investors converting some of their preferred shares into common equity, tangible capital levels now seem adequate. Credit losses on loans held will likely

Contd...

Notes

remain elevated through most of 2010. We think that due to dilution and asset shrinkage, C probably will not regain the earnings power it once had, but we see the successful shedding of assets from Citi Holdings and solid core earnings from Citicorp pushing these shares higher."

Stock technical analysis for Citigroup shows that the stock has been moving along a tight channel since late July, and is fast approaching its Year 2009 high of $7.59. A check of the Fibonacci (upward) Retracement shows the next resistance at $5.93 at the 61.8% level, taking the near-term peak of $9 in Dec 2008 and the low of $0.97 in Mar 2009. The stock price cleared its 50% retracement level at $4.99 with ease on Aug 27, 2009 on above average volume.

Stock Technical Analysis for C (Aug 28, 2009)

Portfolio (28 Aug 2009)

Symbol	Name	Trade Date	Price Paid	Trade	Gain/Loss	
C	CITIGROUP INC	-	-	5.23		
NEWP	Newport Corporation	-	-	7.56		
ARO	AEROPOSTALE INC	26-Aug-09	40.62	39.70	↓ $0.92	↓ 2.26%
MHS	MEDCOHEALTH SOLUTNS	25-Aug-09	56.05	55.83	↓ $0.22	↓ 0.39%
AIG	AMER INTL GROUP NEW	20-Aug-09	28.72	50.23	↑ $21.51	↑ 74.90%
EPP	ISHARES MSCI EX JAP	-	-	37.30		
XHB	SPDR HOMEBUILDERS ET	7-Aug-09	15.56	15.85	↑ $0.29	↑ 1.86%
WMS	W M S INDS INC	7-Aug-09	41.08	42.62	↑ $1.54	↑ 3.75%
LINC	Lincoln Educational Services Co	11-Aug-09	23.62	22.94	↓ $0.68	↓ 2.88%
SBUX	Starbucks Corporation	3-Aug-09	17.84	19.33	↑ $1.49	↑ 8.35%
USO	U.S. OIL FUND ETF	-	-	37.66		
SMH	ML SEMICOND HLDR1240	-	-	25.69		
GS	GOLDMAN SACHS GRP	-	-	164.42		
EWS	ISHARE MSCI SINGAPOR	-	-	10.46		

Contd...

Notes

Questions

1. What do you analyse about the CitiGroup's status by going though the above technical analysis?
2. What trend do you foresee for the CITIGROUP in future?

Source: www.stocktradinghero.com

6.10 Summary

- The term technical analysis is used to mean a fairly wide range of techniques; all based on the concept that past information on prices and trading volume of stocks gives the enlightened investor a picture of what lies ahead.
- It attempts to explain and forecast changes in security prices by studying only the market data rather than information about a company or its prospects, as is done by fundamental analyst.
- Fundamentalists make their decisions on quality, value and depending on their specific investment goals, the yield or growth potential of the security.
- They are concerned with the basis, the corporation's financial strength, record of growth in sales and earnings, profitability, the investment acceptance and so on.
- They also take into account the general business and market conditions.
- Finally, they interpret these data inductively to determine the current value of the stock and then to project its future price.
- Fundamentalists are patient and seldom expect meaningful profits in less than one year.
- Some critics see technical analysis as a form of black magic.
- One should not be surprised to see them question the validity of the discipline to the point where they mock its supporters.
- In fact, technical analysis has only recently begun to enjoy some mainstream credibility.
- While most analysts on Wall Street focus on the fundamental side, just about any major brokerage now employs technical analysts as well.
- The technician must (1) identify the trend, (2) recognize when one trend comes to an end and prices set off in the opposite direction.
- His central problem is to distinguish between reversals within a trend and real changes in the trend itself.
- This problem of sorting out price changes is critical since prices do not change in a smooth, uninterrupted fashion.
- The two variables concerning groups of stocks or individual stocks are: Behaviour of prices, and Volume of trading contributing to and influenced by changing prices.
- One school of thought led by William L. Jiler developed a comprehensive technique called "Chart Reading".
- Charts provide visual assistance detecting the emerging and changing patterns and changing patterns of price behaviour.
- Technical analysts use three basic types of charts.

Notes

- These are Line Charts, Bar Charts, Point and Figure Charts.
- The trouble with most chart patterns is that they cause their followers to change their opinion very frequently.
- Most chart services change like the wind.
- One day they put out a strong buy signal, two weeks later, they see a change in the pattern and tell their clients to sell, then two weeks later, they tell them to buy again.
- The result is that these patterns force their followers in and out of the market time and time again. This might be great for brokers' commission, but not so great for the investor.
- Most of the technical indicators make sense when examined individually but when one examines many technical indicators simultaneously, the interpretation of their collective meaning is often contradictory and confusing.

6.11 Keywords

Confidence Index: It is the ratio of a group of lower-grade bonds to a group of higher-grade bonds.

Indicators: Indicators are calculations based on the price and the volume of a security that measure such things as money flow, trends, volatility and momentum.

Odd Lots: Stock transactions of less than, close to 100 shares.

Trendline: A charting technique that adds a line to a chart to represent the trend in the market or a stock.

6.12 Self Assessment

Fill in the blanks:

1. Technical analysis is a method of ..... securities by analyzing the statistics generated by market activity, such as past prices and volume.
2. The ..... of price change is as important as the relative size of the change.
3. Technical analysis assumes that, at any given time, a stock's ..... reflects everything that has or could affect the company.
4. Technically-oriented investors start by checking the ..... of the stock.
5. Technicians know that there is no real value to any stock and that ..... reflects supply and demand.
6. Fundamental analysis is based on inadequate income statements and highly subjective nature of ..... multipliers.
7. According to Dow, "The market is always considered as having ..... movements, all going at the same time."
8. ..... indicators are used to determine what the main body of stocks is doing.
9. A ..... is a simple charting technique that adds a line to a chart to represent the trend in the market or a stock.
10. If volume is starting to decrease in an uptrend, it is usually a sign that the upward run is about to .....

Notes

11. The ..... chart is similar to a bar chart.
12. ..... chartists count on discovering certain buying and selling forces in the market, on the basis of which they predict future price trends.
13. A ..... pattern is a distinct formation on a stock chart that creates a trading signal, or a sign of future price movements.
14. ..... is the ratio of a group of lower-grade bonds to a group of higher-grade bonds.
15. The wedge chart pattern can be either a ..... or ..... pattern.

6.13 Review Questions

1. Make a detailed critical evaluation of the Technical Analysis.
2. What do you think are the limitations of charts?
3. Moving averages are used to identify current trends and trend reversals as well as to set up support and resistance levels. Comment.
4. Establish the superiority of Technical Analysis over Fundamental Analysis.
5. Technicians insist that the market always repeats. Justify their statement.
6. What do you think is the reason for the technicians not being committed to buy-and-hold policy?
7. What is your opinion to the belief of critics that say, "Technical Analysis is a form of black magic"?
8. Suggest some potential applications of Chaos Theory to the stock market.
9. Analyse various tools of technical analysis.
10. Which price indicator of the market do you believe to be better and why?
11. What do you think as the advantage of moving averages to the theory of technical analysis?
12. Technical analysis has been around for more than 100 years, and it is not likely to disappear from the investment scene anytime soon. Comment.
13. How do you foresee the future of technical analysis?

Answers: Self Assessment

1. evaluating
2. direction
3. price
4. market action
5. price
6. earnings
7. three
8. Breadth-of-market
9. trendline
10. end
11. Candlestick
12. Bar
13. chart
14. Confidence Index
15. continuation, reversal

6.14 Further Readings

Notes

Books

Rosen, Lawrence R., *How to trade put and call options*, Homewood, III, Dow Jones - Irwin, Inc., 1974.

Shone, Robert, *Problem of Investment*, Oxford, Blackwell, 1971.

Vaughn, Donald E., *Survey of Investment*, New York, Dyden Press, 1974.

Wright, Leonard T., *Principles of Investments*, Columbus, Grid Inc., 1977.

Online links

Investopedia.com

www.bseindia.com

www.maneybhai.com

www.moneyconrol.com

www.nseindia .com

Notes

Unit 7: Efficient Market Theory

CONTENTS

Objectives

Introduction

7.1 Efficient Market Hypotheses

7.2 Efficient Frontier: (i) Risk-free and (ii) Risky Lending and Borrowing

7.3 Benefits of an Efficient Market (Investors Utility)

7.4 Evidence for Market Efficiency

7.5 The Efficient Frontier and Portfolio Diversification

7.6 Forms of the Efficient Market Hypothesis

7.7 Testing Market Efficiency

7.8 Are the Markets Efficient?

7.9 Summary

7.10 Keywords

7.11 Self Assessment

7.12 Review Questions

7.13 Further Readings

Objectives

After studying this unit, you will be able to:

- Discuss forms of the Efficient Market Theory
- Explain the concept of weak form and random walk, semi-strong form
- Describe strong form efficient market hypothesis
- Discuss implications of efficient market hypothesis
- Understand efficient market theory and appraisal

Introduction

An efficient capital market is one in which security prices adjust rapidly to the arrival of new information and, therefore, the current prices of securities reflect all information about the security. Some of the most interesting and important academic researches during the past 20 years have analyzed whether our capital markets are efficient or not. This extensive research is important because its results have significant real-world implications for investors and portfolio managers. In addition, the question of whether capital markets are efficient is one of the most controversial areas in investment research. Recently, a new dimension has been added to the controversy because of the rapidly expanding research in behavioural finance that likewise has major implications regarding the concept of efficient capital markets. You need to understand the meaning of the terms efficient capital markets and efficient market hypothesis (EMH) because

Notes

of its importance and controversy associated with it. You should understand the analysis performed to test the EMH and the results of studies that either support or contradict the hypothesis. Finally, you should be aware of the implications of these results when you analyze alternative investments and work to construct a portfolio.

Did u know? **Why should Capital Markets be Efficient?**

As noted earlier, in an efficient capital market, security prices adjust rapidly to the infusion of new information, and, therefore, current security prices fully reflect all available information. To be absolutely correct, this is referred to as an informationally efficient market. Although the idea of an efficient capital market is relatively straightforward, we often fail to consider why capital markets should be efficient. What set of assumptions imply an efficient capital market? An initial and important premise of an efficient market requires that a large number of profit maximizing participants analyze and value securities, each independently of the others. A second assumption is that new information regarding securities comes to the market in a random fashion, and the timing of one announcement is generally independent of others. The third assumption is especially crucial: profit-maximizing investors adjust security prices rapidly to reflect the effect of new information. Although the price adjustment may be imperfect, it is unbiased. This means that sometimes the market will over-adjust and other times it will under-adjust, but you cannot predict which will occur at any given time.

7.1 Efficient Market Hypotheses

Most of the early works related to efficient capital markets were based on the random walk hypothesis, which contended that changes in stock prices occurred randomly. This early academic work contained extensive empirical analysis without much theory behind it. An article by Fama attempted to formalize the theory and organize the growing empirical evidence. Fama presented the efficient market theory in terms of a fair game model, contending that investors can be confident that a current market price fully reflects all available information about a security and the expected return based upon this price is consistent with its risk. In his original article, Fama divided the overall efficient market hypothesis (EMH) and the empirical tests of the hypothesis into three sub-hypotheses depending on the information set involved: (1) weak-form EMH, (2) semi-strong-form EMH, and (3) strong-form EMH. In a subsequent review article, Fama again divided the empirical results into three groups but shifted empirical results between the prior categories. Therefore, the following discussion uses the original categories but organizes the presentation of results using the new categories.

The weak-form EMH assumes that current stock prices fully reflect all security market information, including the historical sequence of prices, rates of return, trading volume data, and other market-generated information, such as odd-lot transactions, block trades, and transactions by exchange specialists. Because it assumes that current market prices already reflect all past returns and any other security market information, this hypothesis implies that past rates of return and other historical market data should have no relationship with future rates of return (that is, rates of return should be independent). Therefore, this hypothesis contends that you should gain little from using any trading rule that decides whether to buy or sell a security based on past rates of return or any other past market data.

The semi strong-form EMH asserts that security prices adjust rapidly to the release of all public information; that is, current security prices fully reflect all public information. The semi-strong hypothesis encompasses the weak-form hypothesis, because all the market information considered by the weak-form hypothesis, such as stock prices, rates of return, and trading

Notes

volume, is public information. Public information also includes all non-market information, such as earnings and dividend announcements, price-to-earnings (P/E) ratios, dividend-yield (D/P) ratios, price book value (P/BV) ratios, stock splits, news about the economy, and political news. This hypothesis implies that investors who base their decisions on any important new information after it is public should not derive above-average risk-adjusted profits from their transactions, considering the cost of trading because the security price already reflects all such new public information.

The strong-form EMH contends that stock prices fully reflect all information from public and private sources. This means that no group of investors has monopolistic access to information relevant to the formation of prices. Therefore, this hypothesis contends that no group of investors should be able to consistently derive above-average risk-adjusted rates of return. The strong form EMH encompasses both the weak form and the semi-strong form EMH. Further, the strong form EMH extends the assumption of efficient markets, in which prices adjust rapidly to the release of new public information, to assume perfect markets, in which all information is cost-free and available to everyone at the same time. This unit contains five major sections. The first discusses why we would expect capital markets to be efficient and the factors that contribute to an efficient market where the prices of securities reflect available information. The efficient market hypothesis has been divided into three sub-hypotheses to facilitate testing. The second section describes these three sub-hypotheses and the implications of each of them. The third section is the largest section because it contains a discussion of the results of numerous studies. This review of the research reveals that a large body of evidence supports the EMH, but a growing number of other studies do not support the hypotheses. In the fourth section, we discuss the concept of behavioural finance, the studies that have been done in this area related to efficient markets, and the conclusions as they relate to the EMH. The final section discusses what these results imply for an investor who uses either technical analysis or fundamental analysis or what they mean for a portfolio manager who has access to superior or inferior analysts. We conclude with a brief discussion of the evidence for markets in foreign countries.

7.2 Efficient Frontier: (i) Risk-free and (ii) Risky Lending and Borrowing

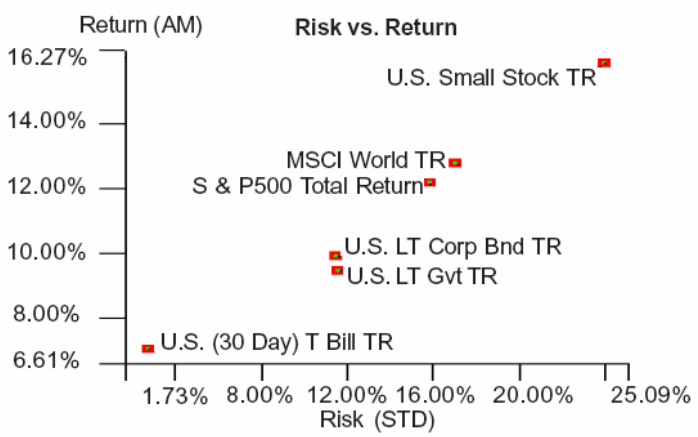
We saw how the risk and return of investments may be characterized by measures of central tendency and measures of variation, i.e. mean and standard deviation. In fact, statistics are the foundations of modern finance, and virtually all the financial innovations of the past thirty years, broadly termed "Modern Portfolio Theory," have been based upon statistical models. Because of this, it is useful to review what a statistic is, and how it relates to the investment problem. In general, a statistic is a function that reduces a large amount of information to a small amount. For instance, the average is a single number that summarizes the typical "location" of a set of numbers. Statistics boil down a lot of information to a few useful numbers and as such, they ignore a great deal. Before the advent of the modern portfolio theory, the decision about whether to include a security in a portfolio was based principally upon fundamental analysis of the firm, its financial statements and its dividend policy. Finance professor Harry Markowitz began a revolution by suggesting that the value of a security to an investor might best be evaluated by its mean, its standard deviation, and its correlation to other securities in the portfolio. This audacious suggestion amounted to ignoring a lot of information about the firm, its earnings, its dividend policy, its capital structure, its market, its competitors and calculating a few simple statistics. In this unit, we will follow Markowitz's lead and see where the technology of modern portfolio theory takes us.

1. ***The Risk and Return of Securities:*** Markowitz's great insight was that the relevant information about securities could be summarized by three measures: the mean return (taken as the arithmetic mean), the standard deviation of the returns and the correlation

Notes

with other assets' returns. The mean and the standard deviation can be used to plot the relative risk and return of any selection of securities. Consider six asset classes:

Figure 7.1: Risk vs Return

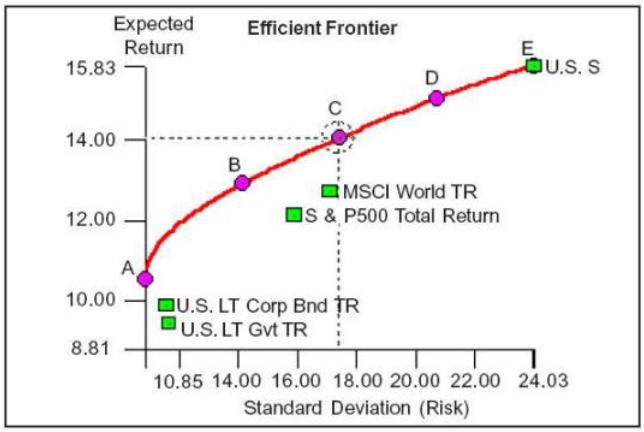


This figure was constructed using historical risk and return data on Small Stocks, S&P stocks, corporate and government bonds, and an international stock index called MSCI, or Morgan Stanley Capital International World Portfolio. The figure shows the difficulty an investor faces about which asset to choose. The axes plot annual standard deviation of total returns, and average annual returns over the period 1970 through 3/1995. Notice that small stocks provide the highest return, but with the highest risk. In which asset class would you choose to invest your money? Is there any single asset class that dominates the rest? Notice that an investor who prefers a low risk strategy would choose T-Bills, while an investor who does not care about risk would choose small stocks. There is no one security that is best for all investors.

Markowitz and the First Efficient Frontier

The first efficient frontier was created by Harry Markowitz, using a handful of stocks from the New York Stock Exchange. Here it is, reproduced from his book Portfolio Selection Cowles Monograph 16, Yale University Press, 1959. It has a line going to the origin, because Markowitz was interested in the effects of combining risky assets with a riskless asset: cash.

Figure 7.2: Efficient Frontier



Notes

An Actual Efficient Frontier Today

This figure is an efficient frontier created from historical inputs for U.S. and international assets over the period 1970 through 3/1995, using the Ibbotson EnCorr Optimizer program.

This is state-of-the-art portfolio selection technology. However, it is still based upon Markowitz's original optimization program. There are some basic features to remember:

(a) A minimum variance portfolio exists

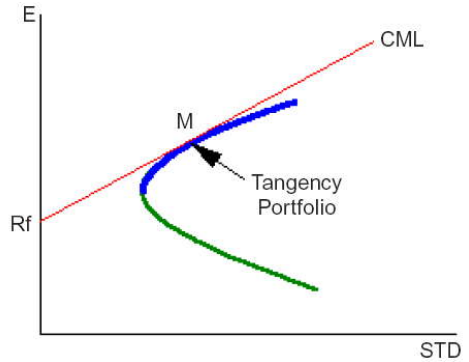
(b) A maximum return portfolio is composed of a single asset.

(c) B, C, D & E are critical points at which the set of assets used in the frontier changes, i.e., an asset drops out or comes in at these points.

(d) There are no assets to the northwest of the frontier. That is why we call it a frontier. It is the edge of the feasible combinations of risk and returns.

2. ***The Efficient Frontier with the Riskless Asset:*** T-Bills are often taken to be riskless assets, and their return is indicated as Rf, the risk-free rate. Once you allow the riskless asset to be combined into a portfolio, the efficient frontier can change. Since it is riskless, it has no correlation to other securities. Thus it provides no diversification, per se. It does provide an opportunity to have a low-risk portfolio, however. This picture is a diagram of the efficient frontier composed of all the risky assets in the economy, as well as the riskless asset.

Figure 7.3: Efficient Frontier



In this special case, the new efficient frontier is a ray, extending from Rf to the point of tangency (M) with the "risky-asset" efficient frontier, and then beyond. This line is called the Capital Market Line (CML). It is actually a set of investable portfolios, if you were able to borrow and lend at the riskless rate. All portfolios between Rf and M are portfolios composed of treasury bills and M, while all portfolios to the right of M are generated by borrowing at the riskless rate Rf and investing the proceeds into M.

The Markowitz model was a brilliant innovation in the science of portfolio selection. With almost a disarming slight-of-hand, Markowitz showed us that all the information needed to choose the best portfolio for any given level of risk is contained in three simple statistics: mean, standard deviation and correlation. It suddenly appeared that you didn't even need any fundamental information about the firm. The model requires no information about dividend policy, earnings, market share, strategy, quality of management – nothing about the myriad of things with which Wall Street analysts concern themselves! In short, Harry Markowitz fundamentally altered how investment decisions were made. Virtually every major portfolio manager today consults an optimization programme. They may

Notes

not follow its recommendations exactly, but they use it to evaluate basic risk and return trade-offs.

Why doesn't everyone use the Markowitz model to solve his or her investment problems? The answer again lies in the statistics. The historical mean return may be a poor estimate of the future mean return. As you increase the number of securities, you increase the number of correlations you must estimate – and you must estimate them correctly to obtain the right answer. In fact, with more than 1,500 stocks on the NYSE, one is certain to find correlations that are widely inaccurate. Unfortunately, the model does not deal well with incorrect inputs. That is why it is best applied to allocation decisions across asset classes, for which the number of correlations is low, and the summary statistics are well estimated.

7.3 Benefits of an Efficient Market (Investors Utility)

So far, arbitrageurs sound like vultures waiting to swoop in for the kill. They take risks to exploit new information at the expense of the less informed. The costs seem to be rewarding opportunism at the expense of other investors. Are there any benefits to having a market operate efficiently? Arguments in favour of efficient capital markets are: (1) The market price will not stray too far from the true economic price if you allow arbitrageurs to exploit deviations. This will avoid sudden, nasty crashes in the future. (2) An efficient market increases liquidity, because people believe the price incorporates all public information, and thus they are less concerned about paying way too much. If only the market for television sets were as efficient as the market for stocks! A lot less comparison-shopping would be needed. (3) Arbitrageurs provide liquidity to investors who need to sell or buy securities for purposes other than "betting" on changes in expected returns.

Example: Currently, China is seeking to limit access to global financial information in Shanghai (site of its major stock exchange). The government wishes to keep certain kinds of information from market participants.

Market efficiency has implications for corporate managers as well as for investors. This takes a lot of the "gamesmanship" out of corporate management. If a market is efficient, it is difficult to fool the public for long and by very much. For instance, only genuine 'news' can move the stock price. It is hard to pump-up the stock price by claims that are not verifiable by investors. 'Fake' news will not move the price at all. Even if it does so, the price will quickly revert to the pre-announcement value when the news proves hollow. Publicly available information is probably impounded in the price already. This is hard for some managers to believe. An example is Sears' attempt to sell the Sears Tower in Chicago in the late 1980s. The company believed that, since it carried the property on its balance sheet at greatly depreciated values, the public did not credit the company with the full market price of the building and thus Sears' stock was underpriced. This proved to be false – in fact, it seems that Sears was overestimating the value of the building and the stock price was relatively efficient! Another lesson: accounting tricks don't fool anybody. Don't worry about timing accounting charges and don't worry about whether information is revealed in the footnotes or in the statements. An efficient market will quickly figure out the meaning of the information, once it is made public.

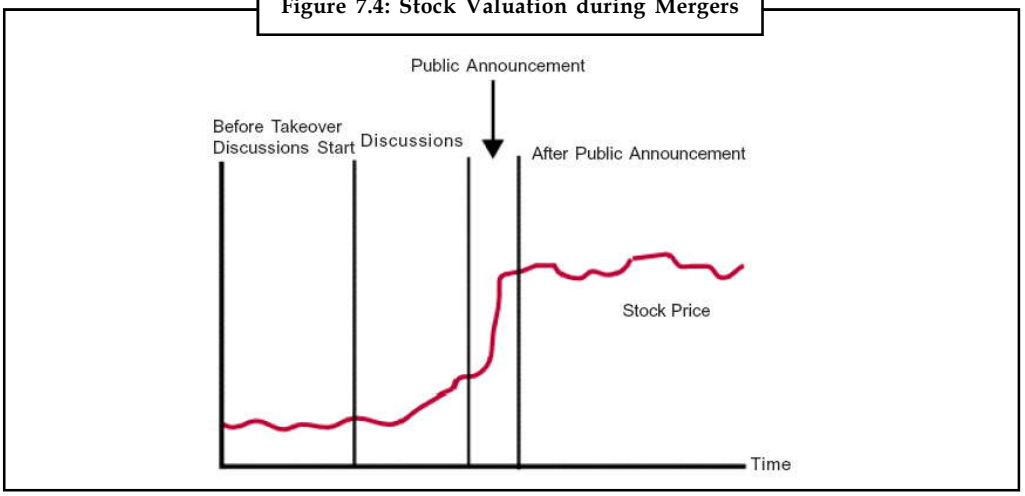
7.4 Evidence for Market Efficiency

A simple test for Strong Form Efficiency is based upon price changes close to an event. Acts of nature may move prices, but if private information release does not, then we know that the information is already in the stock price.

Notes

Example: Consider a merger between two firms. Normally, a merger or an acquisition is known about by an 'inner circle' of lawyers, investment bankers and firm managers before the public release of the information. When these insiders violate the law by trading on this private information, they may make money. They also make it to the SEC's wall of shame.

Figure 7.4: Stock Valuation during Mergers



Unfortunately, stock prices typically move up before a merger, indicating that someone is acting dishonestly. The early move indicates that the market has a tendency towards strong-form efficiency, i.e. even private information is incorporated into prices. However, the public announcement of a merger is typically met with a large price response, suggesting that the market is not strong-form efficient. Leakage, even if illegal, does occur, but it is not fully impounded in stock price. By the way, until recently, insider trading was legal in Switzerland.

Is the Stock Market Semi-strong form Efficient?

The most obvious indication that the market is not always and everywhere semi-strong form efficient is that money managers frequently use public information to take positions in stocks. While there is no evidence that they beat the market on a risk-adjusted basis, it is hard to believe that an entire industry of information production and analysis is for naught. It seems likely that there is value to publicly available information. However, there are probably degrees to which information really is public knowledge. What is surprising is that recent studies have shown some evidence that excess returns can be made by trading upon very public information. These tests usually take the form of 'back-testing' trading strategies. That is, you play a "what-if" game with past stock prices, and pretend you followed some rule, using information available only at the time of the pretend trade. One common rule that seems to perform well historically is to buy stocks when the dividend yield is high. This apparently has made money in the past, even though the information about which stocks have high yields and which have low yields is widely available. Another rule that generates positive excess returns in back-tests is to buy stocks when the earnings announcement is higher than expected. This seems simple, since current announcements and even forecasts are widely available as well.

Does this mean that it is easy to become rich on Wall Street? Hardly! The profitability of these simple trading rules depends upon the liquidity of the stocks involved, and trading costs ('frictions'). Sometimes the costs outweigh the benefits. While many investment managers explain that they pursue a strategy of buying 'value' stocks (such as low P/E firms) few of these managers have consistently superior track records.

The assumption of semi-strong form efficiency is a good first approximation for a market with as many sharp traders and with as much publicly available information as the US equity market.

Is the Stock Market weak form Efficient?

Weak form efficiency should be the simplest type of efficiency to prove, and for a time it was widely accepted that the US stock market was at least weak form efficient. Recall that weak form efficiency only requires that you cannot make money using past price history of a stock (or index) to make excess profits. Recall the intuition that, if people know the price will rise tomorrow, then they will bid the price up today in order to capture the profit. Researchers have been testing weak form efficiency using daily information since the 1950s and typically they have found some daily price patterns, e.g. momentum. However, it appears difficult to exploit these short-term patterns to make money. Interestingly, as you increase the horizon of the return, there seems to be evidence of profits through trading. Buying stocks that went down over the last two weeks and shorting those that went up appears to have been profitable. When you really increase the horizons, stock returns look even more predictable. Eugene Fama and Ken French for instance, found some evidence that 4-year returns tend to revert towards the mean. Unfortunately, this is a difficult rule to trade on with any confidence, since the cycles are so long. In fact, they are as long as the patterns conjectured by Charles Henry Dow some 100 years ago! Does this all lend credence to the chartists, who look for cryptic patterns in security prices? Perhaps. But in all likelihood there is no easy money in charting, either. Prices for widely traded securities are pretty close to a random walk, and if they were not, then they would quickly become so, as arbitrageurs moved in to buy the stock when it is underpriced and short it when it is overpriced. But who knows? Maybe a retired rocket scientist playing around with fractal geometry and artificial intelligence will hit upon something – of course if he or she did, it wouldn't become common knowledge, at least for a while.

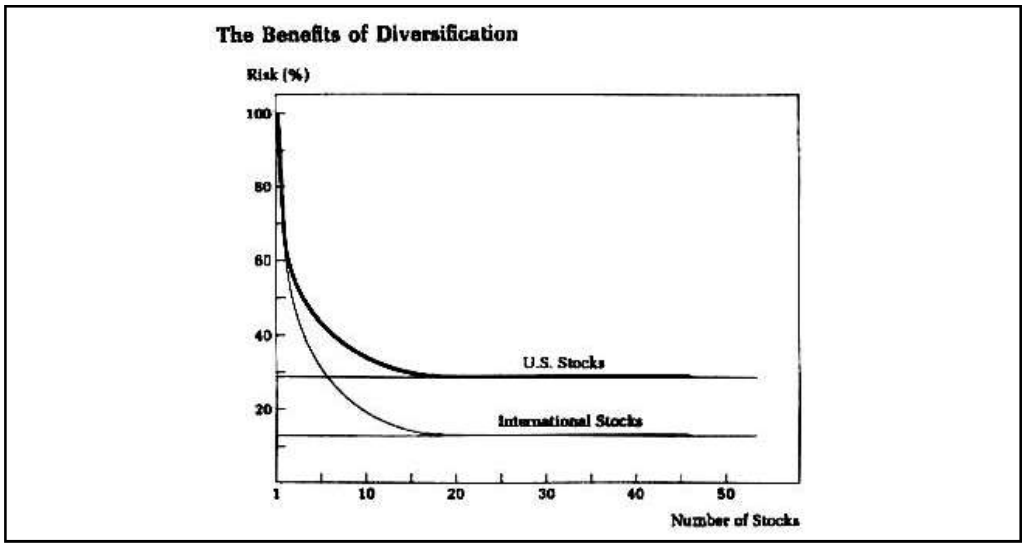
Notes The efficient market theory is a good first approximation for characterizing how prices in a liquid and free market react to the disclosure of information. In a word, 'quickly!' If they did not, then the market is lacking in the opportunism we have come to expect from an economy with arbitrageurs constantly collecting, processing and trading upon information about individual firms. The fact that information is impounded quickly in stock prices and that windows of investment opportunity are fleeting is one of the best arguments for keeping the markets free of excessive trading costs, and for removing the penalties for honest speculation. Speculators keep market prices close to economic values, and this is good, not bad.

Example: One of the most dangerous investment chestnuts is the idea that you can successfully diversify your portfolio with a relatively small number of stocks, the magic number usually being about 15. For example, Ben Graham, in ***The Intelligent Investor***, suggests that adequate diversification can be obtained with 10 to 30 names. In a classic piece in ***Journal of Finance*** in 1968, Evans and Archer found that portfolios with as few as 10 securities had risk, measured as standard deviation, virtually identical to that of the market. Over the decades, the "15-stock diversification solution" has become enshrined in various texts and monographs, most famously in ***A Random Walk Down Wall Street***:

By the time the portfolio contains close to 20 equal-sized and well-diversified issues, the total risk (standard deviation of returns) of the portfolio is reduced by 70 percent. Further increase in the number of holdings does not produce any significant further risk reduction.

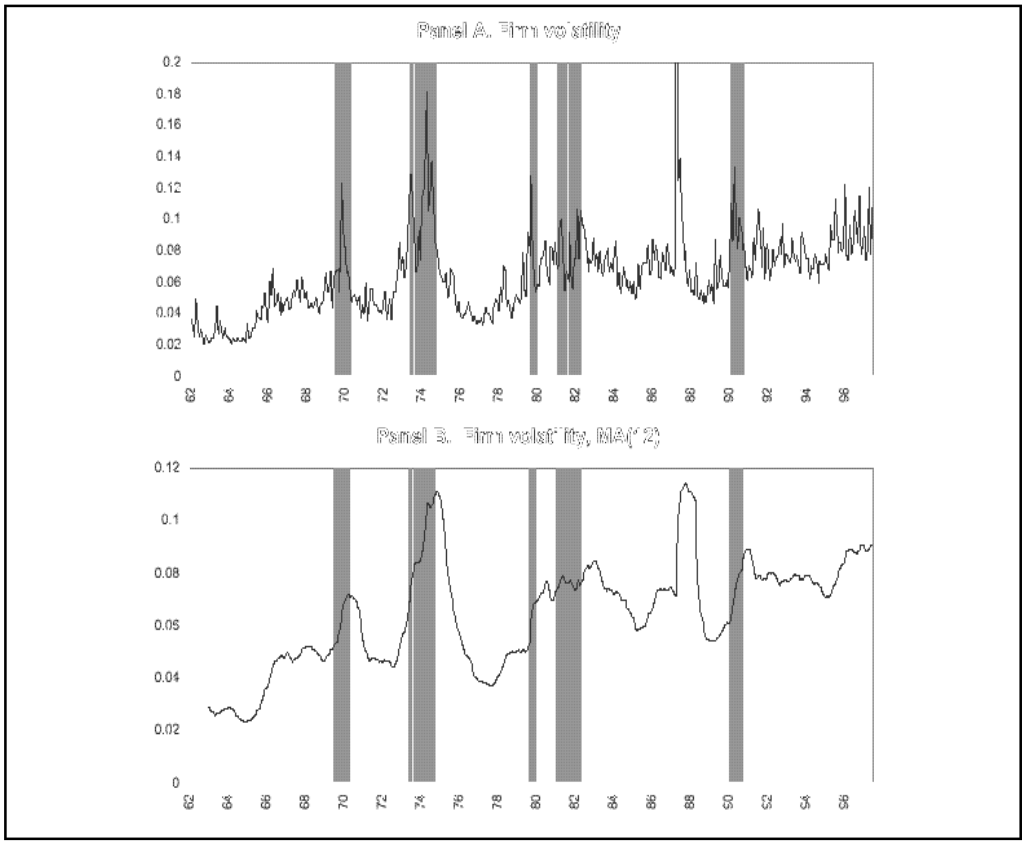
Notes

To emphasize the point, Mr. Malkiel collated data from a paper by Bruno Solnik, and combined the reduction in risk of both domestic and international portfolios into one nifty graph:



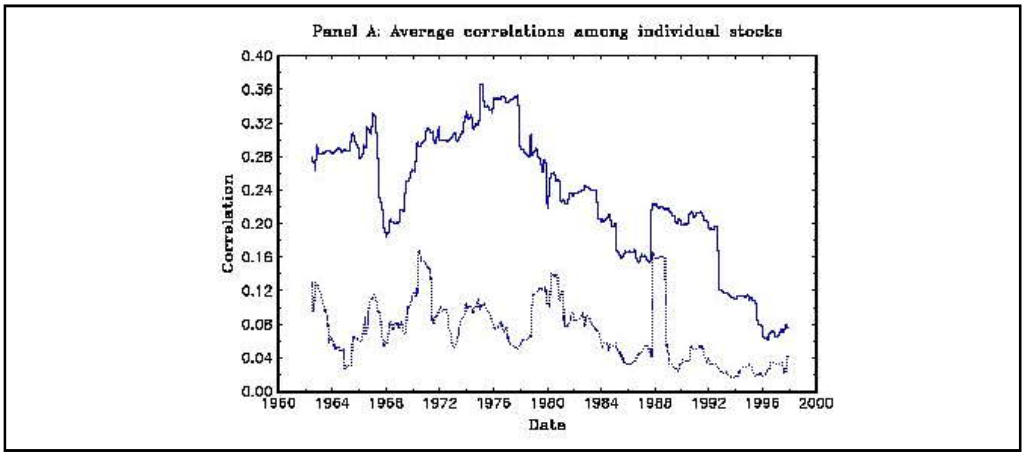
In a paper recently accepted for publication in ***Journal of Finance*** Mr. Malkiel et. al. extend and update the state of our knowledge regarding portfolio diversification and market volatility. It's a wonderful piece, well-written and quite understandable, and comes to four fascinating conclusions:

1. The volatility of individual stocks has risen over the past few decades (the upper plot represents monthly returns, the lower plot annualized monthly returns):

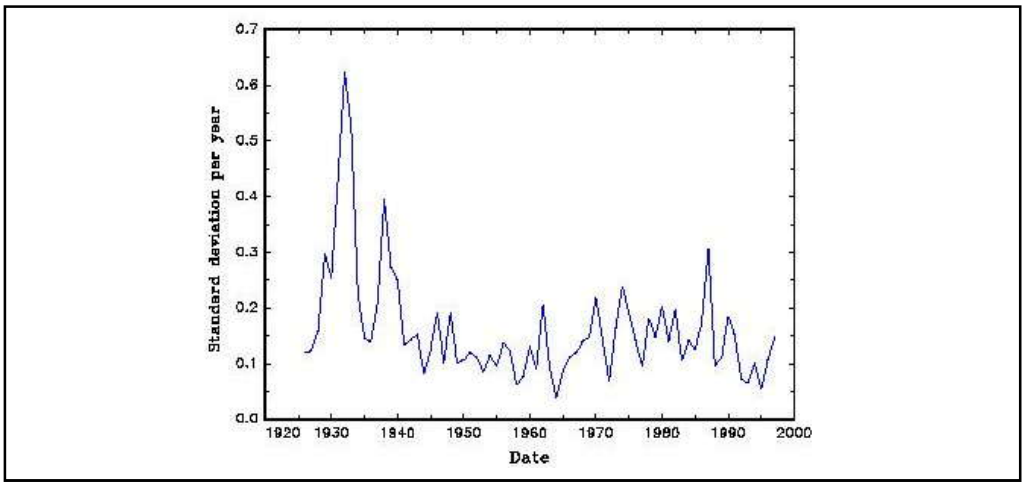


Notes

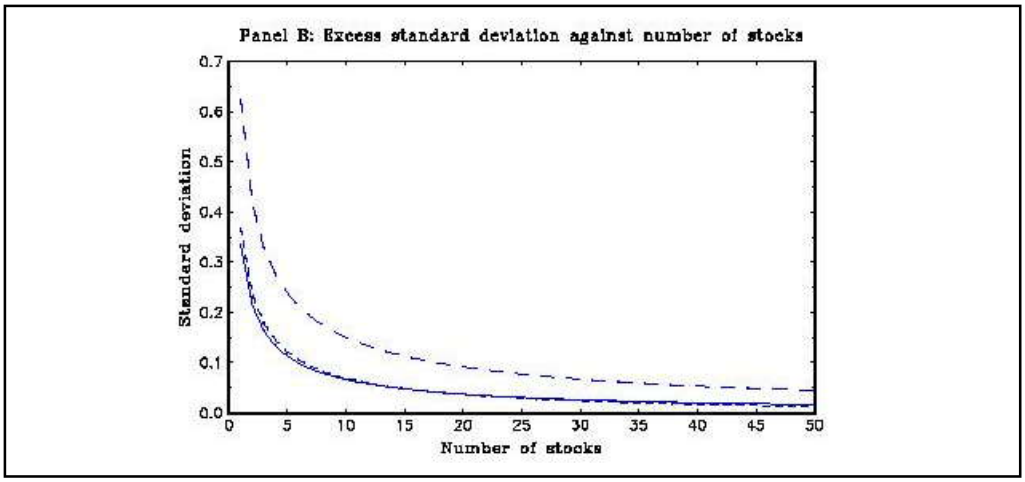
2. The correlation among stock returns is falling (the solid upper line represents monthly data, the lower line daily data):



3. The effects of #1 and #2 cancel each other out. Consequently, the overall volatility of the market has not changed:



4. However, also because of #1 and #2 the number of stocks necessary to eliminate nonsystematic risk is rising (the upper curve represents the more recent period):

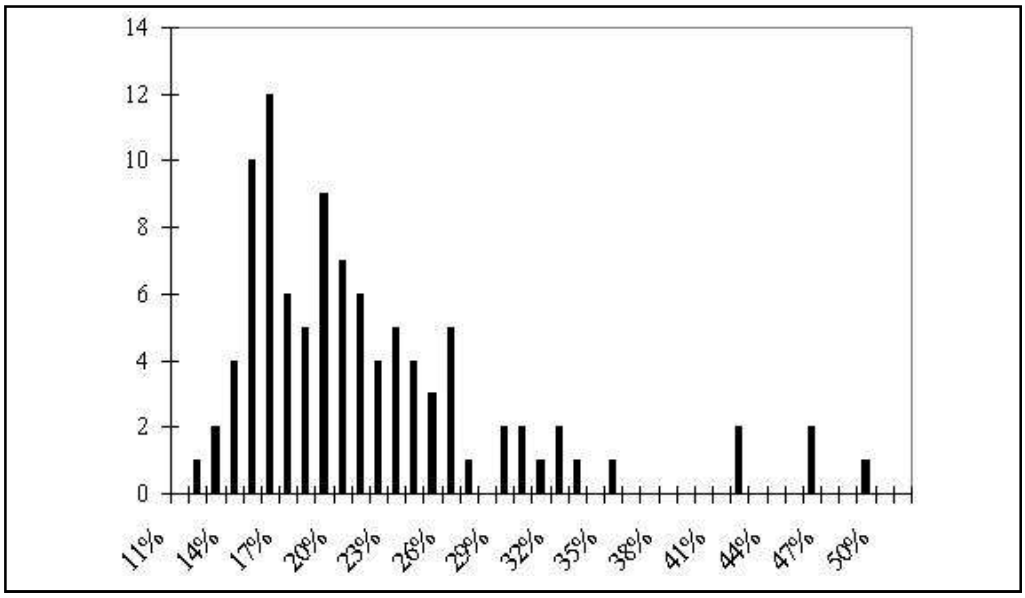


Notes

This is all profound and important stuff. And, unfortunately, highly misleading. To be blunt, if you think that you can do an adequate job of minimizing portfolio risk with 15 or 30 stocks, then you are imperiling your financial future and the future of those who depend on you. The reason is simple: There are critically important dimensions of portfolio risk beyond standard deviation. The most important is so-called Terminal Wealth Dispersion (TWD). In other words, it is quite possible (in fact, as we shall soon see, quite easy) to put together a 15-stock or 30-stock portfolio with a very low SD, but whose lousy returns will put you in the poorhouse.

This issue has not been much investigated or discussed. One of the pioneers in this area is Edward O'Neal of Auburn, who in a piece in ***Financial Analysts Journal*** a few years back looked at TWD as a function of the number of mutual funds. His data show that the risk of TWD falls off as 1/sqrt(n); in other words, a portfolio of four mutual funds is half as risky as one. However, I'm not aware of any definitive studies of TWD as a function of the number of stocks.

In order to investigate this problem, I looked at the stocks constituting the S&P 500 as of 11/30/99, and formed 98 random equally-weighted 15-stock portfolios for the 12/89-11/99 10-year holding period. Below is a histogram of the annualized portfolio returns:



The "market return" (all 500 stocks held in equal proportion) was 24.15%. This is considerably higher than the 18.94% return of the actual S&P for two reasons: First, the S&P is a cap-weighted, not an equal-weighted, portfolio. Second, and much more important, many of the stocks in the S&P on 11/30/99 were not in the index at the beginning of the period. The recently-added stocks obviously had much higher returns than the companies they replaced, upwardly biasing the entire series of returns. Nonetheless, these flaws in the methodology do not change the basic conclusion; the TWD of these 15-stock portfolios is staggering—three-quarters of them failed to beat "the market." (Had the study been done with the S&P stocks extant on 12/1/99, it seems certain that the positive kurtoskewness of the present sample would have been replaced with a significant negative kurtoskewness—a much more important descriptor of risk. If anybody wants to give me a survivorship-bias-free S&P database for the past 10 years, my modem and mailbox are in fine working order.) Even so, the scatter of returns was quite high, with more than a few portfolios underperforming "the market" by 5%-10% per annum.

The reason is simple: a grossly disproportionate fraction of the total return came from a very few "superstocks" like Dell Computer, which increased in value over 550 times. If you didn't have one of the half-dozen or so of these in your portfolio, then you badly lagged the market.

Notes

(The odds of owing one of the 10 superstocks are approximately one in six.) Of course, by owning only 15 stocks you also increase your chances of becoming fabulously rich. But unfortunately, in investing, it is all too often true that the same things that maximize your chances of getting rich also maximize your chances of getting poor.

If the O'Neal data are generalizable to stocks, and I believe that they are, then even 100 stocks are not nearly enough to eliminate this very important source of financial risk.

So, yes, you can eliminate non systematic portfolio risk, as defined by Modern Portfolio Theory, with a relatively few stocks. It's just that nonsystematic risk is only a small part of the puzzle. Fifteen stocks is not enough. Thirty is not enough. Even 200 are not enough. *The only way to truly minimize the risks of stock ownership is by owning the whole market.*

7.5 The Efficient Frontier and Portfolio Diversification

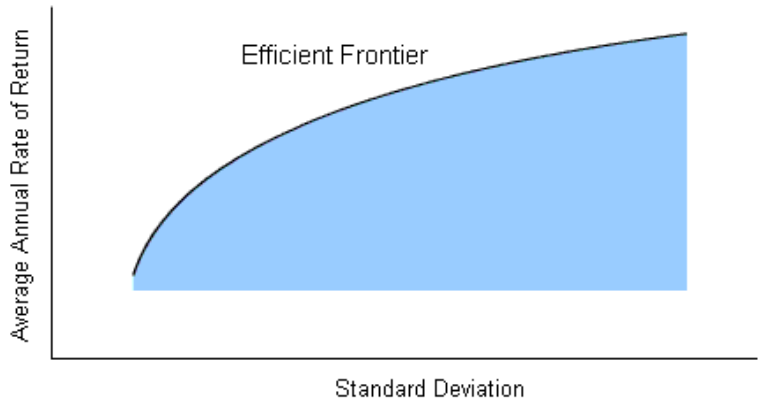
The graph shows how volatility increases your risk of loss of principal, and how this risk worsens as your time horizon shrinks. So all other things being equal, you would like to minimize volatility in your portfolio.

Of course the problem is that there is another effect that works in the opposite direction: if you limit yourself to low-risk securities, you'll be limiting yourself to investments that tend to have low rates of return. So what you really want to do is include some higher growth, higher risk securities in your portfolio, but combine them in a smart way, so that some of their fluctuations cancel each other out. (In statistical terms, you're looking for a combined standard deviation that's low, relative to the standard deviations of the individual securities.) The result should give you a high average rate of return, with less of the harmful fluctuations.

The science of risk-efficient portfolios is associated with a couple of guys (a couple of Nobel laureates, actually) named Harry Markowitz and Bill Sharpe.

Suppose you have data for a collection of securities (like the S&P 500 stocks, for example), and you graph the return rates and standard deviations for these securities, and for all portfolios you can get by allocating among them. Markowitz showed that you get a region bounded by an upward-sloping curve, which he called the efficient frontier.

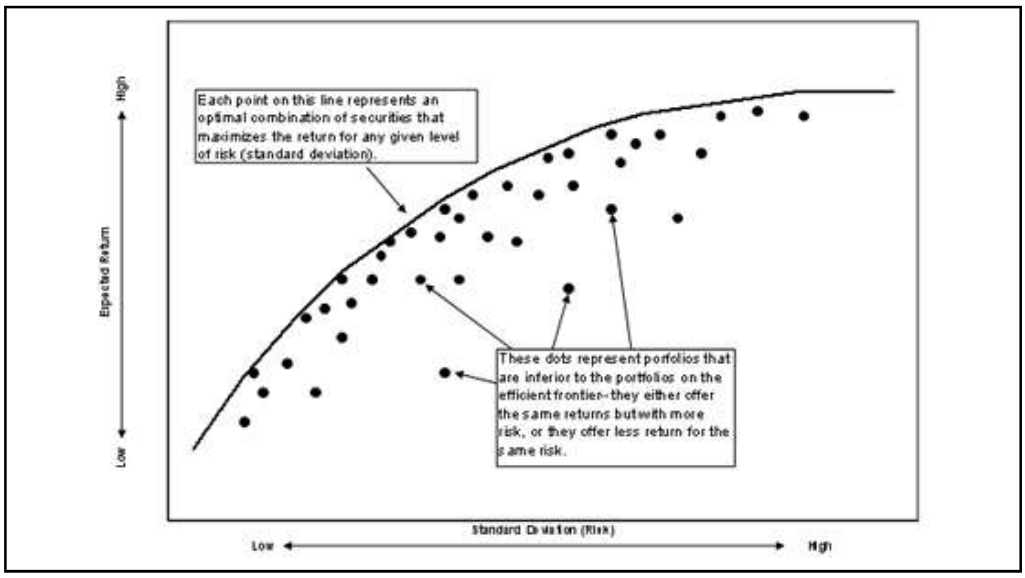
Figure 7.5: Markouritz Efficient Frontier



According to Markowitz, for every point on the efficient frontier, there is at least one portfolio that can be constructed from all available investments that has the expected risk and return corresponding to that point.

Notes

An example appears below. Note how the efficient frontier allows investors to understand how a portfolio's expected returns vary with the amount of risk taken.



The relationship securities have with each other is an important part of the efficient frontier. Some securities' prices move in the same direction under similar circumstances, while others move in opposite directions. The more out of sync the securities in the portfolio are (that is, the lower their covariance), the smaller the risk (standard deviation) of the portfolio that combines them. The efficient frontier is curved because there is a diminishing marginal return to risk. Each unit of risk added to a portfolio gains a smaller and smaller amount of return.

It's clear that for any given value of standard deviation, you would like to choose a portfolio that gives you the greatest possible rate of return; so you always want a portfolio that lies up along the efficient frontier, rather than lower down, in the interior of the region. This is the first important property of the efficient frontier: it's where the best portfolios are.

The second important property of the efficient frontier is that it's curved, not straight. This is actually significant – in fact, it's the key to how diversification lets you improve your reward-to-risk ratio.

Example: Imagine a 50/50 allocation between just two securities. Assuming that the year-to-year performance of these two securities is not perfectly in sync – that is, assuming that the great years and the lousy years for Security 1 don't correspond perfectly to the great years and lousy years for Security 2, but that their cycles are at least a little off – then the standard deviation of the 50/50 allocation will be less than the average of the standard deviations of the two securities separately. Graphically, this stretches the possible allocations to the left of the straight line joining the two securities.

1. ***Leveraged Portfolio:*** An investor can add leverage to the portfolio by borrowing the risk-free asset. The addition of the risk-free asset allows for a position in the region above the efficient frontier. Thus, by combining a risk-free asset with risky assets, it is possible to construct portfolios whose risk-return profiles are superior to those on the efficient frontier.

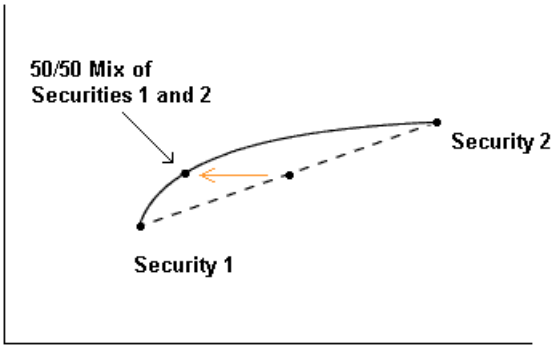
   An investor holding a portfolio of risky assets, with a holding in cash, has a positive risk-free weighting (a de-leveraged portfolio). The return and standard deviation will be lower than the portfolio alone, but since the efficient frontier is convex, this combination

Notes

will sit above the efficient frontier – i.e. offering a higher return for the same risk as the point below it on the frontier.

The investor who borrows money to fund his/her purchase of the risky assets has a negative risk-free weighting—i.e. a leveraged portfolio. Here the return is geared to the risky portfolio. This combination will again offer a return superior to those on the frontier.

Figure 7.6



Example: **Good Portfolio / Diversification**

A portfolio should consist of asset classes such as Bonds, stocks, real estate and commodities. I will not put insurance as an asset class because the insurance company will have to go and invest that into these asset classes anyway. A US investor can invest in the world. In Bonds, you can invest in US Government Bonds (has some tax advantages, esp I Bonds), State and local municipal bonds, Corporate bonds, International developed countries bonds and Emerging market bonds. Though the first three type should be enough for most.

For stocks, a US investor can invest in the world. You can apportion some % for US Stocks some % for International Dev mkts (Europe, Japan, Australia, Canada) and some % for Emerging markets (China, Russia, India, Brazil, Mexico, Turkey etc). Also you can slice and dice the markets by apportioning some % for large companies and some % for small companies. In commodities, you can buy gold/silver or buy commodity ETFs that invest in rolling the commodity options in a wide variety of commodities.

2. ***Market Portfolio:*** Market portfolio is a theoretical portfolio in which every available type of asset is included at a level proportional to its market value. Described as a group of investments, a portfolio is owned by one individual or organization. The typical investment portfolio may include a variety of assets, but usually does not include all asset types. However, a market portfolio literally includes every asset that exists in the market.

   The market value of an investment is described as its current price on the market. The term is also used to refer to the amount for which an asset could presumably be resold. In a market portfolio, investments are held in proportion to their market values in relation to the full value of all included assets.

   A market portfolio is a portfolio consisting of a weighted sum of every asset in the market, with weights in the proportions that they exist in the market (with the necessary assumption that these assets are infinitely divisible).

   Richard Roll's critique (1977) states that this is only a theoretical concept, as to create a market portfolio for investment purposes in practice would necessarily include every single possible available asset, including real estate, precious metals, stamp collections,

Notes

jewellery, and anything with any worth, as the theoretical market being referred to would be the world market. As a result, proxies for the market (such as the FTSE100 in the UK or the S&P 500 in the US) are used in practice by investors. Roll's critique states that these proxies cannot provide an accurate representation of the entire market.

The concept of a market portfolio plays an important role in many financial theories and models, including the capital asset pricing model, where it is the only fund in which investors need to invest, to be supplemented only by a risk-free asset (depending upon each investor's attitude towards risk).

Often, the concept of a market portfolio is discussed in theoretical terms only. For investment purposes, a true market portfolio would need to include every conceivable asset. As such, the market for such a portfolio would be the world market. The market portfolio concept is important in a variety of financial theories, including Modern Portfolio Theory (MPT). According to the MPT, investors should concentrate on choosing portfolios based on overall risk-reward concepts, rather than focusing on the attractiveness of individual securities.

MPT involves the concept of the efficient frontier on which the market portfolio sits. Introduced by Harry Markowitz, the pioneer of MPT, the efficient frontier is a group of optimal portfolios that serves to maximize expected return for a given level of risk. The Sharpe ratio is a term used to indicate the level of additional return offered by a portfolio, relative to the level of risk it entails. The market portfolio, also called the super-efficient portfolio, has the highest Sharpe ratio on the efficient frontier.

Caution When combined with the risk-free asset, it is said that the market portfolio will produce a return rate above the efficient frontier. The risk-free asset is a hypothetical concept. Essentially, the market portfolio would provide for higher return rates than a riskier portfolio on the frontier.

Modern portfolio theory, or MPT, is an attempt to optimize the risk-reward of investment portfolios. Created by Harry Markowitz, who earned a Nobel Prize in Economics for the theory, modern portfolio theory introduced the idea of diversification as a tool to lower the risk of the entire portfolio without giving up high returns.

The key concept in modern portfolio theory is Beta. Beta is a measure of how much a financial instrument, such as a stock, changes in price relative to its market. This is also referred to as its variance. For instance, a stock that moves 2%, on average, when the S&P 500 moves 1%, would have a Beta of 2. Conversely, a stock that, on average, moves in the opposite direction of the market would have a negative Beta. In a broad sense, Beta is a measure of investment riskiness; the higher the absolute value of Beta, the riskier the investment.

Modern portfolio theory constructs portfolios by mixing stocks with different positive and negative Betas to produce a portfolio with minimal Beta for the group of stocks taken as a whole. What makes this attractive, at least theoretically, is that returns do not cancel each other out, but rather accumulate. For example, ten stocks, each expected to earn 5% but risky on their own, can potentially be combined into a portfolio with very little risk which preserves the 5% expected return.

Modern portfolio theory uses the Capital Asset Pricing Model, or CAPM, to select investments for a portfolio. Using Beta and the concept of the risk-free return (e.g., short-term US Treasuries), CAPM is used to calculate a theoretical price for a potential investment. If the investment is selling for less than that price, it is a candidate for inclusion in the portfolio.

Notes

While impressive theoretically, modern portfolio theory has drawn severe criticism from many quarters. The principle objection is with the concept of Beta; while it is possible to measure the historical Beta for an investment, it is not possible to know what its Beta will be going forward. Without that knowledge, it is in fact impossible to build a theoretically perfect portfolio. This objection has been strengthened by numerous studies showing that portfolios constructed according to the theory don't have lower risks than other types of portfolios.

Modern portfolio theory also assumes that it is possible to select investments whose performance is independent of other investments in the portfolio. Market historians have shown that there are no such instruments; in times of market stress, seemingly independent investments do, in fact, act as if they are related.

7.6 Forms of the Efficient Market Hypothesis

Tests of the market efficiency are essentially tests of whether the three general types of information—past prices, other public information and inside information – can be used to make above-average returns on investments. In an efficient market, it is impossible to make above-average return regardless of the information available, unless abnormal risk is taken. Moreover, no investor or group of investors can consistently outperform other investors in such a market. These tests of market efficiency have also been termed as weak-form (price information), semi-strong form (other public information) and strong-form (inside information) tests.

Weak-form and the Random Walk

This is the oldest statement of the hypothesis. It holds that present stock market prices reflect all known information with respect to past stock prices, trends, and volumes. Thus it is asserted, such past data cannot be used to predict future stock prices. Thus, if a sequence of closing prices for successive days for XYZ stock has been 43, 44, 45, 46, 47, it may seen that tomorrow's closing price is more likely to be 48 than 46, but this is not so. The price of 47 fully reflects whatever information is implied by or contained in the price sequence preceding it. In other words, the stock prices approximate a random walk. (That is why sometimes the terms Random Walk Hypothesis and Efficient Market Hypothesis are used interchangeably). As time passes, prices wander or walk more or less randomly across the charts. Since the walk is random, a knowledge of past price changes does nothing to inform the analyst about whether the price tomorrow, next week, or next year will be higher or lower than today's price.

The weak form of the EMH is summed up in the words of the pseudonymous 'Adam Smith', author of The Money Game: "prices have no memory, and yesterday has nothing to do with tomorrow." It is an important property of such a market, so that one might do as well flipping a coin as spending time analyzing past price movements or patterns of past price levels.

Thus, if the random walk hypothesis is empirically confirmed, we may assert that the stock market is weak-form efficient. In this case any work done by chartists based on past price patterns is worthless.

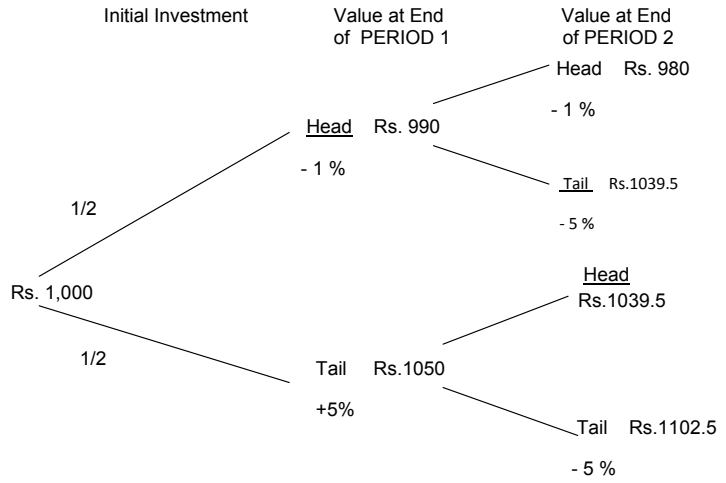
Random walk theorists usually take as their starting point the model of a perfect securities market in which a relatively large number of investors, traders, and speculators compete in an attempt to predict the course of future prices. Moreover, it is further assumed that current information relevant to the decision-making process is readily available to all at little or no cost. If we 'idealize' these conditions and assume that the market is perfectly competitive, then equity prices at any given point of time would reflect the market's evaluation of all currently available information that becomes known. And unless the new information is distributed over time in a non-random fashion – and we have no reason to presume this – price movements in a

Notes

perfect market will be statistically independent of one another. If stock price changes behave like a series of results obtained by flipping a coin, does this mean that on average stock price changes have zero mean? Not necessarily. Since stocks are risky, we actually expect to find a positive mean change in stock prices.

Example: Suppose an investor invests ₹ 1,000 in a share. Flip a coin; if heads comes up he loses 1%, and if tails shows up he makes 5%. The value of investment will be as shown in figure.

Random Walk with Positive Drift (Two-Period-Case)



Suppose that an investor flips the coin (looks up the prices) once a week and it is his decision when to stop gambling (when to sell). If he gambles only once, his average return is 1/2 × ₹ 990 +1/2 × ₹ 1050 = ₹ 1020 since the probabilities of 'heads' or 'tail' are each equal to 1/2. The investor may decide to gamble for another week. Then the expected terminal value of his investment will be:

$$\tfrac{1}{2} \times 980.1 + 1/4 \times 1039.5 + 1/5 \times 1039.5 + 1/4 \times 1102.5 + ₹\ 1040.4$$

Now assume that these means are equal to the value of the given shares at the end of the first week and at the end of the second week. The fact that the shares went up in the first period, say to ₹ 1050, does not affect the probability of the price going up 5% or that ongoing changes in each period are independent of the share price changes in the previous period. In each period, we would obtain the results that one could obtain by flipping a coin, and it is well known that the next outcome of flipping a coin is independent of the past series of 'heads' and 'tails.' Note, however, that on an average we earn 2% if we invest for one week and 4.04% if we invest for two weeks. Thus, the random walk hypothesis does not contradict the theory that asserts that risky assets must yield a positive mean return. We say in such a case, a random walk process with a "positive drift" can characterize share price changes. In our specific example, the drift is equal to: 1/2x5% +1/2 x (–1%) = 2%, which implies that on average the investment terminal value increases every period by 2%.

Thus, reflecting the historical development, the weak form implies that the knowledge of the past patterns of stock prices does not aid investors to attain improved performance. Random walk therapists view stock prices as moving randomly about a trend line, which is based on anticipated earning power. Hence they contend that (1) analysing past data does not permit the technician to forecast the movement of prices about the trend line and (2) new information affecting stock prices enters the market in random fashion, i.e. tomorrow's news cannot be predicted nor can future stock price movements be attributable to that news.

Notes

7.7 Testing Market Efficiency

There are several ways to test the EMH. Analysts have devised direct and indirect tests of market efficiency. Direct tests assess the success of specific investment strategies or trading rules. An example of a direct test would be a test of the accuracy of predictions by some specific technical indicator. Indirect tests are statistical tests of prices or returns. For example, if prices follow a random walk, the serial correlation of returns should be close to zero.

Establishing a Benchmark: Test of the EMH must usually establish some sort of benchmark. The most common benchmark is the so-called buy-and-hold portfolio.

The Time Factor: The time period(s) selected can, of course, always be criticized. A trading rule partisan may respond to a conclusion that the rule did not work by saying, "of course my trading rule didn't work over that period."

Kiss and Tell: Suppose that someone discovered an investment strategy that really worked and made a lot of money. Why would this person want to tell anyone? He or she could try to make money writing a book or an investment newsletter describing the strategy, but it would probably generate more money if keep secret. Suppose an analyst discovers that stocks beginning with the letter K rise on Wednesdays and fall on Fridays.

Case Study

Market Efficiency: Implications

Economist Dick Thaler In an August, FT opinion said quite nice things about "The Myth of the Rational Market." In it, he makes the case that the efficient market hypothesis consists of two main ideas, "No Free Lunch" and "The Price is Right," that have met very different fates over the past decade or so. After running through the history, he concludes:

What lessons should we draw from this? On the free lunch component there are two. The first is that many investments have risks that are more correlated than they appear. The second is that high returns based on high leverage may be a mirage. ... On the price is right, if we include the earlier bubble in Japanese real estate, we have now had three enormous price distortions in recent memory. They led to misallocations of resources measured in the trillions and, in the latest bubble, a global credit meltdown. If asset prices could be relied upon to always be "right", then these bubbles would not occur. But they have, so what are we to do?

While imperfect, financial markets are still the best way to allocate capital. Even so, knowing that prices can be wrong suggests that governments could usefully adopt automatic stabilising activity, such as linking the down-payment for mortgages to a measure of real estate frothiness or ensuring that bank reserve requirements are set dynamically according to market conditions. After all, the market price is not always right.

Questions

1. Do you agree with Thaler's Ideas? Why/why not?
2. Do you think that financial markets are still the best way to allocate capital. Why/ why not?

Source: curiouscapitalist.blogs.time.com

Notes

7.8 Are the Markets Efficient?

Today, it is fashionable to discuss the pending demise of the old EMH. Well, we are not quite yet ready to bury it, but a considerable amount of evidence does contradict it, and more evidence seems to emerge daily. However, a considerable amount of evidence also supports the concept of market efficiency. And even if the markets are not efficient in an academic sense, they may be efficient in a more practical sense. In most parts of the world, the financial markets are well functioning, competitive institutions, in which consistent abnormal profits based on public or historical information are rare.

There is an often-repeated joke about a trader and a finance professor walking down the street. The trader notices a ₹ 500 note lying on the street and stops to pick it up. "Why bother?" the finance professor says, "If it had really been a ₹ 500 note, someone would already have grabbed it."

In one sense, this joke sums up the debate over market efficiency. An unquestioning acceptance of the EMH, and subsequent rejection of all investment analysis and research as worthless, can leave a lot of money lying on the street for someone else.

7.9 Summary

- An efficient capital market is one in which security prices adjust rapidly to the arrival of new information and, therefore, the current prices of securities reflect all information about the security.
- Some of the most interesting and important academic research during the past 20 years has analyzed whether our capital markets are efficient.
- Fama divided the overall efficient market hypothesis (EMH) and the empirical tests of the hypothesis into three sub-hypotheses depending on the information set involved: (1) weak-form EMH, (2) semi-strong-form EMH, and (3) strong-form EMH.
- In a subsequent review article, Fama again divided the empirical results into three groups but shifted empirical results between the prior categories.
- Therefore, the following discussion uses the original categories but organizes the presentation of results using the new categories.
- A simple test for strong form efficiency is based upon price changes close to an event.
- Acts of nature may move prices, but if private information release does not, then we know that the information is already in the stock price.
- An investor can add leverage to the portfolio by borrowing the risk-free asset.
- The addition of the risk-free asset allows for a position in the region above the efficient frontier.
- Thus, by combining a risk-free asset with risky assets, it is possible to construct portfolios whose risk-return profiles are superior to those on the efficient frontier.
- A market portfolio is a portfolio consisting of a weighted sum of every asset in the market, with weights in the proportions that they exist in the market (with the necessary assumption that these assets are infinitely divisible).
- Weak-Form and the Random Walk holds that present stock market prices reflect all known information with respect to past stock prices, trends, and volumes.
- Thus it is asserted, such past data cannot be used to predict future stock prices.

Notes

7.10 Keywords

Efficient Capital Market: An efficient capital market is one in which security prices adjust rapidly to the arrival of new information and, therefore, the current prices of securities reflect all information about the security.

Market Portfolio: Market portfolio is a theoretical portfolio in which every available type of asset is included at a level proportional to its market value.

Market Value of an Investment: The market value of an investment is described as its current price on the market.

7.11 Self Assessment

Fill in the blanks:

1. Modern portfolio theory uses the ....., to select investments for a portfolio.
2. ..... is a measure of how much a financial instrument, changes in price relative to its market.
3. Virtually every major portfolio manager today consults an ..... programme.
4. Market ..... has implications for corporate managers as well as for investors.
5. ..... provide liquidity to investors who need to sell or buy securities for purposes other than "betting" on changes in expected returns.
6. The most obvious indication that the market is not always and everywhere ..... form efficient is that money managers frequently use public information to take positions in stocks.
7. The efficient market theory is a good first approximation for characterizing how prices in a liquid and free market react to the disclosure of .....
8. The efficient frontier has a ..... shape.
9. Modern portfolio theory constructs portfolios by mixing stocks with different ..... and .....
10. The ..... form implies that the knowledge of the past patterns of stock prices does not aid investors to attain improved performance.
11. An investor can add ..... to the portfolio by borrowing the risk-free asset.
12. A ..... is a portfolio consisting of a weighted sum of every asset in the market, with weights in the proportions that they exist in the market.
13. Fama divided the overall efficient market hypothesis (EMH) and the empirical tests of the hypothesis into ..... sub-hypotheses.
14. One would always want a portfolio that lies ..... along the efficient frontier, rather than .....
15. Acts of nature may move prices, but if private information release does not, then we know that the information is already in the .....

Notes

7.12 Review Questions

1. Do you think that the capital markets be efficient? Why/Why not?
2. What do you think was the reason behind insider's trading being legal in Switzerland till recent past? Analyse the causes for Swiss government to illegalise the practice.
3. Is the stock market semi strong form efficient? Why/Why not?
4. Prove that volatility increases your risk of loss of principal.
5. Do you think that the markets are efficient today?
6. When combined with the risk-free asset, the market portfolio will produce a return rate above the efficient frontier. Comment.
7. Currently, China is seeking to limit access to global financial information in Shanghai (site of its major stock exchange). The government wishes to keep certain kinds of information from market participants. Is this desirable? Will this be possible?
8. Examine the concept of efficient frontier with the riskless asset.
9. Through example, show that the mean and the standard deviation can be used to plot the relative risk and return for any selection of securities.
10. The efficient market theory is a good first approximation for characterizing how prices in a liquid and free market react to the disclosure of information. How?
11. While impressive theoretically, modern portfolio theory has drawn severe criticism from many quarters. What do you think as the reason behind it?

Answers: Self Assessment

1.	Capital Asset Pricing Model, or CAPM	2.	Beta
3.	optimization	4.	efficiency
5.	Arbitrageurs	6.	semi-strong
7.	information	8.	curved
9.	positive, negative	10.	weak
11.	leverage	12.	market portfolio
13.	three	14.	up, lower down
15.	stock price		

7.13 Further Readings

Books

Mayo, Herbert B., *Basic Investments*, the Dryden Press; Hinsdale; Ill: 1980.

Melcher, B., *Stockholder Equity*, N.Y., AICPA, 1973.

Newlyn, W.T., *Theory of money*, Clarendon Press, Oxford, 1971.

Parek, H.T., *The Future of Joint Stock Companies in India*, Jaico Publishing House, Bombay, 1958.

Sudhindhra Bhatt, *Security Analysis and Portfolio Management*, Excel Books

Unit 8: Derivatives

Notes

CONTENTS

Objectives
Introduction
8.1 Characteristics of Derivatives
8.2 Hedging
8.3 Portfolio Rebalancing
8.4 Myths and Realities about Derivatives
8.5 Derivative Products
8.5.1 Forward Contract
8.5.2 Futures Contract
8.5.3 Options
8.6 Summary
8.7 Keywords
8.8 Self Assessment
8.9 Review Questions
8.10 Further Readings

Objectives

After studying this unit, you will be able to:

- Define future contracts
- Discuss future of a future contract
- Understand mechanics of future trading
- Explain forwards vs futures contract
- Discuss trading in future contracts
- Explain concept of basis in futures market
- Define options
- Analyze how options work
- Discuss options strategies
- Explain call options, put options, writing options
- Discuss factors deterring option values
- Explain Option Valuation Model
- Understand Binomial Model

Notes

Introduction

The emergence of the market for derivative products, most notably forwards, futures and options, can be traced back to the willingness of risk-averse economic agents to guard themselves against uncertainties arising out of fluctuations in asset prices. By their very nature, the financial markets are marked by a very high degree of volatility. Through the use of derivative products, it is possible to partially or fully transfer price risks by locking-in asset prices. As instruments of risk management, these generally do not influence the fluctuations in the underlying asset prices. However, by locking-in asset prices, derivative products minimize the impact of fluctuations in asset prices on the profitability and cash flow situation of risk-averse investors.

Derivative products initially emerged, as hedging devices against fluctuations in commodity prices and commodity-linked derivatives remained the sole form of such products for almost three hundred years. The financial derivatives came into spotlight in post-1970 period due to growing instability in the financial markets. However, since their emergence, these products have become very popular and by 1990s, they accounted for about two-thirds of total transactions in derivative products. In recent years, the market for financial derivatives has grown tremendously both in terms of variety of instruments available, their complexity and also turnover. In the class of equity derivatives, futures and options on stock indices have gained more popularity than on individual stocks, especially among institutional investors, who are major users of index-linked derivatives.

Even small investors find these useful due to high correlation of the popular indices with various portfolios and ease of use. The lower costs associated with index derivatives vis-à-vis derivative products based on individual securities are another reason for their growing use.

The following factors have been driving the growth of financial derivatives:

1. Increased volatility in asset prices in financial markets.
2. Increased integration of national financial markets with the international markets.
3. Marked improvement in communication facilities and sharp decline in their costs.
4. Development of more sophisticated risk management tools, providing economic agents a wider choice of risk management strategies, and
5. Innovations in the derivatives markets, which optimally combine the risks and returns over a large number of financial assets, leading to higher returns, reduced risk as well as transactions costs as compared to individual financial assets.

Derivative is a product whose value is derived from the value of one or more basic variables, called bases (underlying asset, index, or reference rate), in a contractual manner. The underlying asset can be equity, foreign exchange, commodity or any other asset. For example, wheat farmers may wish to sell their harvest at a future date to eliminate the risk of a change in prices by that date. Such a transaction is an example of a derivative. The price of this derivative is driven by the spot price of wheat which is the 'underlying.'

In the Indian context, the Securities Contracts (Regulation) Act, 1956 (SC(R) A) defines "equity derivative" to include:

A security derived from a debt instrument, share, loan whether secured or unsecured, risk instrument or contract for differences or any other form of security.

A contract, which derives its value from the prices, or index of prices, of underlying securities.

The derivatives are securities under the SC(R) A and thus the regulatory framework under the SC(R) A governs the trading of derivatives.

Notes

According to the author, derivatives can be defined as:

Derivatives are those assets whose value is determined from the value of some underlying assets. The underlying asset may be equity, commodity or currency. The list of derivative assets is long.

Derivatives are the most modern financial instruments in hedging risk. The individuals and firms who wish to avoid or reduce risk can deal with the others who are willing to accept the risk for a price. A common place where such transactions take place is called the 'derivative market'. As the financial products commonly traded in the derivatives market are themselves not primary loans or securities, but can be used to change the risk characteristics of underlying asset or liability position, they are referred to as 'derivative financial instruments' or simply 'derivatives.' These instruments are so called because they derive their value from some underlying instrument and have no intrinsic value of their own. Forwards, futures, options, swaps, caps floor collar etc. are some of more commonly used derivatives. The world over, derivatives are a key part of the financial system.

8.1 Characteristics of Derivatives

The important characteristics of derivatives are as follows:

1. Derivatives possess a combination of novel characteristics not found in any form of assets.
2. It is comfortable to take a short position in derivatives than in other assets. An investor is said to have a short position in a derivatives product if he is obliged to deliver the underlying asset in specified future date.
3. Derivatives traded on exchanges are liquid and involves the lowest possible transaction costs.
4. Derivatives can be closely matched with specific portfolio requirements.
5. The margin requirements for exchange-traded derivatives are relatively low, reflecting the relatively low level of credit-risk associated with the derivatives.
6. Derivatives are traded globally having strong popularity in financial markets.
7. Derivatives maintain a close relationship between their values and the values of underlying assets; the change in values of underlying assets will have effect on values of derivatives based on them.
8. In a Treasury bond futures contract, the derivatives are straightforward.

8.2 Hedging

The term 'hedging' is fairly clear. It would cover derivative market positions that are designed to offset the potential losses from existing cash market positions. Some examples of this are as follows:

1. An income fund has a large portfolio of bonds. This portfolio stands to make losses when interest rates go up. Hence, the fund may choose to short an interest rate futures product in order to offset this loss.
2. An income fund has a large portfolio of corporate bonds. This portfolio stands to make losses when credit spreads of these bonds degrade or when defaults take place. Hence, the fund may choose to buy credit derivatives, which pay when these events happen.

Notes

3. Every equity portfolio has exposure to the market index. Hence, the fund may choose to sell index futures, or buy index put options, in order to reduce the losses that would take place in the event that the market index drops.

The regulatory concerns are about (a) the effectiveness of the hedge and (b) its size.

'Hedging' a ₹ 1 billion equity portfolio with an average beta of 1.1 with a ₹ 1.3 billion short position in index futures is not an acceptable hedge because the over hedged position is equivalent to a naked short position in the future of ₹ 0.2 billion. Similarly, 'hedging' a diversified equity portfolio with an equal short position in a narrow sectoral index would not be acceptable because of the concern on effectiveness. A hedge of only that part of the portfolio that is invested in stocks belonging to the same sector of the sectoral index by an equal short position in the sectoral index futures would be acceptable.

'Hedging' an investment in a stock with a short position in another stocks' futures is not an acceptable hedge because of effectiveness concerns. This would be true even for merger arbitrage where long and short positions in two merging companies are combined to benefit from deviations of market prices from the swap ratio.

Hedging with options would be regarded as over-hedging if the notional value of the hedge exceeds the underlying position of the fund even if the option delta is less than the underlying position. For example, a ₹ 2 billion index put purchased at the money is not an acceptable hedge of a ₹ 1 billion, beta=1.1 fund, though the option delta of approximately ₹ 1 billion is less than the underlying exposure of the fund of ₹ 1.1 billion.

Covered call writing is hedging if the effectiveness and size conditions are met. Again the size of the hedge in terms of notional value and not option delta must not exceed the underlying portfolio.

The position is more complicated if the option position includes long calls or short puts. The worst-case short exposure considering all possible expiration prices should meet the size condition.

8.3 Portfolio Rebalancing

The use of derivatives for portfolio rebalancing covers situations where a particular desired portfolio position can be achieved more efficiently or a lower cost using derivatives rather than cash market transactions. The basic idea is that the mutual fund has a fiduciary obligation to its unit holders to buy assets at the best possible price.

Thus if it is cheaper (after adjusting for cost of carry) to buy a stock future rather than the stock itself, the fund does have a fiduciary obligation to use stock futures unless there are other tangible or intangible disadvantages to using derivatives. Similarly, if a synthetic money market position created using calendar spreads is more attractive than a direct money market position (after adjusting for the credit worthiness of the clearing corporation), the fund would normally have a fiduciary obligation to use the calendar spread. If a fund can improve upon a buy-and-hold strategy by selling a stock or an index portfolio today, investing the proceeds in the money market, and having a locked-in price to buy it back at a future date, then it would have a fiduciary obligation to do so.

8.4 Myths and Realities about Derivatives

Derivatives increase speculation and do not serve any economic purpose. Numerous studies of derivatives activity have led to a broad consensus, both in the private and public sectors that derivatives provide numerous and substantial benefits to the users. Derivatives are a low-cost,

Notes

effective method for users to hedge and manage their exposures to interest rates, commodity prices, or exchange rates.

The need for derivatives as hedging tool was felt first in the commodities market. Agricultural futures and options helped farmers and processors hedge against commodity price risk. After the fallout of Bretton Woods Agreement, the financial markets in the world started undergoing radical changes. This period is marked by remarkable innovations in the financial markets such as introduction of floating rates for the currencies, increased trading in variety of derivatives instruments, on-line trading in the capital markets, etc. As the complexity of instruments increased manifold, the accompanying risk factors grew in gigantic proportions. This situation led to development derivatives as effective risk management tools for the market participants.

Looking at the equity market, derivatives allow corporations and institutional investors to effectively manage their portfolios of assets and liabilities through instruments like stock index futures and options. An equity fund, for example, can reduce its exposure to the stock market quickly and at a relatively low cost without selling off part of its equity assets by using stock index futures or index options.

By providing investors and issuers with a wider array of tools for managing risks and raising capital, derivatives improve the allocation of credit and the sharing of risk in the global economy, lowering the cost of capital formation and stimulating economic growth. Now that global markets for trade and finance have become more integrated, derivatives have strengthened these important linkages between global markets, increasing market liquidity and efficiency and facilitating the flow of trade and finance.

Did u know?

Which are the main operators in the derivatives market?

Hedgers: Operators, who want to transfer a risk component of their portfolio.

Speculators: Operators, who intentionally take the risk from hedgers in pursuit of profit.

Arbitrageurs: Operators who operate in the different markets simultaneously, in pursuit of profit and eliminate mispricing.

8.5 Derivative Products

Derivative is a product/contract that does not have any value on its own i.e. it derives its value from some underlying.

8.5.1 Forward Contract

A forward contract is an agreement made today between a buyer and seller to exchange the commodity or instrument for cash at a predetermined future date at a price agreed upon today. The agreed upon price is called the 'forward price'. With a forward market the transfer of ownership occurs on the spot, but delivery of the commodity or instrument does not occur until some future date. In a forward contract, two parties agree to do a trade at some future date, at a stated price and quantity. No money changes hands at the time the deal is signed. For example, a wheat farmer may wish to contract to sell their harvest at a future date to eliminate the risk of a change in prices by that date. Such transaction would take place through a forward market. Forward contracts are not traded on an exchange, they are said to trade over the counter (OTC). The quantities of the underlying asset and terms of contract are fully negotiable. The secondary market does not exist for the forward contracts and faces the problems of liquidity and negotiability.

Notes

Problems in Forward Contracting

The forward contracts are affected by the problems like: (a) Lack of centralisation of trading, (b) Illiquidity, and (c) Counter party risk.

8.5.2 Futures Contract

The futures contract is traded on a futures exchange as a standardised contract, subject to the rules and regulations of the exchange. It is the standardisation of the futures contract that facilitates the secondary market trading. The futures contract relates to a given quantity of the underlying asset and only whole contracts can be traded, and trading of fractional contracts are not allowed in futures contracting.

The terms of the futures contracts are not negotiable. A futures contract is a financial security, issued by an organised exchange to buy or sell a commodity, security or currency at a predetermined future date at a price agreed upon today. The agreed upon price is called the 'futures price'.

Types of Futures Contract

Futures contracts may be classified into two categories:

1. ***Commodity Futures:*** Where the underlying is a commodity or physical asset such as wheat, cotton, butter, eggs etc. Such contracts began trading on Chicago Board of Trade (CBOT) in 1860s. In India too, futures on soya bean, black pepper and spices have been trading for long.
2. ***Financial Futures:*** Where the underlying is a financial asset such as foreign exchange, interest rates, shares, Treasury bills or stock index.

Standardised Items in Futures

The standardised items in any futures contract are:

1. Quantity of the underlying
2. Quality of the underlying (not required in financial futures)
3. The date and month of delivery
4. The units of price quotation (not the price itself) and minimum change in price (tick-size)
5. Location of settlement

Important Features of Futures Contract

The important features of futures contract are given below:

1. ***Standardisation:*** The important feature of futures contract is the standardisation of contract. Each futures contract is for a standard specified quantity, grade, coupon rate, maturity, etc. The standardisation of contracts fetches the potential buyers and sellers and increases the marketability and liquidity of the contracts.
2. ***Clearing house:*** An organisation called 'futures exchange' will act as a clearinghouse. In futures contract, the obligation of the buyer and the seller is not to each other but to the clearing house in fulfilling the contract, which ensure the elimination of the default risk on any transaction.

Notes

3. ***Time Spreads:*** There is a relationship between the spot price and the futures price of contract. The relationship also exists between prices of futures contracts, which are on the same commodity or instrument but which have different expiry dates. The difference between the prices of two contracts is known as the 'time spread', which is the basis of futures market.

4. ***Margins:*** Since the clearing house undertakes the default risk, to protect itself from this risk, the clearing house requires the participants to keep margin money, normally ranging from 5% to 10% of the face value of the contract.

Uses of Futures Contracting

The uses of futures contracting are as follows:

1. ***Hedging:*** The classic hedging application would be that of a wheat farmer futures selling his harvest at a known price in order to eliminate price risk. Conversely, a bread factory may want to buy wheat futures in order to assist production planning without the risk of price fluctuations.

2. ***Price discovery:*** Price discovery is the use of futures prices to predict spot price that will prevail in the future. These predictions are useful for production decisions involving the various commodities.

3. ***Speculation:*** If a speculator has information or analysis which forecasts an upturn in a price, then he can go long on the futures market instead of the cash market, wait for the price rise, and then take a reversing transaction. The use of futures market here gives leverage to the speculator.

Forward Contract vs. Future Contract

Caution Many people get confused between Forward Contract and Future Contract.

Forward contracts are private bilateral contracts and have well-established commercial usage. Future contracts are standardised tradable contracts fixed in terms of size, contract date and all other features. The differences between forward and futures contracts are given below:

Forward Contracts	Future Contracts
1. The contract price is not publicly disclosed and hence not transparent.	1. The contract price is transparent.
2. The contract is exposed to default risk by counterparty.	2. The contract has effective safeguards against defaults in the form of clearing corporation guarantees for trades and daily mark to market adjustments to the accounts of trading members based on daily price change.
3. Each contract is unique in terms of size, expiration date and asset type/quality.	3. The contracts are standardised in terms of size, expiration date and all other features.
4. The contract is exposed to the problem of liquidity.	4. There is no liquidity problem in the contract.
5. Settlement of the contract is done by delivery of the asset on the expiration date.	5. Settlement of the contract is done on cash basis.

Notes

Mechanism in Futures Contracts:

1. Buy a future to agree to take delivery of a commodity. This will protect against a rise in price in the spot market as it produces a gain if spot prices rise. Buying a future is said to be going long.
2. Sell a future to agree to make delivery of a commodity. This will protect against a fall in price in the spot market as it produces a gain if spot prices fall. Selling a future is said to be going short.

A futures contract is a contract for delivery of a standard package of a standard commodity or financial instrument at a specific date and place in the future but at a price that is agreed when the contract is taken out. Certain futures contracts, such as on stocks or currency, settled in cash on the price differentials, because clearly, delivery of this particular commodity would be difficult.

The futures price is determined as follows:

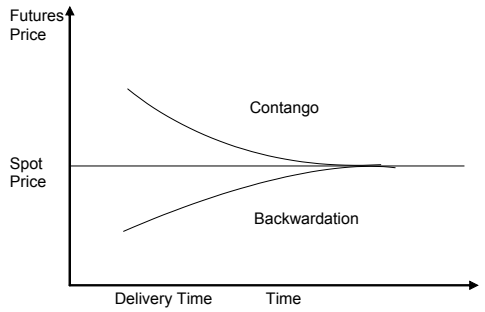
Futures Price = Spot Price + Costs of Carrying

The spot price is the current price of a commodity. The costs of carrying of a commodity will be the aggregate of the following:

1. Storage
2. Insurance
3. Transport costs involved in delivery of commodity at an agreed place.
4. Finance costs, i.e., interest forgone on funds used for purchase of the commodity.

Basis = Futures – Spot Price

Figure 8.1: Futures Contracts – Contango and Backwardation



Although the spot price and futures price generally move in line with each other, the basis is not constant. Generally, the basis will decrease with time. And on expiry, the basis is zero and futures price equals spot price. If the futures price is greater than the spot it is called contango. Under normal market conditions futures contracts are priced above the spot price. This is known as the contango market. In this case, the futures price tends to fall over time towards the spot, equalling the spot price on delivery day. If the spot price is greater than the futures price it is called 'backwardation'. Then the futures price tends to rise over time to equal the spot price on the delivery day. So in either case, the basis is zero at delivery. This may happen when the cost of carry is negative, or when the underlying asset is in short supply in the cash market, but there is an expectation of increased supply in future, for example agricultural products. The direction of the change in price tends to hold for cycles of contracts with different delivery dates. If the spot price is expected to be stable over the life of the contract, a contract with a positive basis will lead to a continued positive basis although this will be lower in nearby delivery dates than in

Notes

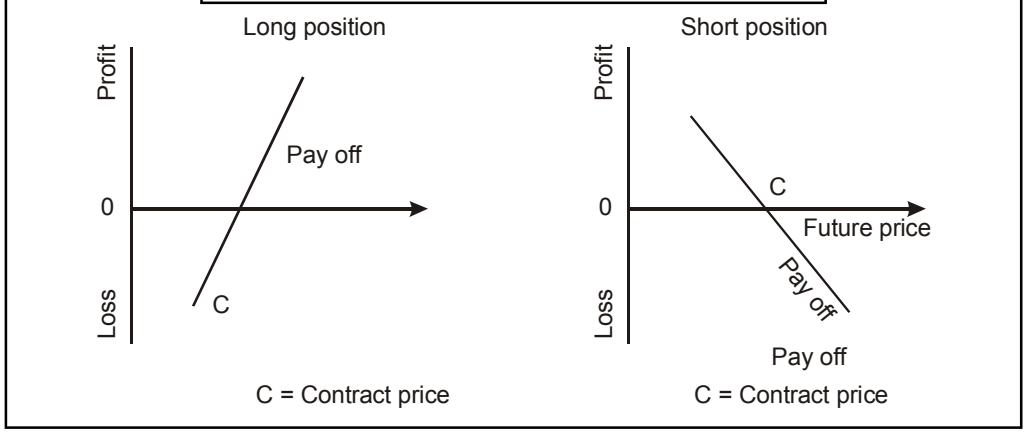
far-off delivery dates. This is a normal contango. Conversely, normal backwardation is the result of a negative basis where nearer maturing contracts has higher futures prices than far-off maturing contract.

Simple Pay-off Positions in Futures: The buyer of a futures contract is said to 'go long' the future, whereas the seller is said to 'go short.' With a long position, the value of the position rises as the asset price rises and falls as the asset price falls. With a short position, a loss ensues if the asset price rises but profits are generated if the asset price falls.

Buyer's Pay-off: The buyer of futures contract has an obligation to purchase the underlying instrument at a price when the spot price is above the contract price. The buyer will buy the instrument for the price 'C' and can sell the instrument for higher spot price thus making a profit. When the contract price is above spot price, a loss is made by the buyer of the contract.

Seller's Pay-off: The seller of the contract makes a profit when the contract price is above the spot price. The seller will purchase the instrument at the spot price and will sell at the contract price. The seller makes a loss when the spot price is above the contract price.

Figure 8.2: Pay off in Long and Short Futures Position



Example: Suppose a trader has bagged an order for which he has to supply 2,000 tonnes of aluminium sheet to the buyer within next two months.

After obtaining the order the trader is observing a rise of price of aluminium sheet in the open market and, if such a rise continues, the profit margin of the trader may get shrunk; he may even land on a huge loss just because of rise in the procurement price of the aluminium sheet. But if the trader under the circumstances purchases aluminium sheet futures, then any loss for the rise of price of aluminium to be bought by the trader for the supply order could be then off-set against profit on the future contract. However, if there is a fall of price, extra profit on fall of price of aluminium sheet can also be offset against cost or loss of futures contract. So hedging technique is the equivalent of insurance facility against market risk where price is always volatile.

Simple Strategies in Futures Market

The following simple strategies are popular in the futures market:

Commodities Futures Market

1. Buy a future to agree to take delivery of a commodity to protect against a rise in price in the spot market as it produces a gain if spot prices rise. Buying a future is said to be going long.

Notes

2. Sell a future to agree to make delivery of a commodity to protect against a fall in price in the spot market as it produces a gain if spot prices fall. Selling a future is said to be going short.

Interest Rate Future

1. Selling short an interest rate futures contract protects against a rise in interest rates.
2. Purchasing long an interest rate futures contract protects against a fall in interest rates.

Future Rate Agreements (FRAs)

1. Selling short on FRA protects against a fall in interest rates.
2. Purchasing long on FRA Protects against a rise in interest rates.

Currency Futures

1. Buying long a currency future protects against a rise in currency value.
2. Selling short a currency future protects against a fall in currency value.

Notes ***Marking to Market:*** In futures contracts, a small payment known as 'initial margin' is required to be deposited with the organised futures exchange. Due to fluctuations in the price of underlying asset, the balance in the margin account may fall below specified minimum level or even become negative at the end of each trading session. All outstanding contracts are appraised at the settlement price of that session, which is called 'marking to market.' This means adjusting the margin accounts of both the parties. A member incurring cost should make payment of profit to the counter party and the value of future contracts is set to zero at the end of each trading session. The daily settlement payments are known as 'variation margin' payments.

Closing Out of Futures Contract: A long position in futures, can be closed out by selling futures while a short position in futures can be closed out by buying futures on the exchange. Once position is closed out, only the net difference needs to be settled in cash, without any delivery of underlying. Most contracts are not held to expiry but closed out before that. If held until expiry, some are settled for cash and others for physical delivery.

Case Study

ABC Ltd.

The following data relates to ABC Ltd.'s share prices:

Current price per share	₹ 180
Price per share in the futures market-6 months	₹ 195

It is possible to borrow money in the market for securities transactions at the rate of 12% per annum.

1. Calculate the theoretical minimum price of a 6-month forward contract.
2. Explain if any arbitraging opportunities exist.

Notes

8.5.3 Options

"An option is a contractual agreement that gives the option buyer the right, but not the obligation, to purchase (in the case of a call option) or to sell (in the case of a put option) a specified instrument at a specified price at any time of the option buyer's choosing by or before a fixed date in the future. Upon exercise of the right by the option holder, an option seller is obliged to deliver the specified instrument at the specified price."

The growth in organised option markets has resulted with the developments in Option Pricing. A theory, in this regard made by Black and Scholes (1973); and has been modified and extended. The option market is not only extended to stocks dealings but also to foreign currencies, commodities etc. An option is the right but not the obligation to enter into a transaction. An option is the right, to buy or sell something at a stated date at a stated price. An option contract gives the holder of the contracts the option to buy or sell shares at a specified price on or before a specific date in the future. The buyer of the contract pays the writer (or seller) for the right, but not the obligation, to purchase shares etc. or sell shares etc. to the writer at the price fixed by the contract (the striking or exercise price). The right to choose, therefore the option, is sold by the seller (writer) of the option to the purchaser (holder) in return for a payment (premium). The right conveyed by the option only lasts a certain period of time and then the right expires – at its maturity or expiration. The seller of an option has no choice. He must meet his obligation to buy/sell if the right of the purchaser to do so is exercised at the agreed exercise/strike rate. It is the purchaser who has choice, he does not have to exercise the right to buy/sell at the strike rate agreed if it is better from his prospective to buy/sell out spot, he can instead walk away from the option. In this respect, options differ from futures where holders of positions do have the obligation to buy/sell the underlying asset. At worst the purchaser will lose the premium, but can gain substantially if the option is worth exercising. Options come in two varieties – European and American. In the European option, the holder of the option can only exercise his right (if he so desire) on the expiration date. In an American option, he can exercise this right any time between purchase date and the expiration date. Options are categorised into – (a) Call option, and (b) Put option.

Features of Options

The important features of option contracts are as follows:

1. The option is exercisable only by the owner, namely the buyer of the option.
2. The owner has limited liability.
3. Owners of options have no right affordable to shareholders such as voting right and dividend right.
4. Options have high degree of risk to the option writers.
5. Options are popular because they allow the buyer profits from favourable movements in exchange rate.
6. Options involve buying counter positions by the option sellers.
7. Flexibility in investors needs.
8. No certificates are issued by the company.
9. An investor who writes a call option against stock held in his portfolio is said to be selling 'covered options.' Options sold without the stock to back them up are called 'naked options.'

Notes

Differences between Futures and Options

The key difference between futures and options is that the former involve obligations, whereas the latter confer rights. Futures are a contractual obligation to buy and sell at an agreed price at a future date. The contract terms are standardised by futures exchanges, and the obligation, from both buyer and seller, is confirmed when the initial margin, or deposit, changes hands. An option does not carry the same obligations. Buyers pay a premium for the right to purchase (or sell, in the case of put options) an agreed quantity of some underlying asset by a future date. The option buyer then has a further decision to make, which is that of exercising his option if he chooses to buy the underlying asset. In most cases, however, he will take whatever profit there is available by selling his option back at a higher price (this is why they are known as 'traded options'). The futures contract margin is, therefore, the basis of a contractual commitment, while the option premium represents the purchase of exercisable rights. In both, the concept of gearing is crucial, although there are differences. Option premiums are a wasting asset, and are much affected by the volatility of the underlying price. Futures margins are not a wasting asset and are affected differently by volatility. These key variations causes important differences in the risk/reward relationships involved in investing in either futures or options. Both futures and options are useful derivatives but have some fundamental differences between the two types of derivatives. They are:

Futures	Options
1. Both the parties are obliged to perform the contract.	1. Only the seller (writer) is obligated to perform the contract.
2. No premium is paid by either party.	2. The buyer pays the seller (writer) a premium.
3. The holder of the contract is exposed to the entire spectrum of downside risk and has potential for all the upside return.	3. The buyer's loss is restricted to downside risk to the premium paid, but retains upward indefinite potentials.
4. The parties of the contract must perform at the settlement date. They are not obligated to perform before the date.	4. The buyer can exercise option any time prior to the expiry date.

Types of Options

Options are classified into two broad categories:

1. Call Option, and
2. Put Option

A call option gives the holder the right to buy an underlying asset by a certain date for a certain price. The seller is under an obligation to fulfil the contract and is paid a price of this, which is called "the call option premium or call option price."

A put option, on the other hand gives the holder the right to sell an underlying asset by a certain date for a certain price. The buyer is under an obligation to fulfil the contract and is paid a price for this, which is called "the put option premium or put option price."

The price at which the underlying asset would be bought in the future at a particular date is the 'Strike Price' or the 'Exercise Price.' The date on the options contract is called the 'Exercise date', 'Expiration Date' or the 'Date of Maturity.'

There are two kinds of options based on the date. The first is the European Option, which can be exercised only on the maturity date. The second is the American Option, which can be exercised before or on the maturity date.

Notes

In most exchanges the options trading starts with European Options, as they are easy to execute and keep track of. This is the case in the BSE and the NSE. Cash settled options are those where, the buyer is paid the difference between stock price and exercise price (call) or between exercise price and stock price (put). Delivery settled options are those where the buyer takes delivery of undertaking (calls) or offers delivery of the undertaking (puts).

Call Options

The following example would clarify the basics on Call Options.

A call option give the buyer the right but not the obligation to buy a given quantity of the underlying asset, at a given price known as 'exercise price' or 'strike price' on or before a given future date called the 'maturity date' or 'expiry date'. A call option gives the buyer the right to buy a fixed number of shares/commodities in a particular security at the exercise price up to the date of expiration of the contract. The seller of an option is known as 'writer.' Unlike the buyer, the writer has no choice regarding the fulfilment of the obligations under the contract. If the buyer wants to exercise his right, the writer must comply. For this asymmetry of privilege, the buyer must pay the writer the option price, which is known as 'premium.'

Example: An investor buys one European Call option on one share of Reliance Petroleum at a premium of ₹ 2 per share on July 31. The strike price is ₹ 60 and the contract matures on September 30. The pay-off table shows the pay-offs for the investor on the basis of fluctuating spot prices at any time. It may be clear from the following graph that even in the worst-case scenario, the investor would only lose a maximum of ₹ 2 per share, which he/she had paid for the premium. The upside to it has an unlimited profit opportunity.

On the other hand, the seller of the call option has a pay-off chart completely reverse of the call options buyer. The maximum loss that he can have is unlimited, though the buyer would make a profit of ₹ 2 per share on the premium payment.

Pay-off from Call Buying/Long (₹)				
S	**X_t**	**c**	**Payoff**	**Net Profit**
57	60	2	0	-2
58	60	2	0	-2
59	60	2	0	-2
60	60	2	0	-2
61	60	2	1	-1
62	60	2	2	0
63	60	2	3	1
64	60	2	4	2
65	60	2	5	3
66	60	2	6	4

A European call option gives the following payoff to the investor: max ($S - X_t$, 0).

The seller gets a payoff of: –max ($S - X_t$, 0) or min ($X_t - S$, 0).

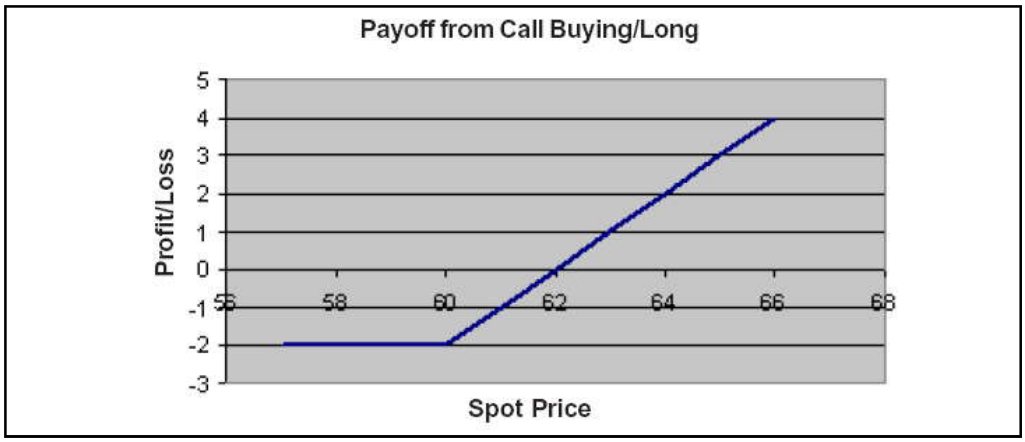
S – Stock Price

X_t – Exercise Price at time 't'

C – European Call Option Premium

Pay-off – Max ($S - X_t$, O)

Notes



Net Profit - Payoff minus 'c'

Notes

Option Position and Strategies

The Call option gives the buyer a right to buy the requisite shares on a specific date at a specific price. This puts the seller under the obligation to sell the shares on that specific date and specific price. The Call buyer exercises his option only when he/she feels it is profitable. This process is called "exercising the option." This leads us to the fact that if the spot price is lower than the strike price then it might be profitable for the investor to buy the share in the open market and forgo the premium paid.

The implications for a buyer are that it is his/her decision whether to exercise the option or not. In case the investor expects prices to rise far above the strike price in the future then he/she would surely be interested in buying call options. On the other hand, if the seller feels that his shares are not giving the desired returns and they are not going to perform any better in the future, a premium can be charged and returns from selling the call option can be used to make up for the desired returns. At the end of the options contract there is an exchange of the underlying asset. In the real world, most of the deals are closed with another counter or reverse deal. There is no requirement to exchange the underlying assets then as the investor gets out of the contract just before its expiry.

Put Options

The European Put Option is the reverse of the call option deal. Here, there is a contract to sell a particular number of underlying assets on a particular date at a specific price. An example would help understand the situation a little better:

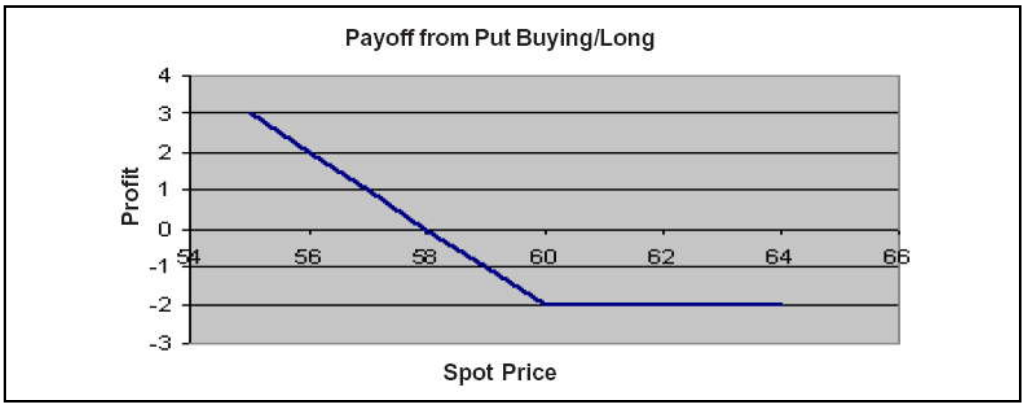
Example: An investor buys one European Put Option on one share of Reliance Petroleum at a premium of ₹ 2 per share on July 31. The strike price is ₹ 60 and the contract matures on September 30. The pay-off table shows the fluctuations of net profit with a change in the spot price.

Notes

Pay-off from Put Buying/Long (₹)				
S	X_t	p	Payoff	Net Profit
55	60	2	5	3
56	60	2	4	2
57	60	2	3	1
58	60	2	2	0
59	60	2	1	-1
60	60	2	0	-2
61	60	2	0	-2
62	60	2	0	-2
63	60	2	0	-2
64	60	2	0	-2

The pay-off for the put buyer is: max (X_t – S, 0)

The pay-off for a put writer is: -max (X_t – S, 0) or min (S – X_t, 0)



These are the two basic options that form the whole gamut of transactions in the options trading. These in combination with other derivatives create a whole world of instruments to choose from depending on the kind of requirement and the kind of market expectations.

Case Study

Jensen Works it out for Helios

Helios Group, having its base in Chicago, USA and London, UK, was a client of Jensen Technologies LLC which provided high quality financial services custom software to the former. Helios Group was interested in adding more functionality and features to their existing trading platform, as well as expanding its connectivity options. Moreover, Helios needed someone to continuously improve the performance of the system without sacrificing quality or affordability.

Jensen Technologies developed several applications for the client's customized futures and options trading platform. This trading system was designed to execute trades across a variety of options and futures exchanges, worldwide, in real time. The company developed a wide variety of applications including a front-end trader's GUI for the Quote Application that allows a trader to see the list of current quote requests sorted by exchange. It also provides estimated quote values based on theoretical values and other parameters.

Contd...

Notes

Questions

1. Do you think that the Helios was adding more functionality and features to their existing trading portfolio? Why/why not?
2. Do you justify the solution given by Jensen? Why/why not?

Source: www.russoft.org

Options undertakings

Stocks

Foreign Currencies

Stock Indices

Commodities

Others: Futures Options, are options on the futures contracts or underlying assets are futures contracts. The futures contract generally matures shortly after the options expiration

Options are often classified as

In the money: These result in a positive cash flow towards the investor.

At the money: These result in a zero-cash flow to the investor.

Out of money: These result in a negative cash flow for the investor.

Did u know?

What are naked and covered options?

Naked Options: These are options that are not combined with an offsetting contract to cover the existing positions.

Covered Options: These are option contracts in which the shares are already owned by an investor (in case of covered call options) and in case the option is exercised then the offsetting of the deal can be done by selling these shares held.

Options Pricing Model

Prices of options commonly depend upon six factors. Unlike futures, which derive their prices primarily from prices of the undertaking, options' prices are far more complex. The table below helps to understand the effect of each of these factors and gives a broad picture of option pricing keeping all other factors constant. The table presents the case of European as well as American Options.

Effect of Increase in the Relevant Parameter on Option Prices

Spot prices: In case of a call option the pay-off for the buyer is max $(S - X_t, 0)$ therefore, more the Spot Price more is the pay-off and it is favourable for the buyer. It is the other way round for the seller, more the Spot Price higher are the chances of his going into a loss.

Notes

	European Options Buying		American Options Buying			
PARAMETERS	CALL	PUT	CALL		PUT	
Spot Price (S)	↑	↓	↑		↓	
Strike Price (X_t)			↓	↑	↓	↑
Time to Expiration (T)			?	?	↑	↑
Volatility ()			↑	↑	↑	↑
Risk Free Interest Rates (r)			↑	↓	↑	↓
Dividends (D)			↓	↑	↓	↑

↑	Favourable
↓	Unfavourable

In case of a put option, the pay-off for the buyer is max (X_t – S, 0) therefore, more the spot price more are the chances of going into a loss. It is the reverse for Put Writing.

Strike price: In case of a call option the pay-off for the buyer is shown above. As per this relationship a higher strike price would reduce the profits for the holder of the call option.

Time to expiration: More the time to expiration more favourable is the option. This can only exist in case of American option as in case of European Options. The options contract matures only on the date of maturity.

Volatility: More the volatility, higher is the probability of the option generating higher returns to the buyer. The downside in both the cases of call and put is fixed, but the gains can be unlimited. If the price falls heavily in case of a call buyer then the maximum that he looses is the premium paid and nothing more than that. More so he/she can buy the same shares from the spot market at a lower price. Similar is the case of the put option buyer. The table show all effects on the buyer side of the contract

Risk-free rate of interest: In reality the rate of interest and the stock market is inversely related. But theoretically speaking, when all other variables are fixed and interest rate increases, this leads to a double effect: Increase in expected growth rate of stock prices discounting factor increases making the price fall.

In case of the put option both these factors increase and lead to a decline in the put value. A higher expected growth leads to a higher price taking the buyer to the position of loss in the pay-off chart. The discounting factor increases and the future value becomes lesser

In case of a call option these effects work in the opposite direction. The first effect is positive as at a higher value in the future the call option would be exercised and would give a profit. The second affect is negative as is that of discounting. The first effect is far more dominant than the second one, and the overall effect is favourable on the call option.

Dividends: When dividends are announced then the stock prices on ex-dividend are reduced. This is favourable for the put option and unfavourable for the call option.

Option Pricing Models

These models are mathematical formulas used in determining theoretical values for option contracts. Professional option traders commonly use these models to make bid and ask prices on a timely basis during the trading, to keep the prices of calls and puts in proper numerical relationship, and for monitoring and adjusting their risk. Some individual investors find these models useful when considering a price to buy or sell an option contract. Option pricing models

Notes

generally require six inputs: underlying price, strike price, time to expiration, interest rates, dividend amount and volatility.

The term 'fair value' (also 'theoretical value') refers to a theoretical option price generated by an option pricing model. Because pricing models require an assumption about an underlying stock or index's future volatility as input, values produced by these formulas are ultimately subjective.

Volatility is fluctuation, not direction, of stock price movement. It represents the standard deviation of day-to-day price changes, expressed as an annualized percentage.

Option traders are generally interested in two types of volatility: historical and implied.

1. An underlying stock's historical volatility represents its actual price fluctuation as observed over a specific period in the past.
2. An option's implied volatility (as derived from an option pricing calculator or displayed on many option chains) represents a forecast of the underlying stock's volatility as implied by the option's price in the marketplace. In other words, it is the volatility measurement that would be needed as input into a pricing model to generate a theoretical value the same as the options current market price.

It is often asked why an option change in price didn't change as much as the underlying stock. You should expect only deep in-the-money calls and puts to change in price as much as the underlying stock. A theoretical sensitivity of option value to underlying stock price movement can be quantified by an option's "delta," generated by an option pricing model, which can range from 0 to 1.00. At-the-money calls and puts have deltas around 0.50, which implies an expected change in option price by 0.50 (or 50%) of underlying stock price change. Deep-in-the-money options may have deltas up to 1.00, implying an expected change in option price of up to 100% the change in stock price. Out-of-the-money calls and puts have deltas less than 0.50, down to a low of 0. An option pricing calculator may generate deltas.

Lets not forget about liquidity. Liquidity is a trading environment characterized by high trading volume. Liquid markets commonly have narrow spreads between the bid and ask prices, and the ability to accept larger orders without significant price changes. Always keep in mind that Index and Equity Options with poor liquidity will serve as a disadvantage to the trader due to wider bid ask spreads and less favourable fills. We should always consider the liquidity issue prior to getting involved in the trading of options in these areas.

The Black-Scholes model and the Cox, Ross and Rubinstein binomial model are the primary option pricing models. Both models are based on the same theoretical foundations and assumptions (such as the geometric Brownian motion theory of stock price behaviour and risk-neutral valuation). However, there are also some important differences between the two models and these are highlighted below.

Black Scholes Model: The Black-Scholes model is used to calculate a theoretical call price (ignoring dividends paid during the life of the option) using the five key determinants of an option's price: stock price, strike price, volatility, time to expiration, and short-term (risk free) interest rate.

The original formula for calculating the theoretical option price (OP) is as follows:

$$OP = SM(d_1) - Xe^{-rt}N(d_2)$$

Where:

$$d_1 = \frac{\ln\left(\frac{S}{X}\right) + \left(r + \frac{v^2}{2}\right)t}{v\sqrt{t}}$$

$$d_2 = d_1 - v\sqrt{t}$$

Notes

The variables are:

S = Stock price

X = Strike price

t = Time remaining until expiration, expressed as a percent of a year

r = Current continuously compounded risk-free interest rate

v = Annual volatility of stock price (the standard deviation of the short-term returns over one year). See below for how to estimate volatility.

ln = Natural logarithm

N(x) = Standard normal cumulative distribution function

e = Exponential function

or

The Black-Scholes model for valuing a European call is:

$$C = SN(d_1) - Xe^{-r(T-t)} N(d_2)$$

Where,

$$D_1 = \frac{\ln(S/X) + (r + \sigma^2/2(T-t)}{\sigma\sqrt{T-t}}$$

$$D_2 = d_1 - \sigma\sqrt{T-t}$$

C = Call option premium

S = Current asset price

X = Exercise price

T-t = Time to expiry in decimals of a year

σ = The annualized standard deviation of the natural log of the asset price relative in decimals

ln = Natural logarithm

$N(d_1)$ = Cumulative standard normal probability distribution

d_1 and d_2 = Standardised normal variables

r = Risk-free rate on interest in decimals (continuously compounded)

Example: The current asset price is 35.0, the exercise price is 35.0, the risk-free rate of interest is 10%, the volatility is 20% and the time to expiry is one year. Thus S = 35, X = 35, (T – t) = 1.0, r = 0.1 and σ = 0.2.

Solution:

First, we calculate d_1, then d_2 and, finally, the present value of the exercise price $Xe^{-r(T-t)}$

$$d_1 = \frac{\ln(35/35) + (0.1 + 0.2^2/2) \times 1.0}{0.2\sqrt{1.0}} = 0.60$$

$$d_2 - d_1 - 0.2\sqrt{1.0} = 0.4$$

$$Xe^{-r(T-t)} = 35e^{-(0.1 \times 1.0)} = 31.66934$$

Notes

Then, the equation for the call looks like this:

$$c = 35N(0.6) - 31.6693N(0.4)$$

Here d_1 is a standardised normal random variable $N(d_1)$ is a cumulative standardised normal probability distribution. It represents the area under the standardised normal curve from Z.

By referring to mathematical table given at the end of book on the standardised normal distribution we can arrive at the values of $-N(d_1)$ and $N(d_2)$ as follows:

The value of $N(d_1)$ when $d_1 = 0.6$ is 0.7257

The value of $N(d_2)$ when $d_2 = 0.4$ is 0.6554

When the above values are substituted in the equation, then

$$c = 35\ (0.7257) - 31.6693\ (0.6554) - 4.6434$$

Valuing Put Options with the Black-scholes Model

An alternative form of valuation is to use the Black-Scholes formula for a put, which is:

$$P = Xe^{-r(T-t)}\ [(1 - N(d_1)_1] - S[1 - N(d_1)]$$

Where d_1 and d_2 are as given in the section deriving a call option.

Note that $[1 - N(d_2)]$ is the same as $N(-d_2)$ and $[1 - N(d_1)]$ is the same as $N(-d_1)$.

Using the same data that we used in valuing the call, the put option value is calculated as follows:

$$P = 31.6693\ (0.3446) - 35(0.2743) = 1.3127$$

Example: Calculate the value of option from the following information

S = ₹ 20, K = ₹ 20, t = 3 months or 0.25 years

r = 1296 = 0.12, $\sigma^2 = 0.16$

Solution:

Since d_1 and d_2 are required inputs for Black-Scholes Option Pricing Model.

$$d_1 = \frac{\ln(20/20) + (0.12+(0.16/2)(0.25)}{0.40(0.50)}$$

$$= \frac{0 + 0.05}{0.20} = 0.25$$

$$d_2 = d_1 - 0.20 = 0.05$$

$$N(d_1) = N(0.25)$$

$$N(d_2) = N(0.05)$$

The above two represent area under a standard normal distribution function.

From table given at the end of the book, we see that value $d_1 = 0.25$ implies a probability of 0.0987 + 0.5000 = 0.5987, so $N(d_1) = 0.5987$. Similarly, $N(d_2) = 0.5199$. We can use those values to solve the equation in Black-Scholes Option Pricing Model

Notes

$$C = ₹\ 20\ [N(d_1)] - ₹\ 20\ e^{(-0.12 \times 0.25)}\ [N(d_2)]$$

$$= ₹\ 20\ [N(0.25)] - ₹\ 20(0.9704)[N(0.05)]$$

$$= ₹\ 20(0.5987) - ₹\ 19.41\ (0.5199)$$

$$= ₹\ 11.97 - ₹\ 10.09$$

$$= ₹\ 1.88$$

Lognormal Distribution

The model is based on a normal distribution of underlying asset returns, which is the same thing as saying that the underlying asset prices themselves are lognormally distributed. A lognormal distribution has a longer right tail compared with a normal, or bell-shaped, distribution. The lognormal distribution allows for a stock price distribution between zero and infinity (i.e. no negative prices) and has an upward bias (representing the fact that a stock price can only drop 100% but can rise by more than 100%).

In practice, underlying asset price distributions often depart significantly from the lognormal. For example, historical distributions of underlying asset returns often have fatter left and right tails than a normal distribution indicating that dramatic market moves occur with greater frequency than would be predicted by a normal distribution of returns – i.e. more very high returns and more very low returns.

A corollary of this is the volatility smile – the way in which at-the-money options often have a lower volatility than deeply out-of-the-money options or deeply in-the-money options.

Modified Black-Scholes and binomial pricing models (using implied binomial trees) are deployed for European and American option pricing with non-lognormal distributions. These models can be used to gauge the impact on option prices of non-lognormal price distributions (as measured by coefficients of skewness (symmetry) and kurtosis (fatness of distribution tails and height of peaks)), and to calculate and plot the volatility smile implied by these distributions.

Measuring the degree to which historical asset price distributions diverge from the lognormal (as measured by coefficients of skewness and kurtosis).

Task

The stock option has 120 days until expiration and the strike price is ₹ 85. The simple rate of interest is 6% p.a. The underlying asset value is ₹ 80 and the volatility (standard deviation) is 0.30.Calculate the value of the stock option.

Relationship with Black-Scholes Model

The same underlying assumptions regarding stock prices underpin both the binomial and Black-Scholes models: that stock prices follow a stochastic process described by geometric Brownian motion. As a result, for European options, the binomial model converges on the Black-Scholes formula as the number of binomial calculation steps increases. In fact the Black-Scholes model for European options is really a special case of the binomial model where the number of binomial steps is infinite. In other words, the binomial model provides discrete approximations to the continuous process underlying the Black-Scholes model.

Notes

The Binomial Model

The binomial model breaks down the time to expiration into potentially a very large number of time intervals, or steps. A tree of stock prices is initially produced working forward from the present to expiration. At each step it is assumed that the stock price will move up or down by an amount calculated using volatility and time to expiration. This produces a binomial distribution, or recombining tree, of underlying stock prices. The tree represents all the possible paths that the stock price could take during the life of the option.

At the end of the tree – i.e. at expiration of the option – all the terminal option prices for each of the final possible stock prices are known, as they simply equal their intrinsic values.

Next, the option prices at each step of the tree are calculated working back from expiration to the present. The option prices at each step are used to derive the option prices at the next step of the tree using risk neutral valuation based on the probabilities of the stock prices moving up or down, the risk-free rate and the time interval of each step. Any adjustments to stock prices (at an ex-dividend date) or option prices (as a result of early exercise of American options) are worked into the calculations at the required point in time. At the top of the tree you are left with one option price.

To get a feel for how the binomial model works you can use the on-line binomial tree calculators: either using the original Cox, Ross and Rubinstein tree or the equal probabilities tree, which produces equally accurate results while overcoming some of the limitations of the C-R-R model. The calculators let you calculate European or American option prices and display graphically the tree structure used in the calculation. Dividends can be specified as being discrete or as an annual yield, and points at which early exercise is assumed for American options are highlighted.

Advantages

The big advantage the binomial model has over the Black-Scholes model is that it can be used to accurately price American options. This is because with the binomial model it is possible to check at every point in an option's life (i.e. at every step of the binomial tree) for the possibility of early exercise (e.g. where, due to a dividend, or a put being deeply in the money, the option price at that point is less than its intrinsic value).

Where an early exercise point is found it is assumed that the option holder would elect to exercise, and the option price can be adjusted to equal the intrinsic value at that point. This then flows into the calculations higher up the tree and so on.

The on-line binomial tree graphical option calculator highlights those points in the tree structure where early exercise would have caused an American price to differ from a European price.

The binomial model basically solves the same equation, using a computational procedure that the Black-Scholes model solves using an analytic approach and in doing so, provides opportunities along the way to check for early exercise for American options.

Limitation

The main limitation of the binomial model is its relatively slow speed. It's great for half a dozen calculations at a time but even with today's fastest PCs it's not a practical solution for the calculation of thousands of prices in a few seconds.

Notes

Binomial Option Pricing Model

The binomial model has proved over time to be the most flexible, intuitive and popular approach to option pricing. It is based on the simplification that over a single period (of possibly very short duration), the underlying asset can only move from its current price to two possible levels. Among other virtues, the model embodies the assumptions of no riskless arbitrage opportunities and perfect markets. Neither does it rely on investor risk aversion or rationality, nor does its use require estimation of the underlying asset expected return. It also embodies the risk-neutral valuation principle, which can be used to shortcut the valuation of European options. In addition, we show later, that the Black-Scholes formula is a special case applying to European options resulting from specifying an infinite number of binomial periods during the time-to-expiration.

Nonetheless, a binomial tree has several curious, and possibly limiting, properties. For example, all sample paths that lead to the same node in the tree have the same risk-neutral probability. The types of volatility – objective, subjective and realized – are indistinguishable; and, in the limit, its continuous-time sample path is not differentiable at any point.

Another way to approach binomial option pricing is through the inverse problem, implied binomial trees. Instead of presuming we know the underlying asset volatility in advance to construct the up and down moves in the tree, we use the current prices of related options to infer the size of these moves.

Binomial trees can also be used to determine the sensitivity of option values to the underlying asset price $(\delta \text{ and } \gamma)$, to the time-to-expiration (τ), to volatility (vega), to the riskless return (rho), and to the payout return (lambda). Of these, gamma is particularly important because it measures the times in the life of the option when replication is likely to prove difficult in practice. Fugit measures the risk-neutral expected life of the option and can also be calculated from a binomial tree.

The standard binomial option pricing model for options on assets can easily be extended to options on futures and options on foreign currencies. In addition, the model continues to work even if its parameters are time-dependent, asset price-dependent, or dependent on the prior path of the underlying asset price. But it fails if its parameters depend on some other random variable. A more difficult task is to extend the binomial model to value options on bonds.

8.6 Summary

- Derivatives are a new invention of the international financial markets, which are traded both in Over-the-Counter and Exchanges.
- Derivatives are very much useful for the concerns whose potential profits are volatile due to changes in weather conditions like agricultural products processing, power generation, oil exploration, tourism, insurance, etc.
- Credit derivatives have been invented to hedge the risk of banks, financial institutions.
- Credit derivatives allow users to isolate price and trade firm-specific risk into its component parts and transfer each risk to those best suited or more interested in managing it.
- Margin money is to be kept with the exchange for entering into futures contracts, as this aims to minimise the risk of default by the counter party.
- The futures contracts overcome the problems faced by forward contracts, since futures contracts are entered into under the supervision and control of an organised exchange.
- The futures contracts are entered into for a wide variety of instruments like agricultural commodities, minerals, industrial raw materials, financial instruments etc.

Notes

- Options contract gives the holder of the contract the option to buy or sell the asset at a specified price on or before a specific date in the future.
- The option is sold by the seller (writer) to the purchaser (holder) in return for a payment (premium).
- In a European option, the holder of the option can exercise his right (if he desires) only on the expiration date.
- In a call option the buyer receives the right, but not the obligation to buy a given quantity of the underlying asset at an exercise price or strike price on or before a given future date called 'maturity date' or 'expiry date.'
- The put option gives the buyer the right but not the obligation, to sell a given quantity of the underlying asset at a given price on or before a given expiry date.
- In determination of prices of the options, some of the important factors like future price, strike price, interest rates, time of the option, volatility of the market, etc., will exert their influence.

8.7 Keywords

Arbitrageurs: Riskless profit making is the prime goal of arbitrageurs. Buying in one market and selling in another, buying two products in the same market are common.

Credit Derivative: A financial instrument used to mitigate or to assume specific forms of credit risk by hedgers and speculators.

Hedgers: The objective of these kinds of traders is to reduce the risk. They are not in the derivatives market to make profits. They are in it to safeguard their existing positions.

Put Option: The reverse of the call option deal. Here, there is a contract to sell a particular number of underlying assets on a particular date at a specific price.

Speculators: They are traders with a view and objective of making profits. They are willing to take risks and they bet upon whether the markets would go up or come down.

8.8 Self Assessment

Fill in the blanks:

1. ..... could be making money even without putting their own money in.
2. A ..... gives the buyer the right but not the obligation to buy a given quantity of the underlying asset.
3. The ..... contract margin is the basis of a contractual commitment.
4. The price at which the underlying asset would be bought in the future at a particular date is the ..... or the .....
5. The date on the ..... contract is called the 'Exercise date', 'Expiration Date' or the 'Date of Maturity.'
6. ..... options are those where the buyer takes delivery of undertaking (calls) or offers delivery of the undertaking.
7. The key difference between futures and options is that the former involves ....., whereas the latter confer .....

Notes

8. An investor who writes a call option against stock held in his portfolio is said to be selling .....
9. A ..... position in futures, can be closed out by selling futures.
10. Purchasing long an interest rate futures contract protects against a ..... in interest rates.
11. Options are popular because they allow the buyer profits from ..... movements in exchange rate.
12. An option contract gives the holder of the contracts the option to ..... shares at a specified price on or before a specific date in the future.
13. The seller of the contract makes a profit when the contract price is ..... the spot price.
14. With a ..... position, a loss ensues if the asset price rises but profits are generated if the asset price falls.
15. ..... is the result of a negative basis where nearer maturing contracts has higher futures prices than far-off maturing contract.

8.9 Review Questions

1. Do you think that the stock market will receive a boost with trading in derivatives in individual securities? State your view with reasons.
2. List out the simple strategies played in the futures market.
3. How are prices determined under futures contracts?
4. Evaluate the growth of the derivatives market in India.
5. How do Currency Futures relate to Spot Rates and Forward Exchange Rates?
6. Have you ever heard about open outcry? Does it exist in India? Why/why not?
7. $32,000 on the preferred dividends in arrears 2 years

   $16,000 on the preferred dividends in arrears in the current year

   Preferred stock = 200,000 shares of 8% cumulative and participating, $10 par value

   Common stock = 800,000 shares of $10 par value.

   The Company wants to issue $80,000 to the preferred stock holders, with a 15% participation. How much is the Company going to pay the common stockholders? How much is the total dividend payout?
8. If current stock price is 41 annual risk free rate is 6 and 1 year call option with a strike price of 55 sells for 7.20 what is the value of a put option?
9. Dow Jones futures are very popular these days. What are they? What drives the Dow Jones futures?
10. How do you calculate gain and loss on covered call options? What are its benefits?
11. In your opinion, what is riskier a call or a put option, and why?
12. In your opinion, how is zero sum maintained in futures trading when speculators outnumber hedgers?
13. It is said that trading in Futures and Options is very risky. Why so?

Notes

Answer: Self Assessment

1. Arbitrageurs
2. call option
3. futures
4. 'Strike Price', 'Exercise Price'
5. options
6. Delivery settled
7. obligations, rights
8. 'covered options'
9. long
10. fall
11. favourable
12. buy or sell
13. above
14. short
15. Normal backwardation

8.10 Further Readings

Books

Chitale, Rajendra P., 2003, *Use of Derivatives by India's Institutional Investors: Issues and Impediments*, in Susan Thomas (ed.), Derivatives Markets in India, Tata McGraw-Hill Publishing Company Limited, New Delhi, India.

Granger, Clive W. and Morgenstern Oskar, *Predictability of Stock Market Prices*, Lexington, Health Lexington.

Hull J.C., *Introduction to Futures & Options Markets*, Prentice Hall, Englewood Cliffs, New Jersey.

Unit 9: Portfolio Management

Notes

CONTENTS

Objectives

Introduction

9.1 Turning your Goals into a Strategy

9.2 Risk-reward Concept

9.3 Investment Risk Pyramid

9.4 Portfolio Strategies

9.5 Building an Investment Portfolio

9.6 Risk Reduction in the Stock Portion of a Portfolio

9.7 Value Investing

9.8 Growth Investing

9.9 Summary

9.10 Keywords

9.11 Self Assessment

9.12 Review Questions

9.13 Further Readings

Objectives

After studying this unit, you will be able to:

- Explain Risk-Reward Concept
- Discuss Investment Risk Pyramid
- Explain specification of investment objectives and constraints
- Describe portfolio strategy formulation
- Discuss asset allocation
- Define asset classes
- Explain diversification
- Discuss risk reduction in the stock portion of a portfolio
- Understand the selection of asset mix
- Discuss selection security
- Describe portfolio execution
- Explain growth investing
- Understand value investing
- Explain performance index

Notes

Introduction

Building a successful investment plan for the twenty-first century may require a fundamental change in the way we think about investing. For instance, while taking less risk, a portfolio comprised of only 60% equities that outperforms the Sensex by a wide margin should certainly be considered a superior portfolio. Furthermore, new advances in investment and finance offer us solutions both simpler and more elegant (and very, very different) than what we grew up with.

We have been conditioned to think of market timing, stock selection, and manager performance as the keys to success. Because these beliefs are deeply ingrained, even superior investment strategies, like Strategic Global Asset Allocation, take a little getting used to.

What I'm advocating is so different from public expectations that sometimes people look at me as if I'm not quite right or a few bricks short of a full load. For instance:

1. As an investment advisor, I'm expected to have an opinion on where the market is going. Well, I have an opinion, but it's no more likely to come true than yours or your dog's. People are offended and disappointed when I tell them that.

   Thanks to the media, we are exposed daily to countless 'experts' who are worried about the market. Their indicators and forecasts point to a possible 'correction.' They are prepared to retreat to the 'safety' of cash. This allows them to look responsible, conservative, and caring. By pandering to the public's fear, they hope thousands of anguished investors will decide to trust them with their money. On the other hand, advisors who insist on remaining fully invested at all times appear wild and crazy.

2. Advisors are supposed to beat somebody or something. Often the first question people will ask is: "What kind of numbers have you achieved this year?" Those numbers become the chief yardstick to determine if the advisor is good or bad.

3. I'm still waiting for the first investor to ask: "What's the best long-term allocation?" Or, "How much risk do I need to take to meet my goals?"

Without tools to evaluate risk or choose between alternative strategies, investors are left with just one number to compare performance. By default, year-to-date or last year's performance figures are the only criteria for measurement. If those figures alone determined a successful investment plan, we could all buy one copy of Money Magazine each year, pick the single, top-performing mutual fund, and go sailing. Unfortunately, the Money Magazine approach is often the worst way to form a strategy.

Did u know? **What are the phases of Portfolio Management?**

1. Specification of investment objectives and constraints
2. Choice of asset mix
3. Formulation of portfolio strategy
4. Selection of securities
5. Portfolio execution
6. Portfolio revision
7. Portfolio evaluation

Notes

9.1 Turning your Goals into a Strategy

Every strategy has certain performance implications. The word strategy implies a conscious effort to achieve stated goals. Their concern is to at least meet their minimum acceptable return levels without taking excessive risk. They want a comfortable and stress-free retirement.

The asset-allocation design will determine results in both short- and long-term periods. What's more, both risk and returns will be driven far more by asset allocation than stock selection or market timing.

We could have looked at the 20-year, asset-class returns and seen that foreign, small-company stocks produced the highest return. But putting all the Joneses' money in foreign, small-company stocks will not produce a comfortable and stress-free retirement. Any asset class can and will have extended periods of serious under-performance from its long-term trend. And foreign, small-company stocks can and do have wild swings in short-term performance.

Specification of Investment Objectives

The commonly stated investment goals are income, growth and stability. Since income and growth represent two ways by which return is generated and stability implies containment of risk, investment objectives may be expressed more succinctly in terms of return and risk.

Constraints

You might be familiar with the risk-reward concept, which states that the higher the risk of a particular investment, the higher the possible return. But, many investors do not understand how to determine the level of risk their individual portfolios should bear. This unit provides a general framework that any investor can use to assess his or her personal level of risk and how this level relates to different investments.

9.2 Risk-reward Concept

This is a general concept underlying anything by which a return can be expected. Anytime you invest money into something there is a risk, whether large or small, that you might not get your money back. In turn, you expect a return, which compensates you for bearing this risk. In theory the higher the risk, the more you should receive for holding the investment, and the lower the risk, the less you should receive.

Determining your Risk Preference

With so many different types of investments to choose from, how does an investor determine how much risk he or she can handle? Every individual is different, and it's hard to create a steadfast model applicable to everyone, but here are two important things you should consider when deciding how much risk to take:

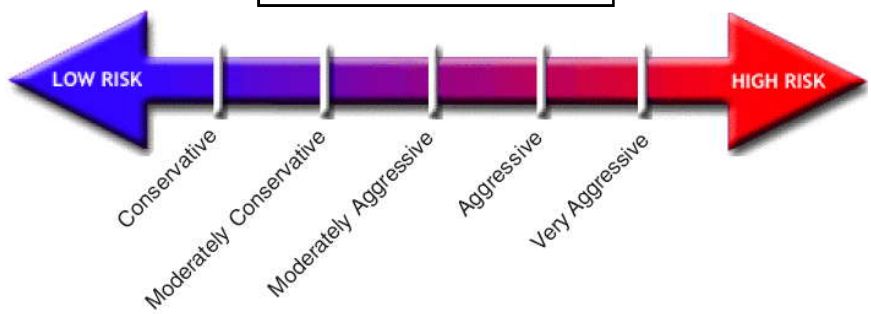
Time Horizon

Before you make any investment, you should always determine the amount of time you have to keep your money invested. If you have ₹ 20,000 to invest today but need it in one year for a down payment on a new house, investing the money in higher-risk stocks is not the best strategy. The riskier an investment is, the greater its volatility or price fluctuations, so if your time horizon is relatively short, you may be forced to sell your securities at a significant loss.

Notes

With a longer time horizon, investors have more time to recoup any possible losses and are therefore theoretically be more tolerant of higher risks. For example, if $20,000 is meant for a lakeside cottage that you are planning to buy in ten years, you can invest the money into higher-risk stocks because there is be more time available to recover any losses and less likelihood of being forced to sell out of the position too early.

Figure 9.1



Bankroll

Determining the amount of money you can stand to lose is another important factor of figuring out your risk tolerance. This might not be the most optimistic method of investing; however, it is the most realistic. By investing only money that you can afford to lose or afford to have tied up for some period of time, you won't be pressured to sell off any investments because of panic or liquidity issues.

The more money you have, the more risk you are able to take and vice-versa. Compare, for instance, a person who has a net worth of ₹ 50,000 to another person who has a net worth of ₹ 5,000,000. If both invest ₹ 25,000 of their net worth into securities, the person with the lower net worth will be more affected by a decline than the person with the higher net worth. Furthermore, if the investors face a liquidity issue and require cash immediately. They will not invest in risky projects.

9.3 Investment Risk Pyramid

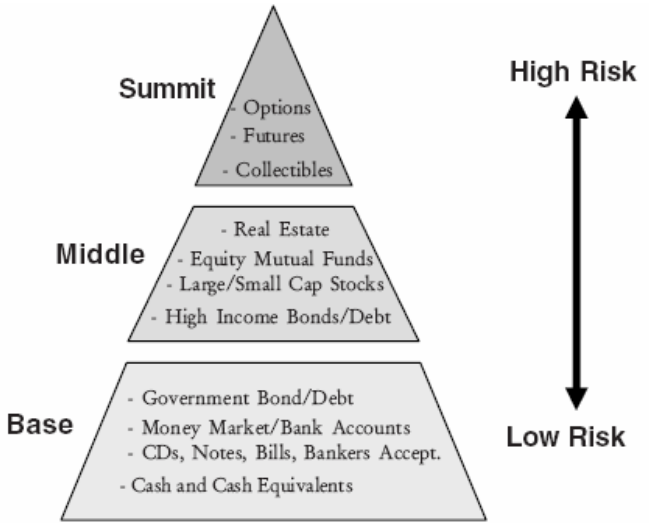
After deciding on how much risk is acceptable in your portfolio by acknowledging your time horizon and bankroll, you can use the risk pyramid approach for balancing your assets.

This pyramid can be thought of as an asset allocation tool that investors can use to diversify their portfolio investments according to the risk profile of each security. The pyramid, representing the investor's portfolio, has three distinct tiers:

1. ***Base of the Pyramid:*** The foundation of the pyramid represents the strongest portion, which supports everything above it. This area should be comprised of investments that are low in risk and have foreseeable returns. It is the largest area and composes the bulk of your assets.
2. ***Middle Portion:*** This area should be made up of medium-risk investments that offer a stable return while still allowing for capital appreciation. Although more risky than the assets creating the base, these investments should still be relatively safe.
3. ***Summit:*** Reserved specifically for high-risk investments, this is the smallest area of the pyramid (portfolio) and should be made up of money you can lose without any serious repercussions. Furthermore, money in the summit should be fairly disposable so that you don't have to sell prematurely in instances where there are capital losses.

Notes

Figure 9.2



Notes It's no secret that throughout history common stock has outperformed most financial instruments. If an investor plans to have an investment for a long period of time, his or her portfolio should be comprised mostly of stocks. Investors who don't have this kind of time should diversify their portfolios by including investments other than stocks.

For this reason, the concept of asset allocation was developed. Asset allocation is an investment portfolio technique that aims to balance risk and create diversification by dividing assets among major categories such as bonds, stocks, real estate, and cash. Each asset class has different levels of return and risk, so each will behave differently over time. At the same time, that one asset is increasing in value, another may be decreasing or not increasing as much.

The underlying principle of asset allocation is that the older a person gets, the less risk he or she should take on. After you retire, you may have to depend on your savings as your only source of income. It follows that you should invest more conservatively because asset preservation is crucial at this time in life.

Determining the proper mix of investments in your portfolio is extremely important. Deciding what percentage of your portfolio you should put into stocks, mutual funds, and low risk instruments like bonds and treasuries isn't simple, particularly for those reaching retirement age. Imagine saving for 30 or more years only to see the stock market decline in the years before your retirement.

9.4 Portfolio Strategies

Passive

One of the most profound ideas affecting the investment decision process, and indeed all of finance, is the idea that the securities markets, particularly the equity markets, are efficient. In an efficient market, the prices of securities do not depart for any length of time from the justified economic values that investors calculate for them. Economic values for securities are determined

Notes

by investor expectations about earnings, risks, and so on, as investors grapple with an uncertain future. If the market price of a security does depart from its estimated economic value, investors act to bring the two values together. Thus, as new information arrives in an efficient marketplace, causing a revision in the estimated economic value of a security, its price adjusts to this information quickly and, on balance, correctly. In other words, securities are efficiently priced on a continuous basis.

Passive strategies do not seek to outperform the market but simply to do as well as the market. The emphasis is on minimizing transaction costs and time spent in managing the portfolio because any expected benefits from active trading or analysis are likely to be less than the costs. Passive investors act as if the market is efficient and accept the consensus estimates of return and risk, accepting current market price as the best estimate of a security's value.

Active

Investors who do not accept the effective market hypothesis (EMH), or have serious doubts, pursue active investment strategies believing that they can identify undervalued securities and that lags exist in the market's adjustment of these securities' prices to new (better) information. These investors generate more search costs (both in time and money) and more transaction costs, but they believe that the marginal benefit outweighs the marginal cost incurred.

Most investment techniques involve an active approach to investing. In the area of common stocks, the use of valuation models to value and select stocks indicates that investors are analyzing and valuing stocks in an attempt to improve their performance relative to some benchmark such as a market index. They assume or expect the benefits to be greater than the costs.

Pursuit of an active strategy assumes that investors possess some advantage relative to other market participants. Such advantages could include superior analytical or judgment skills, superior information, or the ability or willingness to do what other investors, particularly institutions, are unable to do. For example, many large institutional investors cannot take positions in very small companies, leaving this field for individual investors. Furthermore, individuals are not required to own diversified portfolios and are typically not prohibited from short sales or margin trading as are some institutions.

Most investors still favour an active approach to common stock selection and management, despite the accumulating evidence from efficient market studies and the published performance results of institutional investors. The reason for this is obvious – the potential rewards are very large, and many investors feel confident that they can achieve such awards even if other investors cannot.

The most traditional and popular form of active stock strategies is the selection of individual stocks identified as offering superior return-risk characteristics. Such stocks typically are selected using fundamental security analysis, but technical analysis is also used, and sometimes a combination of the two. Many investors have always believed, and continue to believe, despite evidence to the contrary from the EMH, that they possess the requisite skill, patience, and ability to identify undervalued stocks.

Task Discuss which Portfolio Strategy do you think to be better and why.

Notes

9.5 Building an Investment Portfolio

We now consider how investors go about selecting stocks to be held in portfolios. Individual investors often consider the investment decision as consisting of two steps:

1. Asset allocation
2. Security selection

The asset allocation decision refers to the allocation of portfolio assets to broad asset markets; in other words, how much of the portfolio's funds are to be invested in stocks, how much in bonds, money market assets, and so forth. Each weight can range from 0% to 100%. Examining the asset allocation decision globally leads us to ask the following questions:

1. What percentage of portfolio funds is to be invested in each of the countries for which financial markets are available to investors?
2. Within each country, what percentage of portfolio funds is to be invested in stocks, bonds, bills, and other assets?
3. Within each of the major asset classes, what percentage of portfolio funds is to go to various types of bonds, exchange-listed stocks versus over-the-counter stocks, and so forth?

Many knowledgeable market observers agree that the asset allocation decision may be the most important decision made by an investor. According to some studies, for example, the asset allocation decision accounts for more than 90% of the variance in quarterly returns for a typical large pension fund.

According to some analyses, asset allocation is closely related to the age of an investor. This involves the so-called life-cycle theory of asset allocation. This makes intuitive sense because the needs and financial positions of workers in their fifties should differ, on average, from those who are starting out in their twenties. According to the life-cycle theory, for example, as individuals approach retirement they become more risk averse.

Asset Classes

Portfolio construction begins with the basic building blocks of asset classes, which are the following major categories of investments:

1. Cash (or cash equivalents such as money market funds)
2. Stocks
3. Bonds
4. Real Estate (including real estate investment trusts)
5. Foreign Securities

Caution Each investor must determine which of these major categories of investments is suitable for him/her. The next step, as discussed in the preceding section on asset allocation, is to determine which percentage of total investable assets should be allocated to each category deemed appropriate. Only then should individual securities be considered within each asset class.

Notes

Diversification

The insurance principle illustrates the concept of attempting to diversify the risk involved in a portfolio of assets (or liabilities). In fact, diversification is the key to the management of portfolio risk because it allows investors to minimize risk without adversely affecting return.

Random or naïve diversification refers to the act of randomly diversifying without regard to relevant investment characteristics such as expected return and industry classification. An investor simply selects a relatively large number of securities randomly – the proverbial "throwing a dart at The Wall Street Journal page showing stock quotes."

Case Study

Building a Recession-Proof Investment Portfolio

With economists forecasting tough times ahead, David's 2009 New Year resolution was to build an investment portfolio that would be able to withstand a bout of market volatility. David was a UK citizen aged 45 and hoped that if he could grow his investment steadily over the next five years, he would be able to build up a nice nest egg before retirement.

David had £10,000 to invest, which was currently in a high street instance access account (In UK, a high street account means 'very common'. High street instant access accounts are common savings account with a facility that allows customer to withdraw cash whenever he needs, without paying any penalities. This makes it similar to savings bank account in India). He wanted to protect his savings should he entered into a recession. Also, he expected a defensive portfolio with very little risk to savings, but with some potential for growth for next five years. Here's how, with the help of an Independent Financial Adviser (IFA) David constructed his portfolio.

Stockmarket Volatility

Normally a well-diversified investment portfolio would have a major allocation to equities. However, following five years of equity market growth, the current turmoil poses some tough choices for investors like David who are looking to build a portfolio from scratch. Equities are no longer looking such good value.

At the start of 2008, the FTSE 100 index of top UK companies was at a healthy level of 6,500. By the end of October the index had fallen by 3,000 points. There's no indication yet that the recent market volatility will be ending anytime soon.

By the end of 2008 the index was at 4,300. Equity markets are expected to continue to struggle during 2008. Therefore, David decided that he wanted to make sure that the bulk of his portfolio was in less risky investments.

David said "If I was twenty years younger, I would probably be more willing to take on riskier assets, as with markets looking to be quite cheap now, it's probably a great time to be investing."

"Sadly, at my age I can't afford to take any chances. I'm more interested in making sure my money is there when I need it to be."

Contd...

Notes

Investing in Cash

During tough times for stockmarkets, cash investments are usually considered the safest haven. However, for those cash savers used to earning a rate of interest of 6% plus, cash as an asset class is starting to look distinctly unappealing.

The Bank of England's has reduced UK interest rates from 5.25% last year to just 1.5%. This means that savers who put their faith in cash investments will hardly see their money grow.

Once the taxman has taken a share, and inflation has accounted for the rest, there's strong possibility that cash investments will give investors no returns at all.

David decided that, with £10,000 to invest, he should invest £7,200 in a 2008 stocks and shares ISA, investing the whole amount before the 2009 ISA season begins on 6 April 2009.

This meant that David would have to keep £3,000 in his high street instant access account until after this date, at which point he would look for a Cash ISA with a more competitive rate of interest.

"Savings rates on cash aren't that impressive at the moment, but my investment will be covered if my bank goes bust, and sometimes peace of mind is more important than higher returns", David said.

Investing in Bonds

David decided that with some of his money unavoidably tied up in cash, he wanted the rest of his portfolio to be able to generate higher consistent returns, by investing in assets that offered a fixed income, such as government bonds and corporate bonds.

Bonds are known as fixed income assets because they offer investors a consistent stream of payments (income) as well as the initial investment, returned at the end of the investment time period.

A bond fund enables investors to purchase units in a fund that invests in various types of bond. The advantage of this is that the bond fund is easily tradable and the fund manager can make the best investment decisions on your behalf.

Diversifying between Different Bond Types

Based on his IFA's recommendations, David invested £5,000 in two separate bond funds. The first fund (£2,000) invested solely in government bonds, the least risky of all investment types. David felt that given the recent volatility of markets, it made sense to keep a sensible portion of his portfolio as safe as possible.

David also chose to invest £3,000 in a separate fund invested in high quality investment grade corporate bonds, issued by some of the best companies in the UK and globally.

At present, corporate bond markets are offering a competitive rate of income, far superior than available from government bonds. The reason for this is that the risk attached to investing in companies is still much greater – now more than ever since recent high profile banks and other companies have gone bust – than investing through government issued securities.

David said: "sometimes you don't want your investments to be too complicated or risky. Bonds are boring and safe which, at the moment, suits me down to the ground."

Contd...

Notes

Investing in Defensive Equities

David still had £2,200 of his 2008 ISA allowance with which to invest, so he decided to also make an investment of some larger 'defensive' UK companies, with a fund in the UK equity income sector. His IFA asked his opinion on investing outside the UK, explaining that global markets have excellent potential for growth, although carry an extra level of risk.

David decided that, because he felt that the outlook for the rest of the world was so uncertain, he felt more comfortable investing in UK-based funds. He added: "I like the idea of having part of my investment in big UK companies, the sort of firms that I can keep an eye out for in the news and keep checking their progress."

David's IFA advised him that equity-based portfolio would be a good addition to his bond-focused portfolio. If stockmarkets rallied, his equity fund would benefit from the change in market sentiment. The IFA suggested that David should think about a UK equity income fund, which would aim to pay a regular income by investing in defensive UK companies.

David could always decide not to take the regular income from the investment, and keep it 'rolled up' in the fund, and see his money grow that way.

Conclusion David's IFA was well aware of his investment objectives and his attitude to risk before any investment was made. Given David's age and investment horizon, of between five and ten years, the IFA felt that the majority of the portfolio should be invested in low risk assets, although the equity holding offered some potential for future growth.

David explained: "I'm pretty happy with my portfolio, and with the recession getting worse this year, I wouldn't want to be invested in any other areas. This sort of portfolio may not be 'racy' enough for younger investors, but I'm hopeful it will do what I want it to and give me a decent nest egg in a few years time."

Questions

1. What big lesson do you derive from this case?
2. As an analyst, suggest difference that you could have build David's portfolio with.
3. After analysisng the above case, what do you think is the biggest responsibility of a financial advisor when he is up to build a portfolio?

Source: www.moneysheets.co.uk

9.6 Risk Reduction in the Stock Portion of a Portfolio

Law of Large Numbers

Assume that all risk sources in a portfolio of securities are independent. As we add securities to this portfolio, the exposure to any particular source of risk becomes small. According to the Law of Large Numbers, the larger the sample size, the more likely it is that the sample mean will be close to the population expected value. Risk reduction in the case of independent risk sources can be thought of as the insurance principle, named for the idea that an insurance company reduces its risk by writing many policies against many independent sources of risk.

Sustainability through Worst

Notes

We have demonstrated a superior investment strategy. Looking forward, our strategy should yield superior results while limiting risk for long-term investors in almost any economic environment short of unlimited nuclear war or total global economic collapse.

Whether you are playing tennis, flying fighters, or practicing medicine, you should be constantly looking for the highest probability shot. The combination of Strategic Global Asset Allocation and Modern Portfolio Theory (with an appreciation of the cross-section of expected returns in various parts of the world's markets) offers investors the highest probability shot of making their objectives a reality.

9.7 Value Investing

This style of investing termed as conservative investing. In the case of value investing, bargains are often measured in terms of market prices that are below the estimated current economic value of tangible and intangible assets. Value investors pick up shares at attractive low prices. They are characterised by maintaining a portfolio of market under-performers, equipment, or other financial holdings in subsidiaries or other companies, and real estate. Value investors, who select only cheap shares that are very infrequently traded, are called deep-value investors. Some value investors focus on companies at the brink of bankruptcy or in the midst of bankruptcy proceedings. The value investors' portfolio will have shares that have been undervalued by the market. Such value investing is suitable in a market economy that is facing depression. Most value investors' focus on tangible assets such as plant. Cyclical shares also become a favourite with value investors when recession hits and economically sensitive shares get undue importance due to short-term investors focussing on temporarily adverse sales and earnings information.

9.8 Growth Investing

The strategy of growth investors is to identify the shares whose future returns are expected to grow at a fast rate. Growth investment style identifies shares based on the growth potential of companies. These types of investors look into the future potential returns from the company. Historical returns need not exhibit a close relationship with growth rate or historical earnings per share.

Growth investors consider several factors to identify superior performing securities for purchase. Some of the factors that are looked into are short run and long run high growth rates from sales and EPS, high profit margin and notable increase in projected earnings for both three and five years. Growth companies are also identified through comparison with industry averages. If the company has superior expected growth rates compared with the industry averages, such companies are considered as growth companies. Growth shares also show distinctive cost advantage over other companies and are marked by high pay scales to attract talented employees. It is not always possible to identify the growth shares in all capital market situations. Many situations might arise, which would make the identification of growth shares very difficult.

Task

Analyse what would happen to the investor if the identified growth shares change their characteristics. Give reasons to support your argument.

Notes

Performance Index

Portfolio performance evaluation is a component of the portfolio management process. Specifically, it can be viewed as a feedback and control mechanism that identifies superior performance and makes the investment management process successful. Superior performance of a portfolio may have been the result of good portfolio management decisions/styles or due to chance. Conversely, inferior performance of a portfolio could also be attributed to a chance factor or due to costs associated with unscientific portfolio management.

Portfolio performance is evaluated over a specific time-period. The most often used risk adjusted portfolio performance measures are the:

1. Sharpe's Portfolio Performance Measure;
2. Treynor Portfolio Performance Measure; and
3. Jensen Portfolio Performance Measure.

9.9 Summary

- Every strategy has certain performance implications.
- The word strategy implies a conscious effort to achieve stated goals. Their concern is to at least meet their minimum acceptable return levels without taking excessive risk.
- They want a comfortable and stress-free retirement.
- The asset-allocation design will determine results in both short- and long-term periods. What's more, both risk and returns will be driven far more by asset allocation than stock selection or market timing.
- The asset allocation decision refers to the allocation of portfolio assets to broad asset markets; in other words, how much of the portfolio's funds are to be invested in stocks, how much in bonds, money market assets, and so forth.
- Each weight can range from 0% to 100%.
- Examining the asset allocation decision globally leads us to ask the following questions: What percentage of portfolio funds is to be invested in each of the countries for which financial markets are available to investors? Within each country, what percentage of portfolio funds is to be invested in stocks, bonds, bills, and other assets? Within each of the major asset classes, what percentage of portfolio funds is to go into various types of bonds, exchange-listed stocks versus over-the-counter stocks, and so forth?
- Value investing is termed as conservative investing. In the case of value investing, bargains are often measured in terms of market prices that are below the estimated current economic value of tangible and intangible assets.
- The strategy of growth investors is to identify the shares whose future returns are expected to grow at a fast rate.
- Growth investment style identifies shares based on the growth potential of companies. These types of investors look into the future potential returns from the company.
- Historical returns need not exhibit a close relationship with growth rate or historical earnings per share.

Notes

9.10 Keywords

Investment Risk Pyramid: A portfolio strategy that allocates assets according to the relative safety and soundness of investments. The bottom of the pyramid is comprised of low-risk investments, the mid-portion is composed of growth investments and the top is speculative investments.

Random Diversification: Also known as naïve diversification, it refers to the act of randomly diversifying without regard to relevant investment characteristics such as expected return and industry classification.

Value Investing: In the case of value investing, bargains are often measured in terms of market prices that are below the estimated current economic value of tangible and intangible assets.

9.11 Self Assessment

Fill in the blanks:

1. Value investors pick up shares at attractive ..... prices.
2. ..... style identifies shares based on the growth potential of companies.
3. Portfolio performance evaluation can be viewed as a ..... and .....mechanism that identifies superior performance and makes the investment management process successful.
4. The ..... principle illustrates the concept of attempting to diversify the risk involved in a portfolio of assets (or liabilities).
5. Portfolio construction begins with the basic building blocks of ..... classes.
6. Portfolio performance is evaluated over a ..... time-period.
7. The commonly stated investment goals are: ....., ... and .....
8. Before one makes any investment, one should always determine the amount of ..... one has to keep one's money invested.
9. After deciding on how much risk is acceptable in one's portfolio by acknowledging one's time horizon and bankroll, one can use the ..... approach for balancing one's assets.
10. The foundation of the investment pyramid represents the ..... portion.
11. ..... strategies do not seek to outperform the market but simply to do as well as the market.
12. If the market price of a security does depart from its estimated economic value, ... act to bring the two values together.
13. Pursuit of an ..... strategy assumes that investors possess some advantage relative to other market participants.
14. The asset allocation decision refers to the allocation of ..... assets to ..... asset markets.
15. According to the Law of ....., the larger the sample size, the more likely it is that the sample mean will be close to the population expected value.

Notes

9.12 Review Questions

1. How do you select security of selection?
2. How do you make the selection of asset mix?
3. What process will you follow to formulate a portfolio strategy?
4. Examine the concept of risk pyramid.
5. What do you see as the difference between passive and active investment strategies?
6. Before you make any investment, you should always determine the amount of time you have to keep your money invested. Why?
7. Examine the concept of value investing. What do you think is/are its advantage(s)?
8. Only a specialist should handle the work of building an investment portfolio. Why/why not?
9. Examine the concept of asset allocation/asset mix.
10. Portfolio management is a combination of the securities which will give maximum return with minimum risk. Why/ why not?
11. As a portfolio manager, what would you do if a transaction is proposed that has a return from lending activities only that is below the hurdle rate and why?

Answers: Self Assessment

1. low
2. Growth investment
3. feedback, control
4. insurance
5. asset
6. specific
7. income, growth, stability
8. time
9. risk pyramid
10. strongest
11. Passive
12. investors
13. active
14. portfolio, broad
15. Large Numbers

9.13 Further Readings

Books

Dougall, Herbert E., *Capital Markets and Institutions,* 2nd ed., Englewood Cliffs, NJ, Prentice Hall, 1970.

Kaufman, George, G., *Money, the Financial System and the Economy,* 2nd ed., Chicago, Rand McNally & Co., 1977.

Kroos, Herman E., and Blyn, Martin R., *A History of Financial Intermediaries*, New York, Random House, 1971.

Online link

www.investopedia.com

Notes

Unit 10: Portfolio Analysis

CONTENTS

Objectives

Introduction

10.1 Inputs to Portfolio Analysis

10.2 Portfolio Analysis and Selection

10.3 Markowitz Diversification and Classification of Risks

10.4 Traditional Portfolio Analysis

10.5 Summary

10.6 Keywords

10.7 Self Assessment

10.8 Review Questions

10.9 Further Readings

Objectives

After studying this unit, you will be able to:

- Explain inputs to portfolio analysis
- Discuss portfolio risk and return
- Describe portfolio analysis and selection
- Understand Markowitz Diversification and Classification of Risks
- Explain traditional portfolio analysis

Tanima Dutta, Lovely Professional University

Introduction

Portfolio means a collection or combination of financial assets (or securities) such as shares, debentures and government securities. And it is not unusual to define a portfolio in such terms since the institutional portfolios (insurance companies, pension funds, mutual funds, banks, etc.) do, in fact, consist of such assets. However, in a more general sense 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.

Task

Why there is need of portfolio analysis for marketer of XYZ company? Support your argument with examples.

Notes

10.1 Inputs to Portfolio Analysis

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.

Return and Risk Characteristics of Individual Assets

For individual assets, the returns are measured in an intuitively logical way over the predetermined investment horizon (or holding period). For instance, the returns from investment in equity shares are measured over a single holding period (t) as follows:

Total Returns = [Dividends + (Market Prices – Market Prices – 1)]/[Market Prices – 1]

Within a multi-period framework, one may even apply a discounting model to estimate returns. What an investment analyst essentially endeavours to obtain is the forecasts of return.

It is axiomatic that return predictions are seldom accurate. So, investment analyst also aims at measuring 'upside' potential and 'downside' danger – that is, the potential that actual returns may exceed the estimate and the danger that the returns may be less than that. In investment parlance, this is known as measuring 'investment risk'.

Usually, an analyst obtains, for a given period of time in the future, a series of possible rates of return with some probability of occurrence for each return estimate. Based on the distribution of these return estimates, he computes two summary statistics, namely 'expected (or mean) rate of return' and the 'variance (or equivalent i.e., its square root, (or the standard deviation) of return distribution'. The latter, which measures the breadth of the distribution of expected returns from an investment, is considered a measure of the investment risk.

A question with variance as a measure of risk is: why count 'happy' surprises (those above the expected return) at all in a measure of risk? Why not just consider the deviations below the expected return (i.e. the downside danger)? Measures that 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 the left side of a symmetric distribution is a mirror image of the right side. Although distributions of forecasted returns are often non-normal, analysts generally assume normality to simplify their analysis.

Expected Return and Risk of a Portfolio

The return on a portfolio of assets is simply a weighted average of the return on the individual assets. The weight applied to each return is the fraction of the portfolio invested in that asset. Thus,

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

Where

r_p = Expected return of the portfolio;

x_i = Proportion of the portfolio's initial fund invested in asset i;

r_i = Expected return of asset i; and

n = Number of assets in the portfolio;

Notes

Example: Consider a portfolio of two equity shares A and B. The expected return on A is, say, 15% and that on B is 20%. Further, assume that we have invested 40% of our fund in share A and the remaining in B. Then, what will be the expected portfolio return?

Solution: The expected portfolio return will be 0.40 × 15 + 0.60 × 20 = 18%.

It may be noted here that portfolio weight can be either positive or negative; in case of securities, the weight will be negative when investor enters into 'short sales.' Usually, investors buy securities first and sell them later. But with a 'short sale' this process is reversed; the investors sell first the securities that they do not possess, and buy them later to cover the sales. Since institutional investors in our country do not enter into such sales, we will ignore the situation of short sales in the present discussion as well as in our dealing with the subject matter in subsequent units.

The computation of the portfolio variance in the above example is based on the following formula:

$$\sigma_p^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} X_{pi} X_j \sigma_{pj}$$

Where σ_{pj} denotes the covariance of returns between asset i and asset j. An explanation of the formula is now in order.

We start off with the most important element of this formula, namely, covariance. It is a statistical measure of how two random variables, such as the returns on asset i and j, 'move together'. A positive value for covariance indicates that the assets' returns tend to go together.

Example: A better-than-expected return for one is likely to occur along with a better-than-expected return for the other. A negative covariance indicates a tendency for the returns to offset one another. For example, a better-than-expected return for one asset is likely to occur along with a worse-than-expected return for the other. A relatively small or zero value for the covariance indicates that there is little or no relationship between the returns for two assets.

Closely related to covariance is the statistical measure known as correlation. The relationship is given by

$$c = \frac{\text{cov.}(i,j)}{\sigma_i \sigma_j}$$

Where c. denotes the coefficient of correlation between the return on asset i and the on j. The correlation coefficient simply rescales the covariance to facilitate comparison with corresponding values for other pairs of random variables. The coefficient ranges from -1 (perfect negative correlation) to +1 (perfect positive correlation). A co-efficient of 0 indicates, in our context, that returns are totally unrelated.

$$\sigma_p^2 = \sum_{j=1}^{3} X_1 X_j \sigma_{ij} + \sum_{j-1}^{3} X_2 X_j \sigma_{2j} + \sum_{j-1}^{3} X_3 X_j \sigma_{3j}$$

$$= [X_1 X_1 \sigma_{11} + X_1 X_2 \sigma_{12} + X_1 X_3 \sigma_{13} + X_2 X_1 \sigma_{21} + X_2 X_2 \sigma_{22} + X_2 X_3 \sigma_{23} + X_3 X_1 \sigma_{31} + X_3 X_2 \sigma_{32} + X_3 X_3 \sigma_{33}]$$

Notes

10.2 Portfolio Analysis and Selection

Now that we have reviewed all the attributes of combination of assets (namely, return, risk and diversification), we are in position to examine the portfolio selection process. For the purpose of our analysis, we will assume that rational investors are risk averse and prefer more returns to less. With this assumption, let us first state the portfolio selection problem.

1. ***Portfolio Selection Problem:*** What is the opportunity set of investments or portfolios from which an investor must take a choice? A quick reflection on the above equations would reveal that there are infinite number of possibilities to combine *n* assets into a portfolio, provided an investor can hold a fraction of an asset if he or she so desires. Each one of these portfolios available for investment corresponds to a set of portfolio weights (i.e., the proportions of fund that investors may allocate to different assets), and is characterized by an expected rate of return and variance (or standard deviation).

   Does an investor need to evaluate all the portfolios of 'feasible set' to determine his or her 'best' or 'optimal' portfolio? Fortunately, the answer to this question is 'no'. The investor is required to examine only a subset of feasible set of portfolios.

   Generally, the investors would, however, prefer some of them to others. Since the investors are assumed to be risk-averse and prefer more return to less, their choice of portfolios will be bounded by the following two criteria:

   (a) Given two portfolios with the same expected return, prefer the one with the least risk exposure.

   (b) Given two portfolios with the same risk exposures, prefer the one with the higher expected return.

   Caution Not all the portfolios will conform to these criteria. And, hence, an investor's choice set will be reduced from an infinite possible combination of assets to the set of portfolio meeting the criteria. This set of portfolios is termed as 'efficient set' or 'efficient frontier.'

2. ***Selection of Optimal Portfolio:*** The actual computational procedure for locating efficient frontier is much more complex than what it might appear to be from our geometric interpretations. We need to employ some optimisation technique, and this we will discuss in next unit. Meanwhile, let us search for an optimal portfolio from the efficient set.

   Once the location and composition of the efficient set have determined, the selection of optimal portfolio by an investor will depend on his/her 'risk tolerance' or "trade-offs between risk and expected return." For instance, a risk-averse investor, such as person nearing retirement, may prefer an efficient portfolio with low risk (as measured by standard deviation or variance), whereas a risk-taker may prefer a portfolio with greater risk and commensurately higher returns.

   Portfolio selection process entails four basic steps:

   Step 1: Identifying the assets to be considered for portfolio construction.

   Step 2: Generating the necessary input data to portfolio selection. This involves estimating the expected returns, variances and covariance for all the assets considered.

   Step 3: Delineating the efficient portfolio.

   Step 4: Given an investor's risk tolerance level, selecting the optimal portfolio in terms of: (a) the assets to be held; and (b) the proportion of available funds to be allocated to each.

Notes

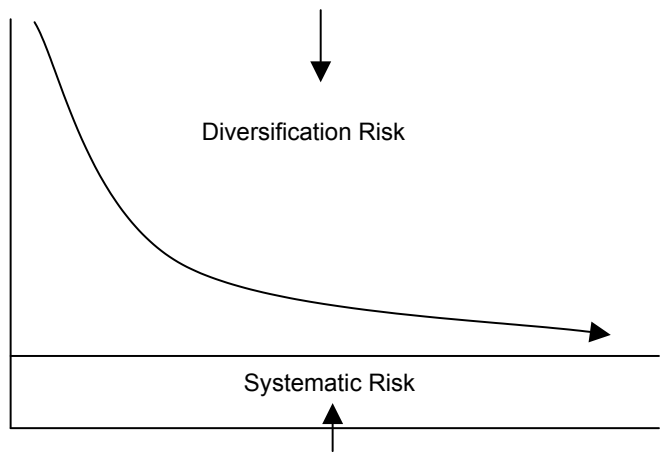
Notes The portfolio selection process as described above is not something new; the model was presented by Harry Markowitz briefly in 1952, and later in a complete book entitled *Portfolio Selection – Efficient Diversification of Investments* (1959). One important concept that Markowitz emphasized for the first time was that some measure of risk, and not just the expected rate of return, should be considered when dealing with investment decision.

Markowitz's approach to portfolio analysis and selection attracted a number of academicians and practitioners, who subsequently began to adjust the basic framework so that practical application could be more readily considered. Another interesting thing happened. Following the presentation of the model, there had been a wide spread realization of how computers could be utilized in investment decision-making. Markowitz's own solution to portfolio selection problem necessitates application of computers. As a final remark, we may mention that Markowitz's work marks the beginnings of what is today known as modern portfolio theory.

10.3 Markowitz Diversification and Classification of Risks

We have seen that the Portfolio Risk is smaller than the risk of individual assets. It indicates that the portfolios are less risky than the isolated assets. This phenomenon has been often attributed to Markowitz contribution. If an investor intends to diversify his investment into different assets instead of investing the whole in one security, he is with to benefit from reduced risk level. Further, if he can find assets with negative correlation, the combined risk works out zero or near zero. But in reality it is difficult to find many assets with negative correlation.

Figure 10.1: Number of Stocks in a Portfolio



What will happen to portfolio risk if we go on adding more and more stocks to a portfolio? It is logical to believe that the risk is bound to reduce as the number of stocks in a portfolio increases. Can we eliminate risk completely? It all depends on the correlation between assets. Smaller the correlations, lower will be the risk in the portfolio. In fact, if we can find stocks with either zero correlation or negative correlation, the portfolio would be certainly low. But it is impossible to find such stocks to construct our portfolios. In such a case there exists a minimum level of risk in every portfolio, however large the number of assets in it may be.

Notes

Effect of Portfolio Size on Portfolio Risk

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

This aspect brings a new dimension to the risk-return analysis. In efficient market Assets are expected to be priced in such a way that they yield a return proportional to the size of risk that the asset carries. Which risk is generally rewarded? Is it the total risk that the asset brings or something else? Certainly, the market is not expected to reward the risk, which can be diversified by putting investment across different stocks. Then the relevant individual stock is its contribution to the systematic risk in a well-diversified portfolio. How to identify this contribution? William F. Sharpe has given an answer to this. He has established the contribution of each single asset to the portfolio risk by developing a 'Single-Index Market Model'.

10.4 Traditional Portfolio Analysis

Traditional security analysis recognizes the key importance of risk and return to the investor traditional approaches, which rely upon intuition and insight. The results of these rather subjective approaches to portfolio analysis are covered under the realm of the traditional analytical approach.

Most traditional methods recognize return as some dividend receipts and price appreciation over a forward period portfolio or combination of securities are thought of as helping to spread risk over many securities.

Case Study

A Calculated Risk

"Only those who risk going too far can possibly find out how far one can go."

- T.S. Eliot

"Investing is a risky business." We have all come across this statutory warning or have learnt it the hard way while investing in the stock market. Let us take a step back to understand what is 'risk'.

The word is commonly used to describe the chance of a loss.

Chance: the Webster's Dictionary defines this word as "something that happens unpredictably without discernible human intention or observable cause." In other words, risk in the financial context stands for the uncertainties associated with future cash flows.

Contd...

Notes

We have learnt earlier how savings transform to 'Risk Capital'. We have taken a hard look at equity risks and figured out that khel risky hai.

But did you know that 'risk' owes its origin to the Italian word, "risicare", that literally means 'to dare?' Risk as a verb is used to imply "taking the chance." In other words, as Peter Bernstein observes in the introduction to his magnum opus Against the Gods,

"... risk is a choice rather than a fate. The actions we dare to take, which depend on how free we are to make choices, are what the story of risk is all about. And that story helps define what it means to be a human being..."

If 'risk' is all about choices, it is time to know how to factor this in our investment decisions.

Let us learn how these choices are made from the actions of Mr. Savvy Investor. Needless to say, he is the smart guy who makes the smartest choices when it comes to investing.

Mr. Savvy Investor has ₹ 1,00,000 to invest. He has two investment options.

The first option is a government bond that pays an interest of 5% per annum for the next three years.

The second option is investing in a particular stock. A leading analyst expects this stock to go up by just 2% in the first year as the company is still expanding its capacity. But he expects the stock to gain 28% in the next two years.

Mr. Savvy Investor fishes out his pocket calculator and gets down to business.

The bond option is fairly easy to calculate. His ₹ 1,00,000 investment would be worth ₹ 1,30,000 in three years. In other words, it would fetch him a return of 30% in three years.

He works out the returns for the second option.

His investment would be worth ₹ 1,02,000 at the end of the first year. A gain of 28% over the next two years means that his investment would be worth ₹ 1,30,560, thanks to the 'power of compounding. his 2% gain in the first year will earn a return too. In the end, he would earn a 30.56% return in three years.

Two investment options with almost the same returns in three years. Which option does Mr. Savvy Investor choose?

Our Mr. Savvy Investor chooses to invest in the government bond.

It is easy to figure out why Mr. Savvy Investor has chosen the bond option.

Though investing in the stock meant marginally higher returns, there were lots of uncertainties. Remember, investment in the stock is based on expectations, expectations of a leading analyst, in this case. On the other hand, the government bond gives a fixed return with no question of a default.

What if the analyst got it all wrong? For all you know, a competitor might increase capacities and kill the market in the second year. Hence, the expected 28% appreciation might actually turn out to be a decline! As Murphy's law states "if anything can go wrong, it will go wrong."

Hence, Mr. Savvy Investor does not even bat an eyelid while deciding to invest in the government bond.

Let us now add a twist to the second investment option and see if it makes a difference to Mr. Savvy Investor's choice.

Contd...

Notes

The leading analyst expects the stock to go up by 12% this year as the company has finished expanding its capacity six months before time. He also expects the stock to gain 28% in the next two years.

Mr. Savvy Investor does his calculations to figure out that his investment, in this case, would fetch a return of 43.4% in three years. A good 13.4% more than the government bond.

Like earlier, the uncertainties still remain. However, since Mr. Savvy Investor earns 43.4%, he can still take the chance. If the stock fails to go up by 28% in the next two years and instead goes up by just 17%, he will still make a return of 31%! In other words, the higher return provides a margin of safety.

Hence, the higher rate of return over the government bond for the same period makes Mr. Savvy Investor prefer the second option of investing in the stock.

What made him go for the second option?

The 13.4% extra return over the government bond. This 'extra return' that induces our Mr. Savvy Investor to choose the more uncertain investment option, which is called 'Risk Premium".

A financial textbook will tell us that risk premium is the 'reward' for holding a risky investment rather than a risk-free investment.

The extra return that the stock market or a stock must provide over the risk-free rate of return to compensate for the market risk is called "Equity Risk Premium".

In case of Mr. Savvy Investor, the extra return of 13.4% over the risk-free 30% rate of return on the government bond defines his "equity risk premium."

How do you determine 'equity risk premium?' What is the right premium to settle for? What is 'beta?' More of this next time as we brace ourselves to risk the stock market and brave the uncertainties. As one great statistician wrote: "Humanity did not take control of society out of the realm of Divine Providence...to put it at the mercy of the laws of chance."

Question:

Analyze the case then comment on Mr. Savvy investment

10.5 Summary

- Portfolio means a collection or combination of financial assets (or securities) such as shares, debentures and government securities.
- Business portfolio analysis as an organizational strategy formulation technique is based on the philosophy that organizations should develop strategy much as they handle investment portfolios.
- Modern Portfolio Theory (MPT) proposes how rational investors will use diversification to optimize their portfolios, and how a risky asset should be priced.
- The basic concepts of the theory are Markowitz diversification, the efficient frontier, capital asset pricing model, the alpha and beta coefficients, the Capital Market Line and the Securities Market Line.
- A portfolio's return is a random variable, and consequently has an expected value and a variance.

Notes

- An investor can reduce portfolio risk simply by holding combinations of instruments which are not perfectly positively correlated.
- The risk-free asset is the asset which pays a risk-free rate.
- A rational investor would not invest in an asset which does not improve the risk-return characteristics of his existing portfolio.

10.6 Keywords

Portfolio Leverage: An investor adds leverage to the portfolio by borrowing the risk-free asset.

Risk-free Asset: A hypothetical asset which pays a risk-free rate. It is usually provided by an investment in short-dated Government securities. The risk-free asset has zero variance in returns.

Specific Risk: Risk associated with individual assets - within a portfolio these risks can be reduced through diversification.

10.7 Self Assessment

Fill in the blanks:

1. ..... may be used synonymously with the expression 'collection of assets'.
2. Individual assets have ..... characteristics of their own.
3. Return predictions are ..... accurate.
4. The return on a portfolio of assets is simply a ..... of the return on the individual assets.
5. A ..... value for covariance indicates that the assets' returns tend to go together.
6. Usually, investors ..... securities first and ..... them later.
7. ..... is the statistical measure known as correlation.
8. Portfolio selection process entails ..... basic steps.
9. Smaller the correlations, ... will be the risk in the portfolio.
10. That portion of the total risk, which declines due to diversification of investment, from a single asset to others is called ..... risk.
11. Systematic risk is that portion of risk, which cannot be further reduced by adding any number of newer ..... to the given portfolio.
12. Most traditional methods recognize return as some dividend receipts and price appreciation over a ..... period portfolio.
13. Once the efficient portfolios are delineated, the investors will next select the 'optimal' portfolio depending upon his or her ..... between return and risk.
14. William F. Sharpe established the contribution of each single asset to the portfolio risk by developing a ..... Market Model.
15. If we can find stocks with either ..... correlation or ..... correlation, the portfolio would be low.

Notes

10.8 Review Questions

1. Elucidate on inputs to portfolio analysis.
2. Examine various return and risk characteristics of individual assets.
3. Analyse the concept of expected return and risk of a portfolio.
4. What do you mean by portfolio selection problem? What is its significance?
5. How would you help your client determine optimal portfolio?
6. Examine portfolio selection process that entails four basic steps.
7. Do you think that the traditional portfolio analysis holds any ground today? Why/why not?
8. Which risk is generally rewarded – is it the total risk that the asset brings or something else?
9. What will happen to portfolio risk if we go on adding more and more stocks to a portfolio?
10. Can we eliminate risk completely? If yes, explain how. If not answer why not.
11. Does an investor need to evaluate all the portfolios of 'feasible set' to determine his or her 'best' or 'optimal' portfolio? Support your answer with reasons.
12. What is the opportunity set of investments or portfolios from which an investor must take a choice? How do you determine it?

Answers: Self Assessment

1. 'Portfolio'
2. risk return
3. seldom
4. weighted average
5. positive
6. buy, sell
7. Covariance
8. four
9. lower
10. diversifiable
11. scrips
12. forward
13. 'trade-offs'
14. Single-Index
15. zero, negative

10.9 Further Readings

Books

Samuels J. M, F.M. Wilkesard R.E. Brayshaw, *Management of Company Finance*, Chapman and Hall, London

Smith, Edger Lawrence, *Common Stocks as Long-term Investment*, New York, MacMillan.

Sprinkel, Beryl, W., *Money and Stock Prices*, Homewood III, Richard S. Irwin, Inc.

Sudhindhra Bhatt, *Security Analysis and Portfolio Management*, Excel Books.

Notes

Online links

newarkwww.rutgers.edu

www.buzzle.com

www.investmentresources.biz

Notes

Unit 11: Capital Market Theory

CONTENTS

Objectives

Introduction

11.1 Introduction to CAPM

11.2 Portfolio Risk

11.3 Further Explorations of the Capital Asset Pricing Model

11.4 Security Market Line (SML)

11.5 Capital Market Line (CML)

11.6 Beta Factor of a Market Portfolio

11.7 Benefits and Limitations of CAPM

11.8 Arbitrage Pricing Model

11.9 Arbitrage Pricing Theory (APT)

11.10 Using the APT

11.11 Modern Portfolio Theory

11.12 Summary

11.13 Keywords

11.14 Self Assessment

11.15 Review Questions

11.16 Further Readings

Objectives

After studying this unit, you will be able to:

- Discuss concepts of risk free asset, risk free lending and borrowings
- Explain the Capital Asset Pricing Model
- Describe testing the Capital Asset Pricing Model
- Define Capital Market Line
- Explain Security Market Line
- Discuss Empirical Evidence on the Capital Asset Pricing Model
- Explain Arbitrage Pricing Theory
- Describe Modern Portfolio Theory
- Discuss Mean Variance Analysis
- Understand Capital Market Line and Identification of Market Portfolio

Notes

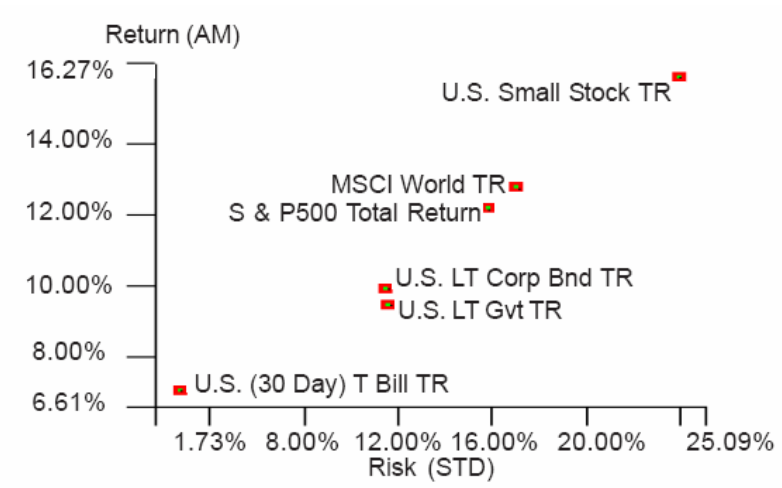
Introduction

We saw how the risk and return of investments may be characterized by measures of central tendency and measures of variation, i.e. mean and standard deviation in the previous units. In fact, statistics are the foundations of modern finance, and virtually all the financial innovations of the past thirty years, broadly termed "Modern Portfolio Theory," have been based upon statistical models. Because of this, it is useful to review what a statistic is, and how it relates to the investment problem. In general, a statistic is a function that reduces a large amount of information to a small amount. For instance, the average is a single number that summarizes the typical "location" of a set of numbers. Statistics boil down a lot of information to a few useful numbers – as such, they ignore a great deal. Before modern portfolio theory, the decision about whether to include a security in a portfolio was based principally upon fundamental analysis of the firm, its financial statements and its dividend policy. Finance professor Harry Markowitz began a revolution by suggesting that the value of a security to an investor might best be evaluated by its mean, its standard deviation, and its correlation to other securities in the portfolio. This audacious suggestion amounted to ignoring a lot of information about the firm – its earnings, its dividend policy, its capital structure, its market, its competitors – and calculating a few simple statistics. In this unit, we will follow Markowitz's lead and see where the technology of modern portfolio theory takes us.

The Risk and Return of Securities: Markowitz's great insight was that the relevant information about securities could be summarized by three measures: the mean return (taken as the arithmetic mean), the standard deviation of the returns and the correlation with other assets' returns. The mean and the standard deviation can be used to plot the relative risk and return of any selection of securities. Consider six asset classes:

This figure was constructed using historical risk and return data on small stocks, S&P stocks, corporate and government bonds, and an international stock index called MSCI, or Morgan Stanley Capital International World Portfolio. The figure shows the difficulty an investor faces about which asset to choose. The axes plot annual standard deviation of total returns, and average annual returns over the period 1970 through 3/1995. Notice that small stocks provide the highest return, but with the highest risk. In which asset class would you choose to invest your money? Is there any single asset class that dominates the rest? Notice that an investor who prefers a low risk strategy would choose T-Bills, while an investor who does not care about risk would choose small stocks. There is no one security that is best for all investors.

Figure 11.1: Risk vs. Return



Notes

11.1 Introduction to CAPM

William F. Sharpe and John Linter developed the Capital Asset Pricing Model (CAPM). The model is based on the portfolio theory developed by Harry Markowitz. The model emphasises the risk factor in portfolio theory is a combination of two risks, systematic risk and unsystematic risk. The model suggests that a security's return is directly related to its systematic risk, which cannot be neutralised through diversification. The combination of both types of risks stated above provides the total risk. The total variance of returns is equal to market related variance plus company's specific variance. CAPM explains the behaviour of security prices and provides a mechanism whereby investors could assess the impact of a proposed security investment on the overall portfolio risk and return. CAPM suggests that the prices of securities are determined in such a way that the risk premium or excess returns are proportional to systematic risk, which is indicated by the beta coefficient. The model is used for analysing the risk-return implications of holding securities. CAPM refers to the manner in which securities are valued in line with their anticipated risks and returns. A risk-averse investor prefers to invest in risk-free securities. For a small investor having few securities in his portfolio, the risk is greater. To reduce the unsystematic risk, he must build up well-diversified securities in his portfolio.

The asset return depends on the amount for the asset today. The price paid must ensure that the market portfolio's risk/return characteristics improve when the asset is added to it. The CAPM is a model, which derives the theoretical required return (i.e. discount rate) for an asset in a market, given the risk-free rate available to investors and the risk of the market as a whole.

The CAPM is usually expressed:

$$E(R_i) = R_f + \beta_i(E(R_m) - R_f)$$

Notes β (Beta), is the measure of asset sensitivity to a movement in the overall market; Beta is usually found via regression on historical data. Betas exceeding one signify more than average "riskiness"; betas below one indicate lower than average.

$E(R_m) - (R_f)$ is the market premium, the historically observed excess return of the market over the risk-free rate.

Once the expected return, $E(r_i)$, is calculated using CAPM, the future cash flows of the asset can be discounted to their present value using this rate to establish the correct price for the asset. (*Here again, the theory accepts in its assumptions that a parameter based on past data can be combined with a future expectation.*)

A more risky stock will have a higher beta and will be discounted at a higher rate; less sensitive stocks will have lower betas and be discounted at a lower rate. In theory, an asset is correctly priced when its observed price is the same as its value calculated using the CAPM derived discount rate. If the observed price is higher than the valuation, then the asset is overvalued; it is undervalued for a too low price.

1. ***Mathematically:***

   (a) The incremental impact on risk and return when an additional risky asset, a, is added to the market portfolio, m, follows from the formulae for a two asset portfolio. These results are used to derive the asset appropriate discount rate.

   Risk = $(w_m^2\sigma_m^2 + [w_a^2\sigma_a^2 + 2w_m w_a \rho_{am}\sigma_a\sigma_m])$

   Hence, risk added to portfolio = $[w_a^2\sigma_a^2 + 2w_m\rho_{am}\sigma_a\sigma_m]$

Notes

But, since the weight of the asset will be relatively low, $w_a^2 \approx 0$

i.e. additional risk = $[2w_m w_a \rho_{am} \sigma_a \sigma_m]$

Return = $(w_m E(R_m) + [w_a E(R_a)])$

Hence additional return = $[w_a E(R_a)]$

(b) If an asset, a, is correctly priced, the improvement in risk to return achieved by adding it to the market portfolio, m, will at least match the gains of spending that money on an increased stake in the market portfolio. The assumption is that the investor will purchase the asset with funds borrowed at the risk-free rate, R_f; this is rational if $E(R_a) > R_f$.

Thus

$[w_a(E(R_a) - R_f)]/[2w_m w_a \rho_{am} \sigma_a \sigma_m] = [w_a(E(R_m) - R_f)]/[2w_m w_a \sigma_m \sigma_m]$

i.e. : $[E(R_a)] = R_f + [E(R_m) - R_f] * [\rho_{am} \sigma_a \sigma_m]/[\sigma_m \sigma_m]$

i.e. : $[E(R_a)] = R_f + [E(R_m) - R_f] * [\sigma_{am}]/[\sigma_{mm}]$

$[\sigma_{am}]/[\sigma_{mm}]$ is the "beta", β — the covariance between the asset and the market compared to the variance of the market, i.e. the sensitivity of the asset price to movement in the market portfolio.

2. ***Assumptions:***

Because the CAPM is a theory, we must assume for argument that:

(a) All assets in the world are traded.

(b) All assets are infinitely divisible.

(c) All investors in the world collectively hold all assets.

(d) For every borrower, there is a lender.

(e) There is a riskless security in the world.

(f) All investors borrow and lend at the riskless rate.

(g) Everyone agrees on the inputs to the Mean-STD picture.

(h) Preferences are well described by simple utility functions.

(i) Security distributions are normal, or at least well described by two parameters.

(j) There are only two periods of time in our world.

This is a long list of requirements, and together they describe the capitalist's ideal world. *Everything* may be bought and sold in perfectly liquid fractional amounts even human capital! There is a perfect, safe haven for risk-averse investors i.e. the riskless asset. This means that everyone is an equally good credit risk! No one has any informational advantage in the CAPM world. Everyone has already generously shared all of their knowledge about the future risk and return of the securities, so no one disagrees about expected returns. All customer preferences are an open book risk attitudes are well described by a simple utility function. There is no mystery about the shape of the future return distributions. Last but not least, decisions are not complicated by the ability to change your mind through time. You invest irrevocably at one point, and reap the rewards of your investment in the next period at which time you and the investment problem cease to exist. Terminal wealth is measured at that time i.e. he who dies with the most toys wins! The technical name for this setting is "A frictionless one-period, multi-asset economy with no asymmetric information."

Notes

3. ***Investment Implications:*** CAPM tells us that all investors will want to hold "capital-weighted" portfolios of global wealth. In the 1960s when the CAPM was developed, this solution looked a lot like a portfolio that was already familiar to many people: the S&P 500. The S&P 500 is a capital-weighted portfolio of most of the US' largest stocks. At that time, the US was the world's largest market, and thus, it seemed to be a fair approximation to the 'cake.' Amazingly, the answer was right under our noses – the tangency portfolio must be something like the S&P 500 Not co-incidentally, widespread use of index funds began about this time. Index funds are mutual funds and/or money managers who simply match the performance of the S&P. Many institutions and individuals discovered the virtues of indexing. Trading costs were minimal in this strategy: capital-weighted portfolios automatically adjust to changes in value when stocks grow, so that investors need not change their weights all the time – it is a "buy-and-hold" portfolio. There was also little evidence at the time that active portfolio management beat the S&P index – so why not?

4. ***Is the CAPM true?:*** Any theory is only strictly valid if its assumptions are true. There are a few nettlesome issues that call into question the validity of the CAPM:

   (a) Is the world in equilibrium?

   (b) Do you hold the value-weighted world wealth portfolio?

   (c) Can you even come close?

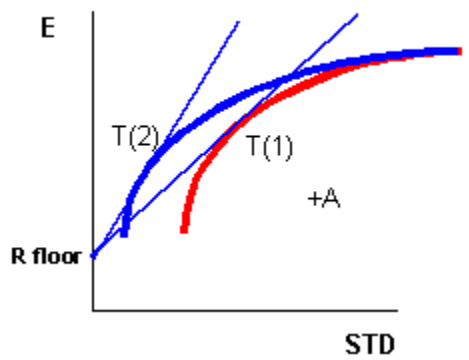
   (d) What about "human capital?"

While these problems may violate the letter of the law, perhaps the spirit of the CAPM is correct. That is, the theory may be a good prescription for investment policy. It tells investors to choose a very reasonable, diversified and low cost portfolio. It also moves them into global assets, i.e. towards investments that are not too correlated with their personal human capital. In fact, even if the CAPM is approximately correct, it will have a major impact upon how investors regard individual securities. Why?

11.2 Portfolio Risk

Suppose you were a CAPM-style investor holding the world wealth portfolio, and someone offered you another stock to invest in. What rate of return would you demand to hold this stock? The answer before the CAPM might have depended upon the standard deviation of a stock's returns. After the CAPM, it is clear that you care about the effect of this stock on the TANGENCY portfolio. The diagram shows that the introduction of asset A into the portfolio will move the tangency portfolio from T(1) to T(2).

Figure 11.2



Notes

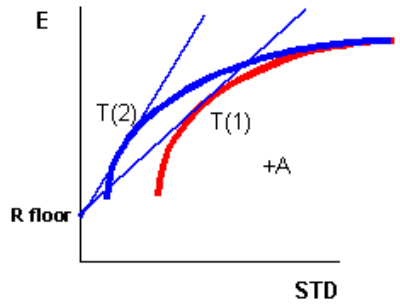
The extent of this movement determines the price you are willing to pay (alternately, the return you demand) for holding asset A. The lower the average correlation A has with the rest of the assets in the portfolio, the more the frontier, and hence T, will move to the left. This is good news for the investor – if A moves your portfolio left, you will demand lower expected return because it improves your portfolio risk-return profile. This is why the CAPM is called the "Capital Asset Pricing Model." It explains relative security prices in terms of a security's contribution to the risk of the whole portfolio, not its individual standard deviation.

The CAPM is a theoretical solution to the identity of the tangency portfolio. It uses some ideal assumptions about the economy to argue that the capital weighted world wealth portfolio is the tangency portfolio, and that every investor will hold this same portfolio of risky assets. Even though it is clear they do not, the CAPM is still a very useful tool. It has been taken as a prescription for the investment portfolio, as well as a tool for estimating an expected rate of return.

11.3 Further Explorations of the Capital Asset Pricing Model

1. ***Risk-return Trade-off:*** *A Technical Aside:* Recall from last unit that, when investors are well diversified, they evaluate the attractiveness of a security based upon its contribution to portfolio risk, rather than its volatility per se. The intuition is that an asset with a low correlation to the tangency portfolio is desirable, because it shifts the frontier to the left.

Figure 11.3



Stephen Ross formalized this institution in an article called *Finance*, published in *The New Palgrave*. It is a simple argument that shows the theoretical basis for the 'pricing' part of the Capital Asset Pricing Model.

Example: Suppose you are an investor who holds the market portfolio M and you are considering the purchase of a quantity dx of asset A, by financing it via borrowing at the riskless rate. This augments the return of the market portfolio by the quantity: $dE_m = [E_A - R_f]dx$

Where d symbolizes a small quantity change. This investment also augments the variance of the market portfolio. The variance of the market portfolio after adding the new asset is: v + dv = v + 2dx cov(A,m) + $(dx)^2$ var(a)

The change in the variance is then: dv = 2 dx cov(A,m) + $(dx)^2$ var(A)

For small dx's this is approximately: dv = 2 dx cov(A,m)

This gives us the risk-return trade-off to investing in a small quantity of A: Risk-Return Trade-off for A = $dE_m/dv = [E_A - R_f]dx/2\ dx\ cov(A,m)$

Risk-Return Trade-off for A = $dE_m/dv = [E_A - R_f]/2\ cov(A,m)$

Notes

Now, if the expected return of asset A is in equilibrium, then an investor should be indifferent between augmenting his or her portfolio with a quantity of A and simply levering up the existing market portfolio position. If this were not the case, then either the investor would not be willing to hold A, or A would dominate the portfolio entirely. We can calculate the same Risk-Return Trade-off for buying dx quantity of the market portfolio P instead of security A. Risk-Return Trade-off for P = $dE_m/dv = [E_m - R_f]/2\ var(m)$.

The equations are almost the same, except that the cov(A,m) is replaced with var(m). This is because the covariance of any security with itself is the variance of the security.

These Risk-reward Tradeoffs must be equal:

$$[E_A - R_f]/2\ cov(A,m) = [E_m - R_f]/2\ var(m)$$

Thus, $[E_A - R_f] = [cov(A,m)/var(m)][E_m - R_f]$

The value cov(A,m)/var(m) is also known as the β of A with respect to m. β is a famous statistic in finance. It is functionally related to the correlation and the covariance between the security and the market portfolio in the following way:

$$\beta = \rho_{i,m}\frac{\sigma_i}{\sigma_m} = \frac{\sigma_{i,m}}{\sigma_m^2}$$

2. ***A Model of Expected Returns:*** In the preceding example, notice that we used the expression *expected* returns. That is, we found an equation that related the expected future return of asset A (in excess of the riskless rate) to the expected future return of the market (in excess of the riskless rate). This expected return is the return that investors will demand when asset prices are in the equilibrium described by the CAPM. For any asset i, the CAPM argues that the appropriate rate at which to discount the cash flows of the firm is that same rate that investors demand to include the security in their portfolio:

$$E[R_i] = R_f + \beta_i(E[R_m] - R_f)$$

Caution One surprising thing about this equation is what is not in it. There is no measure of the security's own standard deviation. The CAPM says that you do not care about the volatility of the security. You only care about its beta with respect to the market portfolio! Risk is now re-defined as the quantity of exposure the security has to fluctuations in the market portfolio.

Task Make a technical assessment of CAPM and discuss its advantages and disadvantages in the changed world scenario.

11.4 Security Market Line (SML)

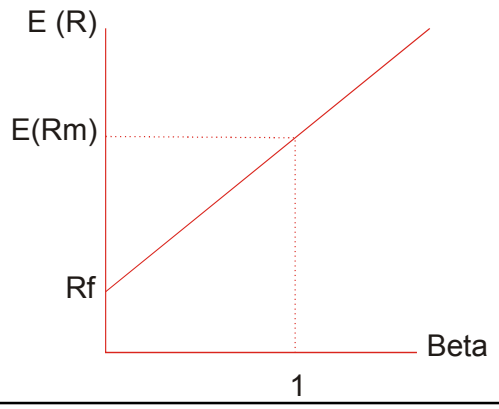
The CAPM equation describes a linear relationship between risk and return. Risk, in this case, is measured by beta. We may plot this line in mean and ß space: The Security Market Line (SML) expresses the basic theme of the CAPM i.e., expected return of a security increases linearly with risk, as measured by 'beta'. The SML is an upward sloping straight line with an intercept at the risk-free return securities and passes through the market portfolio. The upward slope of the line indicates that greater excepted returns accompany higher levels of beta. In equilibrium, each security or portfolio lies on the SML. The next figure shows that the return expected from

Notes

portfolio or investment is a combination of risk free return plus risk premium. An investor will come forward to take risk only if the return on investment also includes risk premium. CAPM provides an intuitive approach for thinking about the return that an investor should require on an investment, given the assessed systematic or market risk.

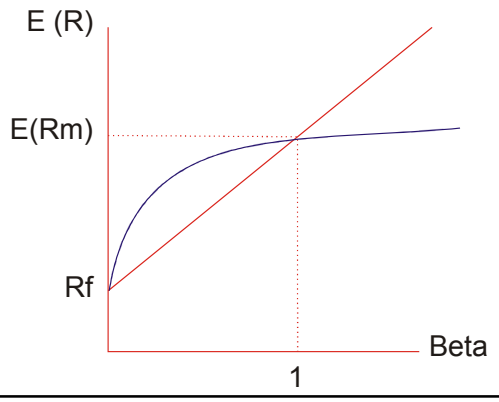
One remarkable fact that comes from the linearity of this equation is that we can obtain the beta of a *portfolio* of assets by simply multiplying the betas of the assets by their portfolio weights. For instance, the beta of a 50/50 portfolio of two assets, one with a beta of .8 and the other with a beta of 1 is .9. The line also extends out infinitely to the right, implying that you can borrow infinite amounts to lever up your portfolio.

Figure 11.4



Why is the line straight? Well, suppose it curved, as the blue line does in the figure below. The figure shows what could happen. An investor could borrow at the riskless rate and invest in the market portfolio. Any investment of this type would provide a higher expected return than a security, which lies on the curved line below. In other words, the investor could receive a higher expected return for the same level of systematic risk. In fact, if the security on the curve could be sold short, then the investor could take the proceeds from the short sale and enter into the levered market position generating an arbitrage in expectation.

Figure 11.5



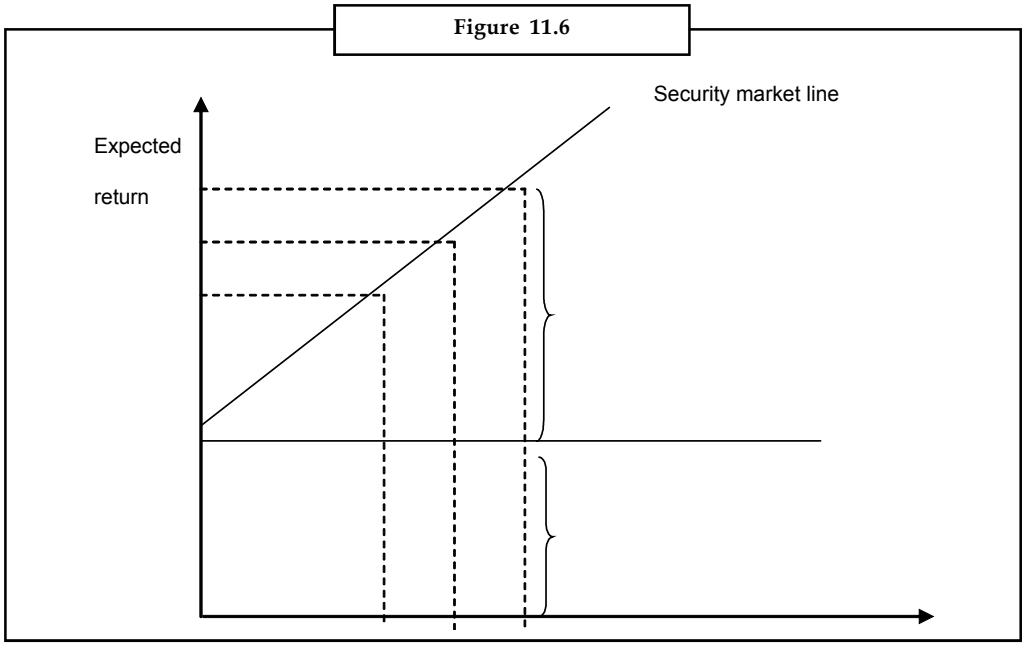
1. ***Expectations vs. Realizations:*** It is important to stress that the vertical dimension in the security market line picture is *expected* return. Things rarely turn out the way you expect. However, the CAPM equation also tells us about the *realized* rate of return. Since the realization is just the expectation plus random error, we can write:

$$R_i = R_f + \beta_i [R_m - R_f] + e_i$$

Notes

This is useful, because it tells us that when we look at past returns, they will typically deviate from the security market line – not because the CAPM is wrong, but because random error will push the returns off the line. Notice that the realized R_m does not have to behave as expected, either. So, even the slope of the security market line will deviate from the average equity risk premium. Sometimes it will even be negative!

Figure 11.6



(R_m)

Risk premium

Risk free return

O 0.5 1.0 1.5 Risk (beta)

2. ***Security Market Line:*** CAPM shows the risk and return relationship of an investment in the formula given below:

$$E(R_i) = R_f + \beta_i (R_m - R_f)$$

Where,

$E(R_i)$ = Expected rate of return on any individual security (or portfolio of securities)

R_f = Risk free rate of return

R_m = Expected rate of return on the market portfolio

$R_m - R_f$ = Risk premium

β_i = Market sensitivity index of individual security (or portfolio of securities)

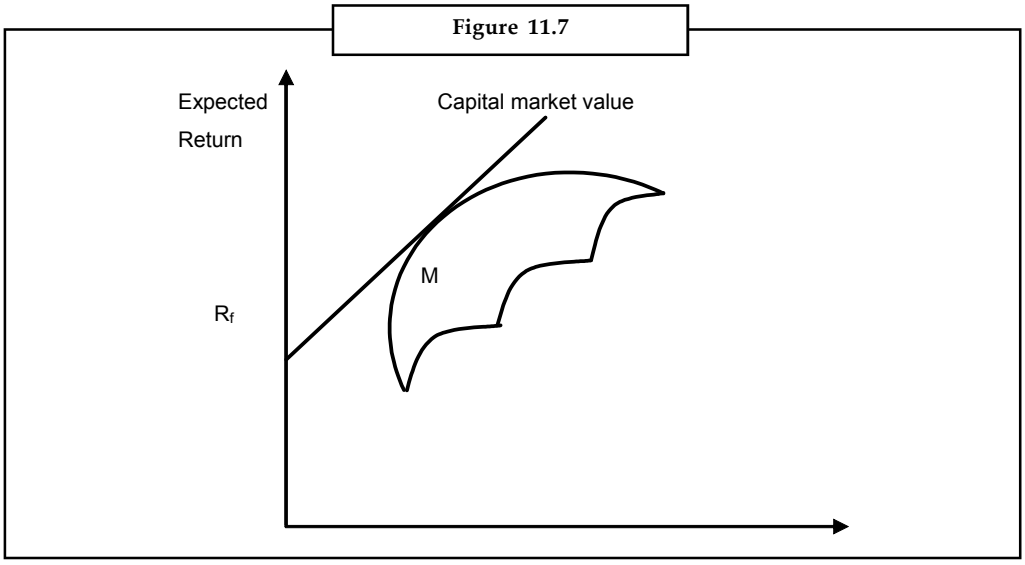
11.5 Capital Market Line (CML)

The Markowitz mean-variance model is modified by introducing into the analysis the concept of risk-free asset. If it is assumed that the investor has access to risk-free securities (for example, Treasury bills) in addition to the universe of risky securities, then he can construct a new set of portfolios as depicted by the line R_fM. At point R_f the investor is investing all his investible fund in risk-free securities, whilst at point M he is holding an all-equity portfolio. The combination of risk-free investment and risky investments in portfolio which may be achieved by points

Notes

between these two limits are termed 'lending portfolios.' Let us now assume that the investor can lend and borrow funds at the same risk-free interest rate. In such circumstances the efficiency boundary simply becomes the straight line drawn from R_f that is a tangent to the original risky portfolio efficiency boundary. The efficiency boundary that arises out of this assumption of the identical risk free lending and borrowing rates leads to some very important conclusions and is termed as 'Capital Market Line' (CML).

Figure 11.7



Example: Dummy Ltd., an investment company, has invested in equity shares of a blue chip company. It's risk-free rate of return (R_f) = 10% , Expected total return (R_m) = 16%, Market sensitivity index (β) = 1.50, (of individual security)

Calculate the expected rate of return on the investment make in the security.

Solution:

Total expected return (R_m) = 16%

Risk free return (R_f) = 10%

Risk premium ($R_m - R_f$) = 6%

$$E(R_i) = R_f + \beta_i (R_m - R_f)$$

$$= 10 + 1.50 (16 - 10) = 19\%$$

Example: Mr. Rakesh provides you following information compute expected return by using CAPM

$R_m = 16\%$ $R_f = 9\%$ $\beta_i = 0.8\%$

Solution:

The expected return on portfolio

$$E(R_1) = R_f + \beta_i (R_m - R_f)$$

$$= 9 + 0.8 (16 - 9) = 14.6\%$$

Notes

Characteristic Line

A rational investor would not invest in an asset, which does not improve the risk-return characteristics of his existing portfolio. Since a rational investor would hold the market portfolio, the asset in question will be added to the market portfolio. MPT derives the required return for a correctly priced asset in this context.

Specific risk is the risk associated with individual assets - within a portfolio these risks can be reduced through diversification (specific risks 'cancel out'). Systematic risk, or market risk, refers to the risk common to all securities – except for selling short as noted below, systematic risk cannot be diversified away (within one market). Within the market portfolio, asset-specific risk will be diversified away to the extent possible. Systematic risk is, therefore, equated with the risk (standard deviation) of the market portfolio.

Since a security will be purchased only if it improves the risk/return characteristics of the market portfolio, the risk of a security will be the risk it adds to the market portfolio. In this context, the volatility of the asset, and its correlation with the market portfolio, is historically observed and is, therefore, a given (there are several approaches to asset pricing that attempt to price assets by modelling the stochastic properties of the moments of assets' returns – these are broadly referred to as conditional asset pricing models). The (maximum) price paid for any particular asset (and hence the return it will generate) should also be determined based on its relationship with the market portfolio.

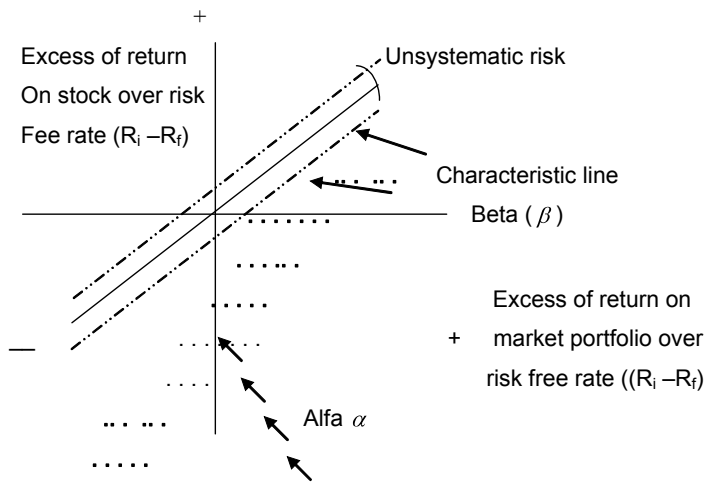
Systematic risks within one market can be managed through a strategy of using both long and short positions within one portfolio, creating a 'market neutral' portfolio.

The Security Characteristic Line (SCL) represents the relationship between the market return (r_M) and the return of a given asset i (r_i) at a given time *t*. In general, it is reasonable to assume that the SCL is a straight line and can be illustrated as a statistical equation:

$$\text{SCL: } r_{it} = \alpha_i + \beta_i r_{Mt} + \in_{it}$$

where α_i is called the asset's alpha coefficient and β_i the asset's beta coefficient.

Figure 11.8: Characteristic Line



A line that best fits the points representing the returns on the assets and the market is called 'characteristic line'. The slope of the line is the beta of the asset, which measures the risk of a security relative to the market. Beta coefficient (β) describes the slope of the characteristic toe

Notes

and so indicates the degree to which the individual security's risk premium reacts to changes in the market portfolio's risk premium. The greater the beta coefficient value the greater the slope of the characteristic line, greater the systematic risk for an individual security. The slope of the characteristic line (regression line) is obtained statistically and it shows the relationship of an individual security with the market.

It is observed from the graph that greater the expected return for the market, the greater the expected excess for the stock. The characteristic line equation for the individual security is given below:

$$R_i - R_f = \sigma_1 + \beta_1 (R_m - R_f)$$

Example: The rates of return on the security of Company Wipro and market portfolio for 10 periods are given below:

Period	Return of Security Wipro (%) (x)	Return on market portfolio (%) (y)
1	20	22
2	22	20
3	25	18
4	21	16
5	18	20
6	-5	8
7	17	-6
8	19	5
9	-7	6
10	20	11

1. What is the beta of Security Wipro?
2. What is the characteristic line for Security Wipro?

Solution:

1. Let us assume that Market is y and Security Wipro is x

Period	R_x	R_m	$(R_x - \bar{R}_x)$	$(R_m - \bar{R}_m)$	$(R_x - \bar{R}_x)(R_m - \bar{R}_m)$	$(R_m - \bar{R}_m)^2$
1	20	22	5	10	50	100
2	22	20	7	8	56	64
3	25	18	10	6	60	36
4	21	16	6	4	24	16
5	18	20	3	8	24	64
6	–5	8	–20	–4	80	16
7	17	-6	2	–18	–36	324
8	19	5	4	-7	–28	49
9	–7	6	–22	–6	132	36
10	20	11	5	–1	–5	1
	150	120	120		357	706
	ΣR_x	ΣR_m			$\Sigma (R_x - \bar{R}_x)(R_m - \bar{R}_m)$	$\Sigma(R_m - \bar{R}_m)$

Notes

$$\bar{R}_x = 15,\ \bar{R}_m = 12$$

$$\sigma^2_m = \frac{\sum(R_m - \bar{R}_m)^2}{n-1} = \frac{706}{9} = 78.44$$

$$\text{Cov} = \frac{\sum(R_x - \bar{R}_x) - (R_m - \bar{R}_m)}{n-1} = \frac{357}{9} = 39.67$$

$$\beta = \frac{Cov_{xm}}{\sigma^2_m} = \frac{39.67}{78.44} = 0.506$$

2. $Y = 15\ x = 12$

$$Y = \alpha + \beta x$$

$$15 = \alpha + (0.506 \times 12)$$

$$\alpha = 15 - (0.506 \times 12) = 8.928\%$$

Characteristic Line for Security X = $\alpha + (\beta \times R_m)$

Where R_m = Expected return on market index

$\therefore$ Characteristic Line for Security X = 8.928 + 0.506 R_m

Alpha Coefficient

The alpha coefficient (α) gives the vertical intercept point of the regression line. In a perfect world, the alpha for an individual stock should be zero and the regression line should go through the graph's origin where the horizontal and vertical axis crosses.

If the alpha was positive, the opposite equilibrium process would occur; investors would rush to buy the security which causes the price of the security to rise and the expected rate on it to fall.

Beta Coefficient

The risk of an individual security can be estimated under CAPM model. The market related risk, which is also called 'systematic risk,' is unavoidable even by diversification of the portfolio. The systematic risk of an individual security is measured in terms of its sensitivity to market movements which is referred to as security's beta. Investors can avoid or eliminate the unsystematic risk by investing funds in wide range of securities and by having well diversified portfolio. Beta coefficient is a measure of the volatility of stock price in relation to movement in stock index of the market; therefore, beta is the index of systematic risk.

$$\beta_I = \frac{Cov_{im}}{Var_m} = \frac{\sigma_i \sigma_m Cor_{im}}{\sigma_m^{\ 2}} = \frac{\sigma_i \sigma_m Cor_{im}}{\sigma_m}$$

Where,

β_I = Beta of individual security

Cov_{im} = Covariance of returns of individual security with market portfolio

Var_m = Variance of returns of market portfolio ($\sigma_m^{\ 3}$)

Cov_{im} = Correlation coefficient between the returns of individual security and the market portfolio

Notes

σ_i = Standard deviation of returns of individual security

σ_m = Standard deviation of returns of market portfolio

Did u know?

What is beta co-efficient?

A beta coefficient is a relative measure of the sensitivity of an assets' return to changes in the return on the market portfolio. Mathematically, the beta coefficient of a security is the security's covariance with the market portfolio divided by the variance of the market portfolio. The beta factor is the measure of volatility of systematic risk of a security or investment in the portfolio. The beta factor of the market as a whole is 1.0. A beta of 1.0 indicates average level of risk while more or less than that the security's return fluctuates more or less than that of market portfolio. A zero beta means no risk. The degree of volatility is expressed as follows:

1. If the beta is one, then it has the same risk profile as the market as a whole, the average risk profile.
2. If the beta is less than one, it is not as sensitive to systematic or market risk as the average investment.
3. If beta is more than one, it is more sensitive to the market or systematic risk than the average investment.

11.6 Beta Factor of a Market Portfolio

If the return from the market portfolio rises or falls, we should expect a corresponding rise or fall in the return from an individual share. The amount of this corresponding rise or fall depends on the beta factor of the share. The beta factor of an investor's portfolio is the total of the weighted average beta factors of each security in the portfolio. As the market portfolio represents all shares on the stock market, it follows that the beta coefficient of the market portfolio must be 1, and all other betas are viewed relative to this value. Thus, if the return from the market portfolio rise by says 2%, the coefficient would be:

$$\frac{\text{Increase in return on investment}}{\text{Increase in return on market portfolio}} = \frac{2\%}{2\%} = 1$$

CAPM indicates the expected return of a particular security in view of its systematic or market risk. The value of a share price is determined in relation to investment in shares of individual companies, rather than as a portfolio.

In practice, for estimation of beta factor the following regression equation is used:

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

Where,

R_i = Rate of return of individual security

α_i = The intercept that equals the risk free rate (R_f)

β_i = Beta factor of he individual security

R_m = Market of return

e_i = Random error, which reflects the diversifiable risk of individual security

Notes

Example: Wipro provides you the following informations. Calculate the expected rate of return of a portfolio:

Expected market return	15%
Risk-free rate of return	9%
Standard deviation of an asset	2.4%
Market Standard deviation	2.0%
Correlation co-efficient of portfolio with market	0.9

Solution:

Calculation Market Sensitivity Index (β_i)

Since, market sensitivity index is not given in the problem, it is calculated by applying the following formula:

$$\beta_i = \frac{\sigma_i}{\sigma_m} = r_m$$

Where, β_i = Market sensitivity index or Beta factor

σ_i = Standard deviation of an asset i.e., 0.024

σ_m = Market Standard deviation i.e., 0.02

r_{im} = Correlation coefficient of portfolio with market i.e., 0.90

$$\beta_i = \frac{0.024}{0.02} \times 0.90 = 1.08$$

We can calculate the expected rate of return of a portfolio by applying capital asset pricing model: $E(R_i) = R_f + \beta_i (R_m - R_f)$

Where,

Correlation

$E(R_j)$ = Expected rate of return of portfolio

R_f = Risk free rate of return i.e., 9%

R_m = Expected return of market portfolio i.e. 15%

β_i = Beta coefficient of investment i.e. 1.08

By substituting, we get

$$E(R.) = 9 + 1.08 (15 - 9) = 9 + 1.08(6) = 15.48 \text{ or } 15.48\%$$

Example: SCM Portfolio Ltd. has three investments in its portfolio. Its details are given below:

Investment	E(R)	β_i	Proportion of invested funds
Wipro	14%	1.6	50%
SBI	16%	1.2	20%
DCM	12%	0.8	30%

Notes

Calculate the weighted average of expected return and Beta factor of the portfolio.

Solution:

Weighted Average of Expected Return of the Total Portfolio:

$$E(R_p) = (14\% \times 0.5) + (16\% \times 0.2) + (12\% \times 0.3) = 7\% + 3.2\% + 3.6\% = 13.8\%$$

Weighted Average Market Sensitivity Index of the Total Portfolio:

$$\beta_p = (1.6 \times 0.5) + (1.2 \times 0.2) + (0.8 \times 0.3) = 0.8 + 0.24 + 0.24 = 1.28$$

Risk-Return Trade-off

$$R_m - r_i = \frac{R_m - R_t}{\sigma_m}$$

Where,

R_m = Market rate of return

R_m = Risk free return

σ_m = Standard deviation of returns of market portfolio

r_i = Rate of return on individual investment

Example: The beta co-efficient of security 'A' is 1.6. The risk free rate of return is 12% and the required rate of return is 18% on the market portfolio. If the dividend expected during the coming year is ₹ 2.50 and the growth rate of dividend and earnings is 8%, at what price should the security 'A' can be sold based on the CAPM.

Solution:

Expected Rate of Return is calculated by applying CAPM formula:

$$E(R_i) = R_f + \beta_i (R_m - R_f)$$

$$= 12\% + 1.6 (18\% - 12\%) = 12\% + 9.6\% = 21.6\%$$

Price of security 'A' is calculated with the use of dividend growth model formula:

$$R_e = \frac{D_1}{P_0} + g$$

Where,

D_1 = Expected dividend during the coming year

R_e = Expected rate of return on security 'A'

g = Growth rate of dividend

P_0 = Price of security 'A'

$$R_e = \frac{D_1}{P_0} + g$$

$$0.216 = \frac{2.50}{P_0} + 0.08$$

Notes

$$0.216 = \frac{2.50}{P_0} + \frac{0.08}{1}$$

$$0.216 = \frac{2.50 + 0.08P_0}{P_0}$$

$$0.216\ P_0 = 2.50 + 0.08\ P_0$$

$$0.216\ P_0 - 0.08\ P_0 = 2.50$$

$$0.136\ P_0 = 2.50$$

$$P_0 = 2.50/0.136 = ₹\ 18.38$$

11.7 Benefits and Limitations of CAPM

Benefits

CAPM model of portfolio management can be effectively used to:

1. Investments in risky projects having real assets can be evaluated of its worth in view of expected return.
2. CAPM analyses the riskiness of increasing the levels of gearing and its impact on equity shareholders returns.
3. CAPM suggests the diversification of portfolio in minimisation of risk.

CAPM is criticised for the following reasons:

1. In real world, assumptions of CAPM will not hold good.
2. In practice, it is difficult to estimate the risk-free return, market rate of return, and risk premium.
3. Investors can estimate the required rate of return on a particular investment in company's securities.
4. CAPM is a single period model while most projects are often available only as large indivisible projects. It is, therefore, more difficult to adjust.

11.8 Arbitrage Pricing Model

The Arbitrage Pricing Model (APM) looks very similar to the CAPM, but its origins are significantly different. Whereas the CAPM is a single-factor model, the APM is a multi-factor model instead of just a single beta value; there is a whole set of beta values – one for each factor. Arbitrage Pricing Theory, out of which the APM arises, states that the expected return on an investment is dependent upon how that investment reacts to a set of individual macro-economic factors (the degree of reaction being measured by the betas) and the risk premium associated with each of those macro-economic factors. The APM, which was developed by Ross (1976), holds that there are four factors, which explain the risk/risk premium relationship of a particular security.

Basically, CAPM says that:

$$E(R_i) = R_f + \beta_i\ (R_m - R_f)$$

Where, λ is the average risk premium = $R_m - R_f$

Notes

However, APM holds that:

$$E(R_i) = R_f + \lambda_1\beta_{i1} + \lambda_2\beta_{i2} + \lambda_3\beta_{i3} + \lambda_4\beta_{i4}$$

Where,

$\lambda_1, \lambda_2, \lambda_3$, and λ_4 the average risk premium for each of the four factors in the model and β_{i1}, β_{i2}, β_{i3} and β_{i4} are measures of the sensitivity of the particular security 'i' to each of the four factors.

Several factors appear to have been identified as being important (some of which, such as inflation and money supply, industrial production and personal consumption, do have aspects of being inter-related). In particular, researchers have identified:

1. Changes in the level of industrial production in the economy
2. Changes in the shape of the yield curve
3. Changes in the default risk premium (i.e., changes in the return required on bonds\ different perceived risks of default)
4. Changes in the inflation rate
5. Changes in the real interest rate
6. Level of personal consumption
7. Level of money supply in the economy

Example: As an investment manager you are given the following informations:

Particulars	Initial price (₹)	Dividends (₹)	Market price at the year end (₹)	Beta (Risk factor)
Investment in equity shares of A Cement Ltd.	25	2	50	0.8
Steel Ltd.	35	2	60	0.7
Liquor Ltd.	45	2	135	0.5
B. Government of India bonds	1,000	140	1,005	0.99

Risk-free return may be taken at 14%.

You are required to calculate:

1. Expected rate of returns of portfolio in each using Capital Asset Pricing Model (CAPM).
2. Average return of portfolio.

Solution:

1. Calculation of Expected Rate of Return on Market Portfolio

Investments	Amount Invested (₹)	Dividends (₹)	Capital Gains (₹)
A. Equity shares of			
Cement Ltd.	25	2	25
Steel Ltd.	35	2	25
Liquor Ltd.	45	2	90
B. Government of India bonds	1,000	140	5
	1,105	146	145

Notes

Expected Rate of Return on Market Portfolio

$$\frac{\text{Dividends earned + Capital appreciation}}{\text{Initial investment}} \times 100 = \frac{146+145}{1,105} \times 100 = 26.33\%$$

Now we can calculate the expected rate of return on individual portfolio, by applying CAPM.

$$E(R_i) = R_f + \beta_i (R_m - R_f)$$

Cement Ltd. = 14 + 0.8 (26.33 – 14) = 23.86%

Steel Ltd. = 14 + 0.7 (26.33 – 14) = 22.63%

Liquor Ltd. = 14 + 0.5 (26.33 – 14) = 20.17%

Govt. of India bonds = 14 + 0.99 (26.33 – 14) = 26.21%

2. Average Return of the Portfolio = $\frac{23.86 + 22.63 + 20.17 + 26.21}{4}$ = 23.22%

The average return is also calculated by finding out the average of beta factors of all securities in the portfolio.

Average of betas = $\frac{0.8 + 0.7 + 0.5 + 0.99}{4}$ = 0.7475

Average return = 14 + 0.7475 (26.33 – 14) = 23.22%

Example: The market portfolio has a historically based expected return of 0.095 and a standard deviation of 0.035 during a period when risk-free assets yielded 0.025. The 0.06 risk premium is thought to be constant through time. Riskless investments may now be purchased to yield 0.08. A security has a standard deviation of 0.07 and a 0.75 correlation with the market portfolio. The market portfolio is now expected to have a standard deviation of 0.035.

Find out the following:

1. Market's return-risk trade-off,
2. Security beta,
3. Equilibrium required expected return of the security.

Solution:

1. Calculation of Market's Return-risk Trade-off

$$\frac{(R_m - R_f)}{\sigma} = \frac{0.095 - 0.025}{0.035} = 2$$

2. Calculation of Security Beta

$$\beta_i = \frac{\sigma_i}{\sigma_m} \times r_m = \frac{0.07}{0.035} \times 0.75 = 1.5$$

3. Calculation of equilibrium required for Expected Rate of Return on the Security

$$E(R_i) = R_f + \beta_i (R_m - R_f)$$

$$= 8 + 1.5 (6) - 17\%$$

Notes

Example: SCM provides the following data, compute beta of Security J:

$$\sigma_j = 12\% \ \sigma_m = 9\%$$

$$Cor_{jm} = +0.72$$

Solution:

Calculation of beta of Security J = $\beta_i = \frac{\sigma_i}{\sigma^2_m} \times Cor_{jm} = \frac{12 \times 9 \times 0.72}{9^2} \times \frac{77.76}{81} = 0.96$

11.9 Arbitrage Pricing Theory (APT)

Arbitrage Pricing Theory (APT) in finance is a general theory of asset pricing, which has become influential in the pricing of shares.

APT holds that the expected return of a financial asset can be modelled as a linear function of various macro-economic factors or theoretical market indices, where sensitivity to changes in each factor is represented by a factor specific beta coefficient. The model-derived rate of return will then be used to price the asset correctly – the asset price should equal the expected end-of-period-price discounted at the rate implied by model. If the price diverges, arbitrage should bring it back into line. The theory was initiated by the economist Stephen Ross in 1976.

1. ***The APT Model:*** If APT holds, then a risky asset can be described as satisfying the following relation:

$$E(r_j) = r_j + b_{j1}RP_1 + b_{j2}RP_2 + ... + b_{jn}RP_n$$

$$r_j = E(r_j) + b_{j1}F_1 + b_{j2}F_2 + ... + b_{jn}F_n + \in_j$$

where

$E(r_j)$ is the risky asset's expected return,

RP_k is the risk premium of the factor,

r_f is the Risk-free

F_k is the macroeconomic factor,

b_{jk} is the sensitivity of the asset to factor k, also called factor loading,

ε_j is the risky asset's idiosyncratic random stock with mean zero.

Arbitrage and the APT: Arbitrage is the practice of taking advantage of a state of imbalance between two (or possibly more) markets and thereby making a risk-free profit, rational Pricing.

Arbitrage in Expectations: The APT describes the mechanism whereby arbitrage by investors will bring an asset that is mispriced, according to the APT model, back into line with its *expected* price. Note that under true arbitrage, the investor locks-in a *guaranteed* payoff, whereas under APT arbitrage as described below, the investor locks-in a positive *expected* payoff. The APT, thus, assumes "arbitrage in expectations" – i.e. that arbitrage by investors will bring asset prices back into line with the returns expected by the model portfolio theory.

Arbitrage Mechanics: In the APT context, arbitrage consists of trading in two assets – with at least one being mispriced. The arbitrageur sells the asset that is relatively too expensive and uses the proceeds to buy one which is relatively too cheap.

Notes

Under the APT, an asset is mispriced if its current price diverges from the price predicted by the model. The asset price today should equal the sum of all future cash flows discounted at the APT rate, where the expected return of the asset is a linear function of various factors, and sensitivity to changes in each factor is represented by a factor-specific beta coefficient.

A correctly priced asset here may be in fact a *synthetic* asset – a *portfolio* consisting of other correctly priced assets. This portfolio has the same exposure to each of the macroeconomic factors as the mispriced asset. The arbitrageur creates the portfolio by identifying x correctly priced assets (one per factor plus one) and then weighting the assets such that portfolio beta per factor is the same as for the mispriced asset.

When the investor is long the asset and short the portfolio (or vice versa) he has created a position which has a positive expected return (the difference between asset return and portfolio return) and which has a net-zero exposure to any macroeconomic factor and is, therefore, risk free (other than for firm specific risk). The arbitrageur is thus in a position to make a risk free profit:

2. ***Where today's price is too low:*** The implication is that at the end of the period the *portfolio* would have appreciated at the rate implied by the APT, whereas the mispriced asset would have appreciated at *more* than this rate. The arbitrageur could therefore:

   Today:
   - (a) Short-sell the *portfolio*
   - (b) Buy the mispriced-asset with the proceeds.
   - (c) At the end of the period:
     - (i) Sell the mispriced asset
     - (ii) Use the proceeds to buy back the *portfolio*
     - (iii) Pocket the difference.

3. ***Where today's price is too high:*** The implication is that at the end of the period the *portfolio* would have appreciated at the rate implied by the APT, whereas the mispriced asset would have appreciated at *less* than this rate. The arbitrageur could therefore:

   Today:
   - (a) Short sell the mispriced-asset
   - (b) Buy the *portfolio* with the proceeds
   - (c) At the end of the period:
     - (i) Sell the *portfolio*
     - (ii) Use the proceeds to buy back the mispriced-asset
     - (iii) Pocket the difference

4. ***Relationship with the Capital Asset Pricing Model:*** The APT along with the CAPM is one of two influential theories on asset pricing. The APT differs from the CAPM in that it is less restrictive in its assumptions. It allows for an explanatory (as opposed to statistical) model of asset returns. It assumes that each investor will hold a unique portfolio with its own particular array of betas, as opposed to the identical "market portfolio." In some ways, the CAPM can be considered a "special case" of the APT in that the securities market line represents a single-factor model of the asset price, where Beta is exposure to changes in value of the market.

Notes

Additionally, the APT can be seen as a "supply side" model, since its beta coefficients reflect the sensitivity of the underlying asset to economic factors. Thus, factor shocks would cause structural changes in the asset's expected return, or in the case of stocks, in the firm's profitability.

On the other side, the capital asset pricing model is considered a "demand side" model. Its results, although similar to those in the APT, arise from a maximization problem of each investor's utility function, and from the resulting market equilibrium (investors are considered to be the "consumers" of the assets).

11.10 Using the APT

Identifying the Factors

As with the CAPM, the factor-specific Betas are found via a linear regression of historical security returns on the factor in question. Unlike the CAPM, the APT, however, does not itself reveal the identity of its priced factors – the number and nature of these factors is likely to change over time and between economies. As a result, this issue is essentially empirical in nature. Several *a priori* guidelines as to the characteristics required of potential factors are, however, suggested:

1. Their impact on asset prices manifests in their *unexpected* movements.
2. They should represent *undiversifiable* influences (these are, clearly, more likely to be macroeconomic rather than firm-specific in nature).
3. Timely and accurate information on these variables is required.
4. The relationship should be theoretically justifiable on economic grounds.

Chen, Roll and Ross identified the following macro-economic factors as significant in explaining security returns:

1. Surprises in inflation;
2. Surprises in GNP as indicted by an industrial production index;
3. Surprises in investor confidence due to changes in default premium in corporate bonds;
4. Surprise shifts in the yield curve.

As a practical matter, indices or spot or futures market prices may be used in place of macro-economic factors, which are reported at low frequency (e.g. monthly) and often with significant estimation errors. Market indices are sometimes derived by means of factor analysis. More direct 'indices' that might be used are:

1. Short-term interest rates;
2. The difference in long-term and short-term interest rates;
3. A diversified stock index such as the S&P 500 or NYSE Composite Index;
4. Oil prices
5. Gold or other precious metal prices
6. Currency exchange rates

Notes

11.11 Modern Portfolio Theory

Portfolio management is concerned with efficient management of investment in the securities. An investment is defined as the current commitment of funds for a period in order to derive a future flow of funds that will compensate the investing unit:

1. For the time the funds are committed
2. For the expected rate of inflation
3. For the uncertainty involved in the future flow of funds

The portfolio management deals with the process of selection of securities from the number of opportunities available with different expected returns and carrying different levels of risk and the selection of securities is made with a view to provide the investors the maximum yield for a given level of risk or ensure minimise risk for a given level of return.

1. ***Markowitz Mean-variance Model:*** *Harry Markowitz* is regarded as the father of modern portfolio theory. According to him, investors are mainly concerned with two properties of an asset: risk and return, but by diversification of portfolio it is possible to trade-off between them. The essence of his theory is that risk of an individual asset hardly matters to an investor. What really counts is the contribution it makes to the investor's total risk. By turning his principle into a useful technique for selecting the right portfolio from a range of different assets, he developed 'Mean Variance Analysis' in 1952. The thrust has been on balancing safety, liquidity and return depending on the taste of different investors. The portfolio selection problem can be divided into two stages, first finding the mean-variance efficient portfolios and secondly selecting one such portfolio. Investors do not like risk and the greater the riskiness of returns on an investment, the greater will be the returns expected by investors. There is a trade-off between risk and return, which must be reflected in the required rates of return on investment opportunities. The standard deviation (or variance) of return measures the total risk of an investment. It is not necessary for an investor to accept the total risk of an individual security. Investors can and do diversify to reduce risk. As number of holdings approach larger, a good deal of total risk is removed by diversification.

   Assumptions: This model has taken into account of risks associated with investments – using variance or standard deviation of the return. This model is based on the following assumptions:

   (a) The return on an investment adequately summarises the outcome of the investment.

   (b) All investors are risk-averse. For a given expected return he prefers to take minimum risk, obviously for a given level of risk the investor prefers to get maximum expected return.

   (c) Investors are assumed to be rational in so far as they would prefer greater returns to lesser ones given equal or smaller risk and risk averse. Risk aversion in this context means merely that, as between two investments with equal expected returns, the investment with the smaller risk would be preferred.

   (d) 'Return' could be any suitable measure of monetary inflows such as NPV, but yield has been the most commonly used measure of return, in this context, so that where the standard deviation of returns is referred to we shall mean the standard deviation of yield about its expected value.

   (e) The investors can visualise a probability distribution of rates of return.

Notes

(f) The investors' risk estimates are proportional to the variance of return they perceive for a security or portfolio.

(g) Investors base their investment decisions on two criteria i.e., expected return and variance of return.

2. ***Efficient Frontier:*** Markowitz has formulised the risk return relationship and developed the concept of efficient frontier. For selection of a portfolio, comparison between a combination of portfolios is essential. As a rule, a portfolio is not efficient if there is another portfolio with:

(a) a higher expected value of return and a lower standard deviation (risk)

(b) a higher expected value of return and the same standard deviations (risk).

(c) the same expected value but a lower standard deviation (risk).

Markowitz has defined the diversification as the process of combining assets that are less than perfectly positively correlated in order to reduce portfolio risk without sacrificing any portfolio returns. If an investor's portfolio is not efficient he may:

(a) increase the expected value of return without increasing the risk.

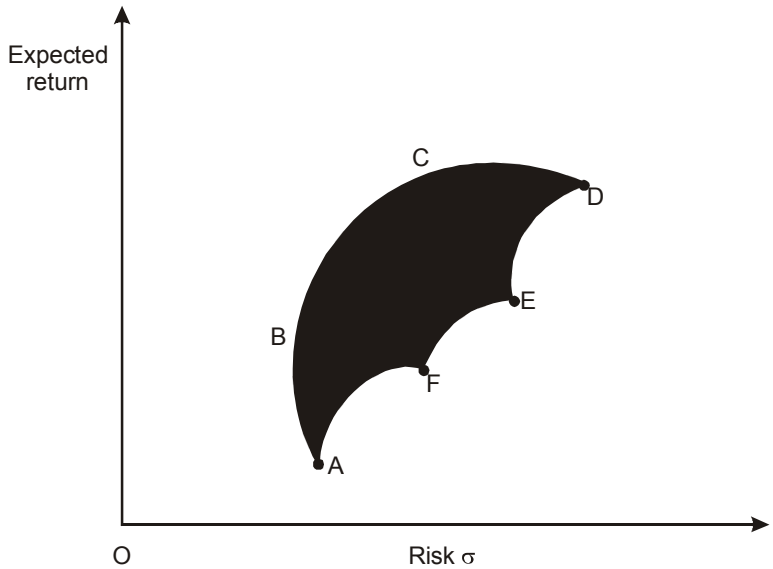
(b) decrease the risk without decreasing the expected value of return, or

(c) obtain some combination of increase of expected return and decreased risk.

This is possible by switching to a portfolio on the efficient frontier.

If all the investments are plotted on the risk-return sphere, individual securities would be dominated by portfolios, and the efficient frontier would take shape, indicating investments which yield maximum return given the level of risk bearable, or which minimises risk given the expected level of return. The figure depicts the boundary of possible investments in securities A, B, C, D, E and F; and B, C, D are lying on the efficient frontier.

Figure 11.9: Markowitz Efficient Frontier



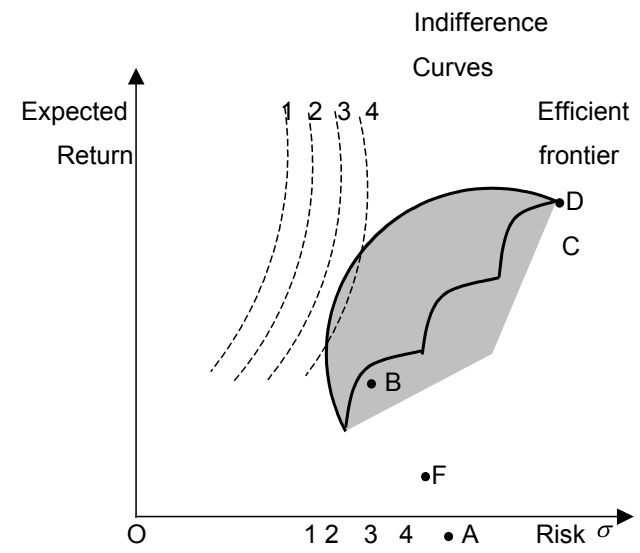
The best combination of expected value of return and risk (standard deviation) depends upon the investors' utility function. The individual investor will want to hold that portfolio

Notes

of securities that places him on the highest indifference curves, choosing from the set of available portfolios. The dark line at the top of the set is the line of efficient combinations, or the efficient frontier. It depicts the trade-off between risk and expected value of return.

The optimal investment achieved at a point where the indifference curve is at a tangent to the efficient frontier. This point reflects the risk level acceptable to the investor in order to achieve a desired return and provide maximum return for the bearable level of risk. The concept of efficient frontier, and the optimal point location is explained with help of next figure. A, B, C, D, E and F define the boundary of all possible investments out of which investments in B, C and D are the efficient proposals lying on the efficient frontier. The attractiveness of the investment proposals lying on the efficient frontier depends on the investors' attitude to risk. At point B, the level of risk and return is at optimum level. The returns are the highest at point D, but simultaneously it carries higher risk than any other investment.

Figure 11.10



The shaded area represents all attainable portfolios, that is all the combinations of risk and expected return that may be achieved with the available securities. The efficient frontier denotes all possible efficient portfolios and any point on the frontier dominates any point to the right of it.

11.12 Summary

- CAPM explains the behaviour of security prices and provides a mechanism whereby investors could assess the impact of a proposed security investment on the overall portfolio risk and return.
- CAPM suggests that the prices of securities are determined in such a way that the risk premium or excess returns are proportional to systematic risk, which is indicated by the beta coefficient.
- The model is used for analysing the risk-return implications of holding securities.
- CAPM refers to the way in which securities are valued in line with their anticipated risks and returns.

Notes

- CAPM tells us that all investors will want to hold "capital-weighted" portfolios of global wealth.
- The CAPM equation describes a linear relationship between risk and return.
- Risk, in this case, is measured by beta.
- We may plot this line in mean and β space: The Security Market Line (SML) expresses the basic theme of the CAPM, i.e., expected return of a security increases linearly with risk, as measured by 'beta'. The SML is an upward sloping straight line with an intercept at the risk-free return securities and passes through the market portfolio.
- The efficiency boundary that arises out of this assumption of the identical risk free lending and borrowing rates leads to some very important conclusions and is termed as 'Capital Market Line' (CML).
- A rational investor would not invest in an asset that does not improve the risk-return characteristics of his existing portfolio.
- Since a rational investor would hold the market portfolio, the asset in question will be added to the market portfolio. MPT derives the required return for a correctly priced asset in this context.
- The alpha coefficient (a) gives the vertical intercept point of the regression line.
- In a perfect world, the alpha for an individual stock should be zero and the regression line should go through the graph's origin where the horizontal and vertical axis crosses.
- Beta coefficient is a measure of the volatility of stock price in relation to movement in stock index of the market, therefore, beta is the index of systematic risk.
- APT holds that the expected return of a financial asset can be modelled as a linear function of various macro-economic factors or theoretical market indices, where sensitivity to changes in each factor is represented by a factor specific beta coefficient.
- The model-derived rate of return will then be used to price the asset correctly – the asset price should equal the expected end of period price discounted at the rate implied by model.
- In the APT context, arbitrage consists of trading in two assets – with at least one being mispriced. The arbitrageur sells the asset, which is relatively too expensive and uses the proceeds to buy one that is relatively too cheap.
- The APT differs from the CAPM in that it is less restrictive in its assumptions.
- It allows for an explanatory (as opposed to statistical) model of asset returns.
- It assumes that each investor will hold a unique portfolio with its own particular array of betas, as opposed to the identical "market portfolio".
- In some ways, the CAPM can be considered a "special case" of the APT in that the securities market line represents a single-factor model of the asset price, where Beta is exposure to changes in value of the market.
- *Harry Markowitz* is regarded as the father of modern portfolio theory.
- According to him, investors are mainly concerned with two properties of an asset: risk and return, but by diversification of portfolio, it is possible to trade off between them.
- The essence of his theory is that risk of an individual asset hardly matters to an investor.

Notes

11.13 Keywords

Arbitrage: The practice of taking advantage of a state of imbalance between two (or possibly more) markets and thereby making a risk-free profit, Rational Pricing.

Beta: The measure of asset sensitivity to a movement in the overall market.

CAPM: A model that explains relative security prices in terms of a security's contribution to the risk of the whole portfolio, not its individual standard deviation.

Security Characteristic Line (SCL): It represents the relationship between the market return (r_M) and the return of a given asset i(r_i) at a given time t.

11.14 Self Assessment

Fill in the blanks:

1. A more risky stock will have a ..... beta and will be discounted at a ..... rate.
2. CAPM is the abbreviation of .....
3. The CAPM is a theoretical solution to the identity of the ..... portfolio.
4. The ..... expresses the basic theme of the CAPM.
5. A line that best fits the points representing the returns on the assets and the market is called .....
6. Systematic risks within one market can be managed through a strategy of creating a ..... portfolio.
7. The slope of the characteristic line shows the relationship of an individual security with the .....
8. The alpha coefficient (a) gives the ..... intercept point of the regression line.
9. Whereas the CAPM is a ..... model, the APM is a ..... model instead of just a single beta value.
10. The ..... sells the asset that is relatively too expensive and uses the proceeds to buy one which is relatively too cheap.
11. Portfolio management is concerned with efficient management of ..... in the securities.
12. The optimal investment achieved at a point where the indifference curve is at a tangent to the .....
13. A ..... investor would not invest in an asset that does not improve the risk-return characteristics of his existing portfolio.
14. The ..... coefficient gives the vertical intercept point of the regression line.
15. The APT differs from the CAPM in that it is ..... in its assumptions.

Notes

11.15 Review Questions

1. Can an investor receive a higher expected return for the same level of systematic risk? If yes, explain under which conditions, if no- answer why not.
2. Examine the concept of the Beta factor of a market portfolio.
3. What do you analyse as the benefits and limitations of CAPM.
4. Do you think that the assumptions of CAPM are practical? Why/why not?
5. Critically evaluate Arbitrage Pricing Model.
6. What do you see as the difference between arbitrage and the APT?
7. Explain arbitrage mechanics.
8. As an investor, how do you use the APT?
9. Analyse the modern portfolio theory and present a short write-up on its utility in wake of the current global crisis.
10. Examine the concept of Efficient Frontier.
11. RKS Ltd. has an expected return of 22% and standard deviation of 40%. BBS Ltd. has an expected return of 24% and standard deviation of 38%. RKS Ltd. has a beta of 0.86 and BBS Ltd. a beta of 1.24. The correlation coefficient between the return of RKS Ltd. and BBS Ltd. is 0.72. The standard deviation of the market return is 20%. Suggest:
    (a) Is investing in BBS Ltd. better than investing in RKS Ltd.? (H) If you invest 30% in BBS Ltd. and 70% in RKS Ltd.,
    (b) What is your expected rate of return and portfolio standard deviation?
    (c) What is the market portfolio's expected rate of return and how much is the risk-free rate?
12. Wipro Limited pays no taxes and is entirely financed by equity shares. The equity share has a beta of 0.6, a price-earning ratio of 12.5 and is priced to offer an expected return of 20%. Wipro Ltd. now decides to buy back half of the equity shares by borrowing an equal amount. If the debt yields a risk free return of 10%, calculate:
    (a) The beta of the equity shares after the buyback.
    (b) The required return and risk premium on the equity shares before the buyback.
    (c) The required return and risk premium on the equity shares after the buyback.
    (d) The required return on debt.
    (e) The percentage increase in expected earnings per share.
    (f) The new price-earning multiple.

    Assume that the operating profit of the firm is expected to remain constant in perpetuity.

Answers: Self Assessment

1. higher, higher
2. Capital Asset Pricing Model
3. tangency
4. Security Market Line (SML)
5. 'characteristic line'
6. 'market neutral'

Notes

7. market
8. vertical
9. single-factor, multi-factor
10. arbitrageur
11. investment
12. efficient frontier
13. rational
14. alpha
15. less restrictive

11.16 Further Readings

Books

Cleeton, Cloud E, *Strategies for the Options Traders*, NY, John Wiley.

Francis J.C. and Archer, S.H., *Portfolio Analysis*, Englewood Cliffs, NJ, Prentice Hall.

Mayo, Herbert B., *Basic Investments*, The Dryden Press; Hinsdale.

Meredith, G.G., *Capital Investment Decisions*, NY, Harper & Row.

Renwick, Fred B., *Introduction to Investments and Finance: Theory and Analysis*, NY, MacMillan.

Unit 12: Models

Notes

CONTENTS

Objectives

Introduction

12.1 Markowitz Risk-return Optimisation

12.2 Single Index Model

12.3 Two Factor Model

12.4 Multi Factor Model

12.5 Summary

12.6 Keywords

12.7 Self Assessment

12.8 Review Questions

12.9 Further Readings

Objectives

After studying this unit, you will be able to:

- Discuss Markowitz Risk-return Optimisation
- Explain Single Index Model
- Describe Two Factor Model
- Understand Multi Factor Models

Introduction

The optimal portfolio concept falls under the modern portfolio theory. The theory assumes (among other things) that investors fanatically try to minimize risk while striving for the highest return possible. The theory states that investors will act rationally, always making decisions aimed at maximizing their return for their acceptable level of risk.

Harry Markowitz used the optimal portfolio in 1952, and it shows us that it is possible for different portfolios to have varying levels of risk and return. Each investor must decide how much risk they can handle and then allocate (or diversify) their portfolio according to this decision.

Suppose you find a great investment opportunity, but you lack the cash to take advantage of it. This is the classic problem of financing. The short answer is that you borrow either privately from a bank, or publicly by issuing securities. Securities are nothing more than promises of future payment. They are initially issued through financial intermediaries such as investment banks, which underwrite the offering and work to sell the securities to the public. Once they are sold, securities can often be re-sold. There is a secondary market for many corporate securities. If they meet certain regulatory requirements, they may be traded through brokers on the stock exchanges, such as the NYSE, the AMEX and NASDAQ, or on options exchanges and bond trading desks.

Notes

Securities come in a bewildering variety of forms – there are more types of securities than there are breeds of cats and dogs, for instance. They range from relatively straightforward to incredibly complex. A straight bond promises to repay a loan over a fixed amount of interest over time and the principal at maturity. A share of stock, on the other hand, represents a fraction of ownership in a corporation, and a claim to future dividends. Today, much of the innovation in finance is in the development of sophisticated securities: structured notes, reverse floaters, IO's and PO's – these are today's specialized breeds. Sources of information about securities are numerous on the worldwide web. For a start, begin with the Ohio State Financial Data Finder. All securities, from the simplest to the most complex, share some basic similarities that allow us to evaluate their usefulness from the investor's perspective. All of them are economic claims against future benefits. No one borrows money that they intend to repay immediately; the dimension of time is always present in financial instruments. Thus, a bond represents claims to a future stream of pre-specified coupon payments, while a stock represents claims to uncertain future dividends and division of the corporate assets. In addition, all financial securities can be characterized by two important features: *risk* and *return*. These two key measures will be the focus of this unit.

12.1 Markowitz Risk-return Optimisation

Dr. Harry Markowitz is credited with developing the first modern portfolio analysis model since the basic elements of modern portfolio theory emanate from a series of propositions concerning rational investor behaviour set forth by Markowitz, then of the Rand Corporation, in 1952, and later in a more complete monograph sponsored by the Cowles Foundation. It was this work that has attracted everyone's perspective regarding portfolio management. Markowitz used mathematical programming and statistical analysis in order to arrange for the optimum allocation of assets within portfolio. To reach this objective, Markowitz generated portfolios within a reward-risk context. In other words, he considered the variance in the expected returns from investments and their relationship to each other in constructing portfolios. In so directing the focus, Markowitz, and others following the same reasoning, recognized the function of portfolio management as one of composition, and not individual security selection – as it is more commonly practiced. Decisions as to individual security additions to and deletions from an existing portfolio are then predicated on the effect such a manoeuvre has on the delicate diversification balance. In essence, Markowtiz's model is a theoretical framework for the analysis of risk return choices. Decisions are based on the *concept of efficient portfolios.*

A portfolio is efficient when it is expected to yield the highest return for the level of risk accepted or, alternatively, the smallest portfolio risk for a specified level of expected return. To build an efficient portfolio an expected return level is chosen, and assets are substituted until the portfolio combination with the smallest variance at return level is found. As this process is repeated for other expected returns, a set of efficient portfolios is generated.

Assumptions

The Markowitz model is based on several assumptions regarding investor behaviour.

1. Investors consider each investment alternative as being represented by a probability distribution of expected returns over some holding period.
2. Investors maximize one period's expected utility and progress along the utility curve, which demonstrates diminishing marginal utility of wealth.
3. Individuals estimate risk on the basis of the variability of expected returns.
4. Investors base decisions solely on expected returns and variance (or standard deviation) of returns only.

Notes

5. For a given risk level, investors prefer high returns to lower returns. Similarly, for a given level of expected return, investor prefer less risk to more risk.

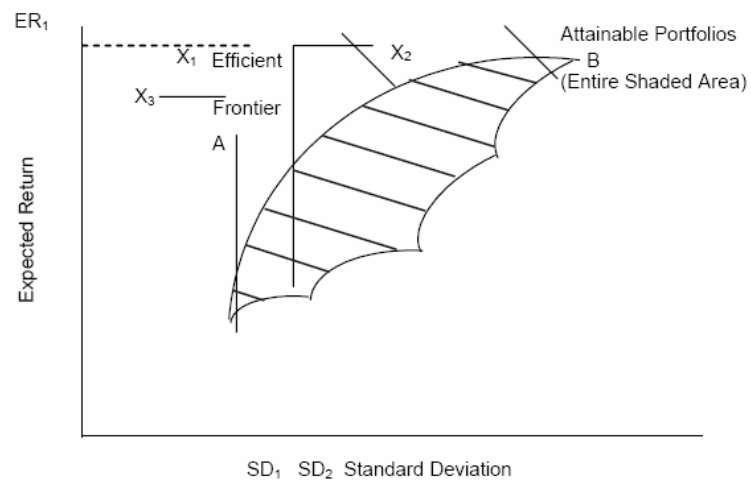
Under these assumptions, a single asset or portfolio of assets is considered to be 'efficient' if no other asset or portfolio of assets offers higher expected return with the same (or lower) risk or lower risk with the same (or higher) expected return.

$$\sigma_P = W^2_C \sigma^2_C + (1 - W_C)\ \sigma^2_E + 2\,[W_C\,(1 - W_C)\ \sigma_C\,\sigma_E\,r_{CE}]^{1/2}$$

$$E(R)_P = W_C\,E\,(R_C) + (1 + W_C)\ E(R_E)$$

Geographical representation of the Mean-Variance Criterion is presented in Figure 12.1, the vertical axis denoting expected return while the horizontal axis measures the standard deviation (or variance) of the returns. Given its expected return and standard deviation, any investment option can be represented by a point on such a plane and the set of all potential options can be enclosed by an area such as shown in Figure 12.1. The efficient frontier, given by the arc AB, is a boundary of the attainable set. In Figure 12.1 the shaded area represents the attainable set of portfolio considerations, with their own risks and expected returns. (Two different portfolios may have the same expected return and risk). Any point inside the shaded area is not as efficient as a corresponding point on the efficient frontier – the arc AB.

Figure 12.1: Markowitz Efficient Frontier



Example: The policy committee of CDME recently used reports from various security analysts to develop inputs for the single-index model. Output derived from the single-index model consisted of the following efficient portfolios:

Portfolio	Expected Return (ER)	Standard Deviation
1	8%	3%
2	10%	6%
3	13%	8%
4	17%	13%
5	20%	18%

1. If the prevailing risk-free rate is 6% which portfolio is the best?
2. If a SD of 12% were acceptable, what would the expected portfolio return be and how would CDME Finance achieve it?

Notes

3. Assume that the policy committee would like to earn an expected 10% with a SD of 4%. Is this possible?

Solution:

1.

Portfolio	[E (R) – T/ σ
1	(8 – 6)/ 3 = 0.67
2	(10 – 6)/6 = 0.67
3	(13 – 6)/8 = 0.875
4	(17 – 6)/13 = 0.846
5	(20 – 6)/18 = 0.77

Portfolio 3 is the optimal portfolio

2. E(R) = 6% + 12% (0.875) = 16.5%

Borrow Re. 0.50 for each Re. 1.00 equity.

σ_p = 1.5 (8%) = 12%

3. A standard deviation of 4% results in an expected return of only 9.5%:

9.5% = 6% + 4% (0.875)

Example: The following regression statistics were generated using the market model and a broad equity index:

Security	σ_i	σ	r_{it}
DH WELDING	-0.21	14.7%	0.48
DEF	0.15	6.3%	0.25
GHI	0.01	11.3%	0.51
JKL	0.20	5.2%	0.95
INDEX	0.00	4.3%	1.00

Historical correlation between i and l.

1. Calculate an estimate of β for each.
2. Do you think that the market model betas during next five-year period will be the same, higher, or lower?
3. Assuming that the index used in the market portfolio, and the return on market portfolio is 7%; and that risk-free rate is 9.0%, calculate the equilibrium expected return on each.
4. Assume that each security is the only holding of the portfolio, calculate required expected returns and explain why these are not the same as the answer to part (c).
5. Calculate the beta of a portfolio consisting of an equal investment in each security.

Notes

Solution:

1.

Security	Beta
DH WELDING	(14.7 +4.3) (0.48) = 1.64
DEF	(6.3 + 4.3) (0.25) = 0.37
GHI	(11.3 +4.3)(0.51) = 1.34
JKL	(5.2 + 4.3) (0.95) = 1.15
INDEX	(4.3 +4.3) (1.00) = 1.00

2. Beta estimate smaller than 1.0 will probably increase towards 1.0. Beta estimates larger than 1.0 will probably decrease towards 1.0

3.

Security	E(R)
DH WELDING	20.48 = 9 + 1.64 (7)
DEF	11.59 = 9 + 0.37 (7)
GHI	18.38 = 9 + 1.34 (7)
JKL	17.46 = 9 + 5.2(7/4.3)
Index	16.00 = 9 + 4.3 (7/4.3)

4. β_{pm} = 0.25(1.64) + 0.25(0.37) + 0.25(1.34) + 0.25(1.15) = 1.125

Example: Mr Fool Vijay provides you the following information. You are required to calculate the optimum portfolio in choosing among the following securities and assuming the risk-free return is 8% and variance in the market index (σ^2_m) = 12%.

Security No.i	Expected Return $\widehat{R}_i$	Beta β_{im}	Security's unsystematic risk σ^2_{ei}
SBI	20	1.0	40
RBL	18	2.5	35
ITC	12	1.5	30
IDBI	16	1.0	35
ICICI	14	0.8	25
MRPL	10	1.2	15
CNBC	17	1.6	30
NDTV	15	2.0	35

Notes

Solution:

Comparing the ratio of excess return to β to the cut-off rate, C

Security	$(\tilde{R}_{it} - T)/\beta_{im}$	$\frac{(\tilde{R}_{it} - T)/\beta_{im}}{\sigma^2_{ei}}$	$\frac{\beta^2_{im}}{\sigma^2_{ei}}$	$\Sigma(\tilde{R}_{it} - T)\beta^2_{im}$	$\Sigma\beta^2_{im}$
SBI	12.00	0.300	.025	0.300	0.025
RBL	8.00	0.229	.029	0.529	0.054
ITC	7.50	0.179	0.26	0.708	0.080
IDBI	5.63	0.480	.085	1.188	0.165
ICICI	4.00	0.714	.179	1.902	0.344
MRPL	3.50	0.400	.114	2.302	0.458
CNBC	2.67	0.200	.064	2.502	0.522
NDTV	1.67	0.160	.026	2.662	0.618

Possible cut-off Rate C

$$C_i = \frac{\sigma^2 m \sum_{i=1}^{i} \frac{(R_i - T)\beta_{im}}{\sigma^2_{ei}}}{1 + \sigma^2 m \sum^{i} \beta^2_{im}}$$

SBI	2.769	1
RBL	3.852	2
ITC	4.414	3
IDBI	4.836	4
ICICI	4.481	5
MRPL	4.276	6
CNBC	4.155	7
NDTV	3.814	8

The value of cut-off rate, C is 4.836 and equal to G cut-off rate. Finding the percentage is each security:

$$Z_1 = \left\{ \frac{\beta_{im\ R_i - T - C}}{\sigma^2_{ei}\ \beta_{im}} \right\}$$

Z_1 = **(AQ) (12 – 4.836) = 0.1791

Z_3 = ** (AQ) (8 – 4.836) = 0.0904

Z_4 = **(AQ) (5.63 – 4.836) = 0.0423

$$\sum_{i=1}^{4} Z_i = 0.3971$$

By dividing each Z_i by the sum of Z_i we get the fund to be invested in each security.

In A = 45.10%; in D = 22.77%; in E = 21.48%; and in G = 10.65%.

Notes

Example: Ms. Sushma owns a portfolio composed of four securities with the following characteristics:

Security	Beta	Standard Deviation Random Error Term	Projection
ACC	1.05	12	.30
ABB	0.90	10	.30
ITC	1.20	15	.25
LRBL	1.00	11	.15

If the standard deviation of the market index is 20%, what is total risk of Ms. Sushma's portfolio?

Solution: $\beta_p \sum_{i=1}^{4} x_i \beta_i$

$= (0.30 \times 1.05) + (0.30 \times 0.90) + (0.25 \times 1.20) + (0.15 \times 1.0)$

$= [0.315 + 0.27 + 0.3 + 15]$

$= 1.035$

The standard deviation of the portfolio is:

$= [(1.035)^2 (20)^2 + (0.30)^2 (12)^2 + (0.30)^2 (10)^2 + (0.25)^2 (15)^2 + (0.15)^2 (11)^2]^{1/2}$

$= [428.49 + 12.96 + 9 + 14.0625 + 2.7225]^{1/2}$

$= 21.62\%$

12.2 Single Index Model

Sharpe assumed that, for the sake of simplicity, the return on a security could be regarded as being linearly related to a single index like the market index. Theoretically, the market index should consist of all the securities trading on the market. However, a popular average can be treated as a surrogate for the market index. The acceptance of the idea of a market between individual securities is because any movements in securities could be attributed to movements in the single underlying factor being measured by the market index. The simplification of the Markowitz Model has come to be known as the Market Model or Single Index Model (SIM).

In an attempt to capture the relative contribution of each stock towards portfolio risk, William Sharpe has developed a simple but elegant model called as 'Market Model'. His argument is like this. We appreciate that the portfolio risk declines as the number of stocks increases but to an extent. That part of the risk which cannot be further reduced even when we add few more stocks into a portfolio is called systematic risk. That undiversifiable risk is attributed to the influence of systematic factors principally operated at a given market. If one includes all traded securities in a market in his portfolio, that portfolio reduces the risk to the extent of the market influences. In such a case, one can easily capture every individual stock's contribution to portfolio risk by simply relating its returns with that of the market index. Such a relationship is expected to give us the market sensitivity of the given scrip. This is exactly the relationship that William Sharpe has estimated with a simple regression equation considering the returns or Market Index, such as SENSEX, ET Index, NSE Index or RBI Index as independent variable and returns on individual stocks as dependent.

$R_{it} + \alpha_i + \beta_{mt} - e_{it}$

Notes

Where

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

R_{mt} = Return on a Market Index during t^{th} holding period

α = Constant term

β_{mt} = Market Beta or Market Sensitivity of a given stock

Notes Since the regression coefficient (Beta) indicates the manner in which a security's return changes systematically with the changes in market, this linear line is also called Characteristic Line. *The slope of the line is called Beta*. It gained lot of popularity in security analysis as a measure of relative market risk. Beta is 'one' for such a stock, which is said to have the risk exactly equal to that of the market. On the other hand, the stock with Beta greater than one indicates the aggressiveness of the stock in the market and less than one indicates the slow response in the price of that stock.

1. ***Beta Predicting:*** Beta, as commonly defined, represents how sensitive the return of an equity portfolio (or security) is to the return of the overall market. It can be measured by regressing the historical returns of a portfolio (or security) against the historical returns of an index; the resulting slope of this regression line would be the historical beta. This can be useful for attributing relative performance to various sources or for explaining active risk over a certain period of time.

   Portfolio managers are also very interested in what the beta of a portfolio (or security) will be in the future, or what the realized beta will be. As one might expect, predicting the value of beta can be a complicated process. In the past, when returns were typically available no more frequently than monthly, historical betas were not very reliable predictors of realized betas; achieving statistical significance usually meant using returns from past periods that were no longer relevant. In the 1970s, Barra pioneered the use of multi-factor equity models to calculate, among other things, predicted betas that were based on statistically significant historical relationships between equity returns and a number of risk factors. Other vendors followed this lead with their own multi-factor models, with the belief that predicted betas calculated in this manner would be better predictors of realized betas than historical betas were.

   Back to Basics

   Since daily returns are now widely available, it is worth asking the question: are multi-factor predicted betas better predictors of realized betas than historical betas, which use daily returns? A related question, which probably should have been asked some time ago, is: how good are these predictors? We will try to address these questions below.

   Using daily security returns, going back to the end of 1998 and Barra-predicted betas for the same time period, we performed the following calculations for each month:

   (a) For each security, we calculated the beta relative to the S&P 500 using the 20 business days' returns starting in that month (the realized beta).

   (b) For each security, we obtained the Barra-predicted beta as of the beginning of that month.

   (c) Using the data points for all these securities, we performed the regression:

   Realized Beta = a + b x Predicted Beta + e

Notes

We repeated this calculation by substituting a historical beta (calculated using trailing daily returns) for the predicted beta; we used trailing periods of 60, 120, 180, 240, 300, and 360 business days to calculate six different values of trailing historical betas. We then repeated all of these calculations using 60 business days' returns for the calculation of the realized beta.

2. ***Interpreting the Results:*** A perfect predictor would have regression results of a = 0, b = 1, correlation = 1, and MAE = 0. While these results are far from perfect, it is important to remember that they are for individual securities; predictions for portfolios can be expected to be far more reliable.

   It is more useful to look at the results on a comparative basis. For each line, the shaded values of b, correlation, and MAE are the closest to ideal. We can see that all of the shaded numbers are associated with either the daily historical beta or the average of the predicted and historical beta. While we cannot conclude from this that daily historical betas are significantly better predictors of realized beta than Barra-predicted betas, it certainly raises the question of whether the Barra-betas (or any other multi-factor betas) are the best predictors.

   Caution There are a few other interesting results worth noting:

   (a) The "b" in the regression results for the predicted betas are greater than 1. This is not necessarily good or bad, but simply indicates that the predicted betas have less dispersion than the realized betas. This makes intuitive sense, since the predicted betas are based on longer-term factor relationships.

   (b) The "b" in the regression results for the historical betas increases as the length of the trailing period increases. This indicates that the dispersion of historical betas decreases as the trailing period increases, which also makes intuitive sense.

   (c) All of the prediction results are better for the 60-day realized betas than for the 20-day realized betas.

   (d) The historical beta appears to have the largest relative advantage for trailing periods of 240-300 days (for both the 20-day and the 60-day realized betas).

3. ***Implications:*** As mentioned previously, we should not rush to draw any hard conclusions from these results. A brief study such as this has its limitations, not the least of which is the fact that it uses less than four years worth of data. However, the evidence presented above supports the following claim: *In recent years, a simple daily historical beta has been at least as good a predictor of short-term security betas as the predicted betas generated by a sophisticated multi-factor equity model.*

   Since beta is such a primary feature of any equity factor model, this has implications for our investment process. It raises the question of how much we should rely on the numbers generated by multi-factor models for our risk controls. While these numbers are useful and should not be ignored, we can no longer claim that they are the best numbers available for this purpose. For risk-control purposes, the daily historical beta appears to be at least as important a measure as the multi-factor predicted beta.

Notes

Example: Mr. Soma owns a portfolio of two securities with the following expected returns, standard deviations, and weights:

Security	Expected Return	Standard Deviation	Weight
RNL	12%	15%	.40
SBI	15%	20%	.60

What are the maximum and minimum portfolio standard deviations for varying levels of correlation between two securities?

Solution:

$$\sigma_p = [X^2_A \sigma^A_A + X^2_B \sigma^2_B + 2 X_A X_B r_{AB} \sigma_A r_B]^{½}$$

$$\sigma_p = [(.40)^2 (15)^2 + (.60)^2 (20)^2 + 2 (.60) (.40) (15) (20) r_{AB}]^{½}$$

$$= [36 + 144 + (144) r_{AB}]^{½}$$

The portfolio's standard deviation will be at a maximum when the correlation between securities RNL and SBI is + 1.0. That is:

$$\sigma_p = [36 + 144 + (144 \times 1)]^{½}$$

$$= 18\%$$

The portfolio's standard deviation will be at a minimum when the correlation between securities RNL and SBI is –1.0. That is:

$$= [36 + 144 + (144 \times 1)]^{½} = 6\%$$

Example: RKV owned five securities at the beginning of the year in the following amounts and with the following current and expected end-of-year prices:

Security	Share Amount	Current Price in (₹)	Expected Year-End Price in (₹)
KRBL	100	50	65
SBI	150	30	40
INY	75	20	25
RNL	100	25	32
I-Gate	125	40	47

What is the expected return on RKV's portfolio for the year?

Solution:

The initial value of RKV's portfolio is:

= (₹ 50 × 100) + (₹ 30 × 150) + (₹ 20 × 75) + (₹ 25 × 100) + (₹ 40 × 125)

= ₹ 5000 + ₹ 4500 + ₹ 1500 + ₹ 2500 + ₹ 5000

= ₹ 18,500

The proportion that each security constitutes of RKV's initial portfolio is:

X_A = (₹ 50 × 100)/(₹ 18,500) = 0.27

Notes

X_B = (₹ 30 × 150)/(₹ 18,500) = 0.24

X_C = (₹ 20 × 75)/(₹ 18,500) = 0.08

X_D = (₹ 25 × 100)/(₹ 18,500) = 0.14

X_E = (₹ 40 × 125)/(₹ 18,500) = 0.27

The expected returns on the portfolio securities are:

~ R_A = (₹ 65 – ₹ 50)/₹ 50 + 30.0%

~ R_B = (₹ 40 – ₹ 30)/₹ 30 + 33.3%

~ R_A = (₹ 25 – ₹ 20)/₹ 20 + 25.0%

~ R_A = (₹ 32 – ₹ 25)/₹ 25 + 28.0%

~ R_A = (₹ 47 – ₹ 40)/₹ 40 + 17.5%

The expected return on a portfolio is given by:

$$\tilde{R}_p = \sum_{i=1}^{N} (X_i \times R_x)$$

In the case of RKV's portfolios

$$\tilde{R}_p = (0.27 \times 30.0\%) + (0.24 \times 33.3\%) + (0.08 \times 25.0\%) + (1.4 \times 28.0\%) + (0.27 \times 17.5\%)$$

$$= (0.81\%) + (7.992\%) + (2.0\%) + (3.92\%) + (4.725\%)$$

$$= (19.447\%)$$

12.3 Two Factor Model

The two factor model has been derived from Fama and French's three factor model, it is important that we understand in principle the Fama-French Model. It's a model that compares a portfolio to three distinctive types of risk found in the equity market to assist in categorizing returns. Prior to the three-factor model, the Capital Asset Pricing Model (CAPM) was used as a "single factor" way to explain portfolio returns.

However, several shortcomings of the CAPM model exist. Incorrectly predicting results compared to realize returns and the affect of other risk factors have put this model under criticism. The assumption of a single risk factor limits the usefulness of this model.

In June 1992, Eugene F. Fama and Kenneth R. French published a paper that found that on average, a portfolio's beta only explains about 70% of its actual returns. For example, if a portfolio was up 10%, about 70% of the return can be explained by the advance of all stocks and the other 30% is due to other factors not related to beta.

1. "Beta," the measure of market exposure of a given stock or portfolio, which was previously thought to be the be-all/end-all measurement of stock risk/return, is of only limited use. Fama/French showed that this parameter did not predict the returns of all equity portfolios, although it is still useful in predicting the return of stock/bond and stock/cash mixes.
2. The return of any stock portfolio can be explained almost entirely by two factors: Market cap ("size") and book/market ratio ("value"). The smaller and the median market cap of your portfolio, the higher its expected return.

To represent the market cap ("size") and book/market ratio ("value") returns, Fama and French modified the original CAPM with two additional risk factors: *size* risk and *value* risk.

Notes

The original CAPM equation:

$$E(r_A) = r_{(f)} + \beta_A (E(r_m) - r_{(f)})$$

where, $r_{(f)}$ is the risk-free rate and

$E(r_m)$ is the expected excess return of the market portfolio beyond the risk-free rate, often called the *equity risk premium*.

The Fama and French equation:

$$E(r_A) = r_{(f)} + \beta_A (E(r_m) - (r_f) + s_A SMB + h_A HML$$

where, SMB is the "Small Minus Big" market capitalization risk factor and

HML is the "High Minus Low" value premium risk factor

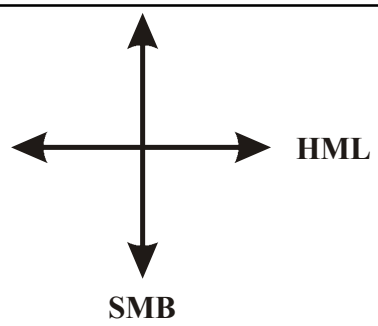
SMB, Small Minus Big, measures the additional return investors have historically received by investing in stocks of companies with relatively small market capitalization. This additional return is often referred to as the "size premium."

HML, which is short for High Minus Low, has been constructed to measure the "value premium" provided to investors for investing in companies with high book-to-market values (essentially, the value placed on the company by accountants as a ratio relative to the value the public markets placed on the company, commonly expressed as B/M). *(Note terminology usage as mentioned above.)*

The key point of the model is that it allows investors to weight their portfolios so that they have greater or lesser exposure to each of the specific risk factors, and therefore can target more precisely different levels of expected return.

Market risk is a common factor, so it does not appear on the graph. Note that although there are three factors in the model, only two are ever shown. Now this is one very common reason for this model to be known as a two factor model.

Figure 12.2: Three-factor Model: Risk Axes



12.4 Multi Factor Model

A Multi Factor Model can be defined as a financial model that employs multiple factors in its computations to explain market phenomena and/or equilibrium asset prices. The multi-factor model can be used to explain either an individual security or a portfolio of securities. It will do this by comparing two or more factors to analyze relationships between variables and the security's resulting performance.

Notes

Factors are compared using the following formula:

$$R_i = a_i + \beta_i(m) R_m + \beta_i(1)F_1 + \beta_i(2)F_2 + ... + \beta_i(N)F_N + e_i$$

Where,

R_i is the returns of security i

R_m is the market return

F(1,2,3…N) is each of the factors used

β is the beta with respect to each factor including the market (m)

e is the error term

a is the intercept

Multi-factor models are used to construct portfolios with certain characteristics, such as risk, or to track indexes. When constructing a multi-factor model, it is difficult to decide how many and which factors to include. One example, the Fama and French model, has three factors: size of firms, book-to-market values and excess return on the market. Also, models will be judged on historical numbers, which might not accurately predict future values.

Multi-factor models can be divided into three categories: macroeconomic, fundamental and statistical models. Macroeconomic models compare a security's return to such factors as employment, inflation and interest. Fundamental models analyze the relationship between a security's return and its underlying financials (such as earnings). Statistical models are used to compare the returns of different securities based on the statistical performance of each security in and of itself.

Task

Analyse the utility of Multi Factor Model and discuss the advantages in details.

12.5 Summary

- The application of Markowitz's model requires estimation of large number of co-variances.
- And without having estimates of co-variances, one cannot compute the variance of portfolio returns.
- This makes the task of delineating efficient set extremely difficult.
- However, William Sharpe's single-index model' simplifies the task to a great extent.
- Even with a large population of assets from which to select portfolios, the numbers of required estimates are amazingly less than what are required in Markowitz's model.
- But how accurate is the portfolio variance estimate as provided by the single-index model's simplified formula? While the Markowitz's model makes no assumption regarding the source of the co-variances, the single-index model does so.
- Obviously, the accuracy of the latter model's formula for portfolio variance is as good as the accuracy of its underlying assumptions.
- Some other portfolio selection models that seem to hold great promises to practical applications are also looked at here.

Notes

- One such model is the multi-factor model.
- There are different variants of this model and each of them is developed to capture some of the non-market influences that cause shares to move together (recall that single-index model accounts for only market-related influences).
- The non-market influences, in essence, include a set of economic factors or industry (or group) characteristics that account for common movement in share prices.
- While it is easy to find a set of indices that are associated with non-market effects over any period of time, it is quite another matter to find a set that is successful in predicting co-variances that are not market related.
- There is still a great deal of work to be done before multi-index models consistently outperform the simpler one.

12.6 Keywords

Beta: The beta (β) of a stock or portfolio is a number describing the relation of its returns with that of the financial market as a whole.

Efficient Frontier: A line created from the risk-reward graph, comprised of optimal portfolios.

Portfolio Manager: The person or persons responsible for investing a mutual, exchange-traded or closed-end fund's assets, implementing its investment strategy and managing the day-to-day portfolio trading.

12.7 Self Assessment

Fill in the blanks:

1. ..... models are used to construct portfolios with certain characteristics, such as risk, or to track indexes.
2. ..... measures the additional return investors have historically received by investing in stocks of companies with relatively small market capitalization.
3. The return of any stock portfolio can be explained almost entirely by two factors: ..... and .....
4. ..... is a common factor, so it does not appear on the graph.
5. ..... is credited with developing the first modern portfolio analysis model.
6. A portfolio is efficient when it is expected to yield the .....return for the level of risk accepted.
7. The .....is a boundary of the attainable set.
8. Markowitz considered the ..... in the expected returns from investments and their relationship to each other in constructing portfolios.
9. Beta is a primary feature of any ..... factor model.
10. ..... are also very interested in what the beta of a portfolio (or security) will be in the future, or what the realized beta will be.
11. The regression coefficient (Beta) indicates the manner in which a security's return changes systematically with the changes in market, this linear line is also called .....

Notes

12. Sharpe assumed that, the return on a security could be regarded as being ..... related to a single index like the market index.

13. Predicting the value of beta can be a ..... process.

14. In Markowitz Model, it is assumed that for a given risk level, investors prefer ..... returns to ..... returns.

15. In Markowitz Model, to build an efficient portfolio an ..... level is chosen, and assets are substituted until the portfolio combination with the smallest variance at return level is found.

12.8 Review Questions

1. Define and explain the Fama-French 2-factor empirical model. Does it work in practice? Is it theoretically plausible? Discuss.

2. From the information given below, calculate each stock's expected return. Using these individual security's expected returns, compute the portfolio's expected return.

Stock	Initial Investment Value (in ₹)	Expected End-of-Period Investment Value (in ₹)	Proportion of Portfolio's Initial Market Value (%)
A	5,000	7000	20.0
B	2,500	4,000	10.0
C	4,000	5,000	16.0
D	10,000	12,000	40.0
E	3,500	5,000	12.0

3. KK provides you following information consider an efficient portfolio with expected return of 15% and standard deviation of 12%. Suppose that the lowest variance portfolio with zero correlation with the efficient portfolio has an expected rate of return of 5%. Next, assume that security i has a standard deviation of 20% and a correlation coefficient of 0.6 with the efficient portfolio. What does the expected rate of return on the asset have to be in order to be consistent with the mathematical relationship for efficient portfolios?

4. Mr. Rajeev provides you following information based on his assumption of the risk-index model, what is the residual variance of each of the following stocks:

Stock	Portfolio Weight	Beta	Expected Return	Total Variance
A	0.25	0.50	0.40	0.07
B	0.25	0.50	0.25	0.05
C	0.50	1.00	0.21	0.07

$\sigma^2_m = 0.06$

5. The standard deviation of return is 4.5% on equity shares of Bharathi Infotel Company, 3.5% for Reliance Infocom Company, and 2.5% for the market portfolio. The correlation coefficient of Bharathi Infotel company for the market if +0.075 and Reliance Infocom to the market is – 0.5. What is the beta coefficient for Bharathi Infotel and Reliance Infocom?

Notes

6. Mr. Daruwals supplies you the following information. What is the expected return on this portfolio? What is the beta of this portfolio? Does the portfolio have more or less systematic risk than an average asset?

Security	Amount Invested (₹)	Expected Return	Beta
Alfa	1,000	8%	.80
Micro Lab	2,000	12	.95
ABB	3,000	15	1.10
ACC	4,000	18	1.40

7. Stocks DH Welding and BHEL have the following historical returns:

Year	Stock DH welding 's Returns (R_A)	Stock BHEL's Returns (R_B)
2003	10.00%	3.00%
2004	18.50	21.29
2005	38.67	44.25
2006	14.33	3.67
2007	33.00	28.30

(a) Calculate the average rate of return for each stock during the period 2000 through 2004. Assume that someone held a portfolio consisting of 50% of stock DH Welding and 50% of Stock BHEL. What would have been the realized rate of return on the portfolio in each year from 2003 through 2007? What would have been the average return on the portfolio during this period?

(b) Now calculate the standard deviation of returns for each stock and for the portfolio.

(c) Looking at the annual returns data on the two stocks, would you guess that the correlation coefficient between returns on the two stocks is closer to 0.9 or to – 0.9?

(d) If you added more stocks at random to the portfolio, which of the following is the most accurate statement of what would happen to σ_P?

(i) σ_P would remain constant.

(ii) σ_P would decline to somewhere in the vicinity of 21%.

(iii) σ_P Would decline to zero if enough stocks were included.

8. Examine the Single Index Model.

9. What are the steps you would take when selecting the best portfolio?

10. Do you think that optimal portfolio is important in investment decisions? Why/Why not?

11. Analyse the significance of the Markowitz Model of Risk Return Optimisation.

12. What do you see as the significance of Beta in the portfolio?

Answers: Self Assessment

1. Multi-factor
2. Small Minus Big
3. Market cap ("size"), book/market ratio ("value")

Notes

4. Market risk
5. Dr. Harry Markowitz
6. highest
7. efficient frontier
8. variance
9. equity
10. Portfolio managers
11. characteristic line
12. linearly
13. complicated
14. high, lower
15. expected return

12.9 Further Readings

Books

Fischer and Jordan, *Security Analysis and Portfolio Management*, Prentice Hall.

Preeti Singh, *Investment Management*, Himalaya Publishing House, N Delhi.

Sauvain, Harry C., *Investment Management,* Englewood Cliffs, N.J., Prentice Hall, 1973.

Shade, Phillip A., *Common Stocks: A Plan for Intelligent Investing*, Illinois, Irwin, 1971.

Notes

Unit 13: Portfolio Performance Evaluation

CONTENTS

Objectives

Introduction

13.1 Methods of Calculating Portfolio Returns

13.2 Determinants of Portfolio Performance

13.3 Market Timing

13.4 Benchmark Portfolios for Performance Evaluation

13.5 Summary

13.6 Keywords

13.7 Self Assessment

13.8 Review Questions

13.9 Further Readings

Objectives

After studying this unit, you will be able to:

- Anlyse classification of managed portfolio
- State advantages of Managed Portfolio
- Discuss methods of computing portfolio return
- Define components of investment performance
- State problems with risk-adjusted measures
- Analyze benchmark Portfolios for Performance Evaluation
- Explain risk-adjusted Measure of Performance
- Discuss sharpe's Reward-to-variability Ratio
- Describe treynor's Reward-to-volatility Ratio
- Understand treynors versus Sharpe Measures
- Discuss Jensen's differential Return Measures
- Explain Application of Evaluation Techniques

Introduction

Of late, mutual funds have gained popularity in India since the early 90s. Most individual investors find it difficult to identify and diversify their investments across different portfolios, either due to lack of adequate knowledge of investment management principles or because of lack of skills needed to play actively with the complex system of making quick decisions for proper handling of their portfolios. As a result, they are simply turning to specialised institutions like mutual funds. Mutual funds in turn, with their skilled portfolio managers are promising to

Notes

generate a rate of return almost similar to the size of return that market yields on efficient portfolios. These specialised institutions are able to invest across different industries and different securities with the available large amounts of money entrusted to them by investors. This facilitates the obtainment of fuller benefits of diversification. Further, the myriad schemes in mutual funds throw up opportunities to suit to the varied requirements of different investors. This lesson examines the performance of a portfolio manager in investing the funds entrusted to a mutual fund. Such an evaluation is important to an investor in different directions.

1. It enables the investor to appraise how well the portfolio manager has achieved the targeted return.
2. It enables the investor to examine how well the manager has achieved the targets in comparison to other mutual funds.
3. It enables the fund authorities to evaluate the performance of their investment decisions not only earning a specified rate of return, but return in relative terms i.e. per unit of risk.

13.1 Methods of Calculating Portfolio Returns

Calculation of portfolio returns is almost similar to the calculation of rate of return on individual stock. The rate of return is generally estimated for a specific holding period. The performance of a portfolio fund is evaluated on the returns generated over a timeframe, with number of sub-periods, by considering the holding periods. The calculation of portfolio return is relatively easy when there are no additions or withdrawals from the initial corpus during the given phenomena.

Example: The portfolio returns can be calculated as illustrated in the following example.

Portfolio Composition: (Beginning)

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

Portfolio Value at the End of Holding Period

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

Notes

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

As we have seen earlier, all mutual funds are specially designed portfolios. The returns from such portfolios are calculated by considering the Net Asset Values (NAVs) of each of these funds, rather than the changes in market prices of all stocks constituting the given portfolio. Then, the portfolio returns (fund returns) are given by

$$R_F = \frac{NAV_t - NAV_{t-i}}{NAV_{t-i}}$$

Performance measurement is just an accounting function that attempts to reconcile the end of period with the beginning period values. Performance evaluation on the other hand, addresses the issues of whether:

1. the past performance was superior or inferior
2. such performance was due to skill or luck
3. future performance will be similar or not

Portfolio performance is generally evaluated over a time interval of at least four years, with returns for a number of sub-periods within the interval, like monthly or quarterly, so that there is a fairly adequate number of observations for statistical evaluation. The calculation of portfolio return is fairly simple when there are no deposits or withdrawals of money from a portfolio during a time period. In that case, the market value of the portfolio in the beginning and at the end of the given period is determined for computing the portfolio return.

Example:

Step 1: Portfolio Value – Beginning

Shares	No. of Shares	Market Price	Portfolio Value Beginning
A	50	100	5,000
B	100	70	7,000
C	200	40	8,000
D	500	60	30,000
Total (V_o)			50,000

Step 2: Portfolio Value – End

Shares	No. of Shares	Market Price	Portfolio Value End
A	50	100	10,000
B	100	40	4,000
C	200	110	22,000
D	500	80	40,000
Total (V_o)			76,000

Notes

Step 3: Portfolio Return

$$= \frac{v_1 - v_0}{v_0}$$

$$= \frac{6,000 - 50,000}{50,000} = 52\%$$

Performance measurement becomes different when a client adds or withdraws money from the portfolio. The percentage change in the market value of the portfolio as computed above may not be an accurate measurement of the portfolio's return in that case. For example, if the beginning value of the portfolio is ₹ 50,000 and the value at the end of October is ₹ 70,000 and the client deposits ₹ 30,000 in cash in early November, the value at the end of the year would be ₹ 1,00,000. The portfolio return in this case will be:

(1,00,000 – 50,000)/50,000 = 100%

However, the entire return was not due to the actions of the investment manager. A more accurate measure would be:

(1,00,000 – 30,000) – 50,000/50,000 = 40%

In the event of a deposit or a withdrawal occurring just after the start of the period, the return on the portfolio should be calculated by adjusting the beginning market value of the portfolio. In the case of a deposit, the beginning value would be increased by the deposit amount and in the case of withdrawal, the beginning value would be decreased by the amount.

When deposits or withdrawals occur in the middle of the period, either the dollar-weighted return (rupee-weighted return) or the time-weighted return should be used. The choice of method will depend on the performance evaluation objectives. If the performance of the fund is being evaluated, dollar-weighted return would be appropriate as it provides the return from the perspective of the client, if the investment manager's decisions are being evaluated, the time-weighted return would be appropriate as it would exclude the effect of the client's cash flow decisions. Let us explain these methods now.

The calculation of portfolio return becomes complicated when there exist certain additions or withdrawals into the funds during the specific evaluating period. Further, when there exist intermediate cash flows that may be due to dividend declarations by some companies and when such cash flows are reinvested into the units of the given mutual fund, the calculation of portfolio return becomes complicated. The following methods are used to calculate the portfolio return during such situations.

1. Dollar-Weighted Rate of Return
2. Time-Weighted Rate of Return
3. Unit-Value Rate of Return

Dollar-Weight Rate of Return

The internal rate of return that equates the initial contribution and the cash flows that occur during the period with the ending value of the fund is the dollar-weighted rate of return. Mathematically, this measure of return is the dollar-weighted average of sub-period returns with the dollar weights equal to the sum of the initial contribution and all the cash flows up to the time of the sub-period return.

Example: A portfolio has a market value of ₹ 100 lakh. In the middle of the quarter, the client deposits ₹ 5 lakh and at the end of the quarter the value of the portfolio is ₹ 103 lakh. What is the dollar weighted return?

Notes

Solution:

The dollar-weighted return would be calculated by solving the following equation for r

$$100 = [-5/(1 + r)] + [103/(1 + r)^2]$$

$$r = -0.98\%$$ which is a semi-quarterly rate of return.

This can be converted into a quarterly rate of return by adding 1 to it, squaring this value and then subtracting 1 from the square, resulting in a quarterly return of [1 + (–0.0098)2 – 1] = –1.95%.

Example: You have invested ₹ 10,000 in a portfolio of securities on January 1. Each month thereafter you have started adding ₹ 1000 to your Portfolio Fund Account. Suppose, by December 31, the fund has appreciated to a higher value. How do you verify performance of your portfolio? Suppose if you have withdrawn some money in the middle. Still, the fund has appreciated. How much of the said appreciation comes from your contribution and how much from increased share value?

Solution:

To illustrate this scenario, let us consider the following table:

Portfolio Fund Account

Month/ Day	Activity	Amount invested or withdrawn	Average price of scrips in the portfolio	Shares added or disposed	Total outstanding shares
01/01	Balance B/f			-	3571.43
01/03	Purchase	1,000	30.00	33.33	3604.76
02/01	Purchase	1,000	39.10	25.58	3630.34
03/01	Purchase	1,000	37.40	26.74	3657.08
03/23	Liquidation	50,000	40.00	1250.00	2407.08
04/03	Purchase	1,000	42.10	23.75	2430.83
05/01	Purchase	1,000	39.70	25.18	2456.01
06/01	Purchase	1,000	41.24	24.25	2480.26

Holding Period Returns

Month/ Day (1)	Amount invested or withdrawn (2)	Average price of a portfolio (3)	Total value of shares (4)	Value (₹) (5)	Days (6)	Return (7)
01/01			3571.43			
01/03	1,000	30.00	3604.76	1,08,142.80	-	
02/01	1,000	39.0.0	3630.34	1,41,583.26	29	30.0%
03/01	1,000	37.4	3657.08	1,36,774.79	29	-4.1%
03/23	50,000	40.00	2407.08	96,283.20	23	6.95%
04/03	1,000	42.10	2430.83	1,02,337.94	11	5.25%
05/01	1,000	39.70	2456.01	97,503.60	29	-5.7%
06/01	1,000	41.24	2480.26	1,02,285.92	30	3.9%

Notes

@ Column (5) - Column (2)

by applying the formula as earlier:

Dollar - Weighted holding Period Return - Annualised

Month/Day (1)	Value (2)	Days (3)	Return (4)	Annualised Returns (5)	Dollar –Weighted Annualised Return (6)
02/01	1,41,583.26	29	30%	377.58%	78.99%
03/01	1,36,774.79	29	-4.1%	-51.60%	-10.43%
03/23	96,283.20	23	6.95%	110.290%	15.69%
04/03	1,02,337.94	11	5.25%	174.20%	26.34%
05/01	97,503.60	29	-5.7%	-71.74%	-10.34%
06/01	1,02,285.92	30	3.9%	47.45%	7.17%
	6,76,768.71				107.42%

Time-weighted Return

This time-weighted rate of return is the weighted average of the internal rates of return for the sub-periods between the cash flows and it is weighted by the length of the sub-periods.

This method considers the market value of the portfolio just before each cash flow occurs.

The percentage change in the value would be 160% as compared with a change in value of 82%, if there had been no interim cash flow. The time-weighted return of 82% is however more appropriate return for the fund manager.

Example: Fund A has ₹ 10,00,000 under management at time 0. It earns 25% in period 1. At that time, ₹ 5,00,000 is pulled out by other investors. The remaining capital earns negative 10% during period 2. What are the funds time-weighted and rupee-weighted rates of return?

Solution:

The time-weighted rate of return is calculated as a geometric mean of the individual rates of return. Thus the time-weighted performance is

$$[(1.25)\ (0.90)]\ 0.5 - 1 = 0.0607 = 6.07\%$$

The rupee-weighted rate of return is found as the solution to the internal rate of return problem.

$$₹\ 10,00,000 = ₹\ 5,00,000/(1 + r) + ₹\ 6,75,000/(1 + r)^2$$

$$R = 10.88\%$$

Unit Value Method

When intermediate cash flows are generated, new units can be added to the existing portfolio. If you assume that the unit value is unchanged while procuring the interim units, the change in Net Asset Value (NAV) of the portfolio indicates the return on portfolio. In the above illustration, about 8,000 units are there at a Net Asset Value of ₹ 100 at the beginning. Since the value of unit

Notes

has gone up to ₹ 110 by July, the intermediate cash flow of ₹ 2,20,000 is converted into 2,000 units increasing the total units to 10,000. At the end of the year, the NAV further raised to ₹ 132 per unit. The NAV of ₹ 132 at the end of the year compared with ₹ 100 at the beginning of the year obviously results in a return of 32% for the year. This is called Unit Value Rate of Return.

Portfolio Performance and Risk Adjusted Methods

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

In case of a well-diversified portfolio the standard deviation could be used as a measure of risk, but in case of individual assets and not-so-well diversified portfolios the relevant measure of risk could be the systematic risk. We have already seen in earlier units the measurement aspects of portfolio risk and the systematic risks.

There are three popular measures to estimate the return per unit of risk from a portfolio. They are

1. Sharpe's Ratio
2. Treynor's Measure
3. Jensen's Differential Returns

Risk-adjusted Returns

The performance of a fund should be assessed in terms of return per unit of risk. The funds that provide the highest return per unit of risk would be considered the best performer. For well-diversified portfolios in all asset categories, the standard deviation is the relevant measure of risk. When evaluating individual stocks and not so well diversified portfolios, the relevant measure of risk is the systematic or market risk, which can be assessed using the beta co-efficient (β). Beta signifies the relationship between covariance (stock, market) and variance of market. Two well-known measures of risk-adjusted return are:

Sharpe's Ratio

A ratio developed by Nobel laureate William F. Sharpe to measure risk-adjusted performance. It is calculated by subtracting the risk-free rate – such as that of the 10-year US Treasury bond – from the rate of return for a portfolio and dividing the result by the standard deviation of the portfolio returns.

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

$$S = \frac{E[R] - R_f}{\sigma}$$

Or

$$= \frac{\bar{r}_p - r_f}{\sigma_p}$$

Notes

Where,

$\bar{r}_p$ = Expected portfolio return

r_f = Risk free rate

σ_p = Portfolio standard deviation

The Sharpe ratio tells us whether the returns of a portfolio are due to smart investment decisions or a result of excess risk. This measurement is very useful because although one portfolio or fund can reap higher returns than its peers, it is only a good investment if those higher returns do not come with too much additional risk. The greater a portfolio's Sharpe ratio, the better its risk-adjusted performance will be.

A variation of the Sharpe ratio is the Sortino ratio, which removes the effects of upward price movements on standard deviation to instead measure only the return against downward price volatility.

Example: Consider two portfolios A and B. On the basis of information given below, compare the performance of portfolios A and B.

Portfolio	Return I (R_M)	Risk-free rate (R_F)	Excess return ($R_F - R_M$)	Portfolio risk (SD)
A	21	8	13	10
B	17	8	9	8

Solution:

A = 13/10 = 1.3

B = 9/8 = 1.125

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

Treynor Portfolio Performance Measure (aka: reward to volatility ratio)

This measure was developed by Jack Treynor in 1965. Treynor (helped developed CAPM) argues that, using the characteristic line, one can determine the relationship between a security and the market. Deviations from the characteristic line (unique returns) should cancel out if you have a fully diversified portfolio.

Treynor's Composite Performance Measure: He was interested in a performance measure that would apply to all investors regardless of their risk preferences. He argued that investors would prefer a CML with a higher slope (as it would place them on a higher utility curve). The slope of this portfolio possibility line is:

$$T_i = \frac{R_M - R_F}{\beta_1}$$

Where, R = Market Return

RFR = Risk Free return, and

β_1 = SD

A larger T_i value indicates a larger slope and a better portfolio for all investors regardless of their risk preferences. The numerator represents the risk premium and the denominator represents the risk of the portfolio; thus the value, T, represents the portfolio's return per unit of systematic risk. All risk-averse investors would want to maximize this value.

Notes

The Treynor measure only measures systematic risk – it automatically assumes an adequately diversified portfolio.

You can compare the T measures for different portfolios. The higher the T value, the better the portfolio performance. For instance, the T value for the market is:

$$T_m = \frac{R_m \cdot RFR}{\beta_m}$$

In this expression, $\beta_m = 1$.

Example:

Fund	Return	Risk-free Rate	Excess Return	SD	Beta
1	20	10	10	8	0.80
2	30	10	20	15	1.10

Calculate of Sharpe and Treynor ratios for two hypothetical funds.

Solution:

Sharpe Ratio Fund 1 = (20 – 10)/8 = 1.23

Sharpe Ratio Fund 2 = (30 – 10)/1.5 = 1.33

Treynor Ratio Fund 1 = (20 – 10)/0.80 = 12.50

Treynor Ratio Fund 2 = (30 – 10)/1.10 = 18.18

The ranking on both these measures will be identical when both the funds are well diversified. A poorly diversified fund will rank lower according to the Sharpe measure than the Treynor ratio. The less diversified fund will show greater risk when using standard deviation.

Example: Returns and SDs for four portfolios (and the calculated Sharpe Index) are given below:

Compare the performance of these three portfolio.

Portfolio	Avg. Annual ROFR	SD of return	Sharpe measure
B	0.13	0.18	0.278
O	0.17	0.22	0.409
P	0.16	0.23	0.348
Market	0.14	0.20	0.30

Thus, portfolio O did the best, and B failed to beat the market. We could draw the CML given this information: CML = 0.08 + (0.30) SD

Notes ***Treynor Measure vs. Sharpe Measure:*** The Sharpe measure evaluates the portfolio manager on the basis of both rate of return and diversification (as it considers total portfolio risk in the denominator). If we had a fully diversified portfolio, then both the Sharpe and Treynor measures will give us the same ranking. A poorly diversified portfolio could have a higher ranking under the Treynor measure than for the Sharpe measure.

Notes

Differential Return (Jensen Measure)

Jensen's measure is an absolute measure of performance, adjusted for risk. This measure assesses the portfolio manager's predictive ability. The objective is to calculate the return that should be expected for the fund given the risk level and comparing it with the actual return realized over the period.

Jensen Measure of differential return with risk measured by Beta: The Jensen measure of differential returns for portfolios p_1 and p_2 is

The model used is; $R_{jt} + R_{ft} + a_1 + \beta_j + (R_{mt} - R_{ft}) + e \rightarrow 1$

Or $Rp_1 - Rp_2 = [R_F + (R_M - R_F)\beta p_1] - [R_F + (R_M - R_F)\beta p_{21}]$,

which simplifies to

$$= Rp_1 - Rp_2 = (R_M - R_F)\ (\beta p_1 - \beta p_{21}).$$

Or $(R_A - R_F) = [R_A - R(\beta_A)] + [R(\beta_A) - R_F]$

The variables are expressed in terms of realized return and risk.

R_{jt} — Average return on portfolio for period t

R_{ft} — Risk-free rate of interest for period t

a_1 — Intercept that measures the forecasting ability of the portfolio manager

β_j — A measure of systematic risk

R_{mt} — Average return on the market portfolio

e —Error term.

In both Sharpe and Treynor models, it is assumed that the intercept is at the origin. In the Jensen model, the intercept can be at any point, including the origin.

If the intercept has a positive value, it indicates that the superior return has been earned due to superior management skills.

$a_j = 0$ indicates neutral performance.

Caution The manager has done as well as an unmanaged randomly selected portfolio with a buy-and-hold strategy. If intercept has negative value it indicates that the managed portfolio did not do as well as an unmanaged portfolio of equal systematic risk.

Applying the Jenson Measure

This requires that you use a different risk-free rate for each time interval during the sample period. You must subtract the risk-free rate from the returns during each observation period rather than calculating the average return and average risk-free rate as in the Sharpe and Treynor measures. Also, the Jensen measure does not evaluate the ability of the portfolio manager to diversify, as it calculates risk premiums in terms of systematic risk (beta). For evaluating diversified portfolios (such as most mutual funds) this is probably adequate. Jensen finds that mutual fund returns are typically correlated with the market at rates above 0.90.

Notes

Example: **Actual Return and Risk**

Funds	R_{ft}	R_{jt}	R_{mt}	β
Fund A	5	12	15	0.5
Fund B	5	20	15	1.0
Fund C	5	14	15	1.10

Solution:

From equation 1 return on the portfolio is:

$$R_{jt} + R_{ft} + \alpha_1 + \beta_j + (R_{mt} - R_{ft})$$

$$\alpha = r_p - r_{jt}$$

Fund A $R_{jt} = 5 + 0.5\ (15 - 5) = 10$

$\alpha = 12 - 10 = 2\%$ (Excess Positive Return)

Fund B $R_{jt} = 5 + 1.0(15 - 5) = 15$

$\alpha = 20 - 15 = 5\%$ (Excess Positive Return)

Fund C $R_{jt} = 5 + 1.10(15 - 5) = 16$

$\alpha = 14 - 16 = -20\%$ (Negative Return)

The Jensen measure not only calculates the differential between actual and expected earnings, but also enables an analyst to determine whether the differential return could have occurred by chance or whether it is significantly different from zero in a statistical sense. The (alpha value) value in Equation can be tested to see if it is significantly different from zero by using a 't statistic'.

Example: Suppose:

R_A 8%

R_F 2%

R_m 9%

β_A = 0.67

σ_A = 15%

σ_M = 21%

Compute the expected return on portfolio and total excess return.

Solution:

Then expected return on Portfolio A is

$$R_A = R_F + (R_M - R_j)\beta$$

$$= 2.0\% + (9.\% - 2.\%)\ 0.67$$

$$= 6.69 \text{ or } 6.7\%$$

$$\text{Actual } R_A = 8.00$$

$$\text{Excess return due to selectivity} = \text{Actual } R_A - R_A$$

$$= 8.00 - 6.69 = 1.31 \text{ or } 1.3\%$$

Notes

$$\text{Return due to risk} = (R_A - R_F - (\text{Return due to selectivity})$$

$$(8\% - 2\%) - (1.31\%)$$

$$4.69 \text{ or } - 4.7\%$$

$$\text{Total excess return} = \text{Selectivity} + \text{Risk}$$

$$(R_A - R_F) = [R_A - R(\beta_A)] + [R(\beta_A) - R_F]$$

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

$$6\% = 1.3\% + 4.7\%$$

Task

Suppose you are asked to analyse two portfolios having the following characteristics:

	Observed Return	Beta	Residual Variance
Portfolio I Gate	0.18	2.0	0.03
Portfolio Wipro	0.12	1.5	0.00

The risk-free rate is 0.07. The return on the market portfolio is 0.15. The standard deviation of the market is 0.06.

1. Compute the Jensen index for portfolio I-Gate and Wipro.
2. Compute the Sharpe index for the market portfolio.
3. Compute the Sharpe index for portfolios I-Gate and Wipro
4. Compute the Treynor index for the portfolios I-Gate and Wipro

13.2 Determinants of Portfolio Performance

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

1. Investment policy
2. Stock Selection
3. Market Timing

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

As we know that Security Market Line (SML) is likely to provide a relationship between the systematic risk (B) and return on an Asset, Fama used this framework to break the actual realised return into two parts. A part of the return may be due to the size of risk that the asset carries and the remaining due to the superior selectivity skills of the portfolio manager. The excess return-form of SML can be used to estimate the expected returns. If actual return is more or less than such expected returns, it can be attributed to superior or inferior stock selection. Then, total excess return on a portfolio (say A) = Selectivity + Risk

Notes

Risk Taking

To earn excess return, portfolio managers bear additional risk. By using the Capital Market Line (CML) we can determine the return commensurate with risk as measured by the standard deviation of return.

Example: The standard deviation of the fund A is assumed to be 15% and the standard deviation of the market 21%; risk free rate is 2%. Find out normal return for Fund A, using total risk.

Solution:

The normal return for Fund A, using total risk would be:

$r_f + (r_m + r_f)\ \sigma_p - \sigma_m$

i.e. 2% + (9% + 2%) 15% – 21% = 7%

The difference between this normal return of 7% and 6.7% that was expected when only considering market risk is 7 – 6.7 = 0.3%.

Net selectivity $= [r_A - r((\beta_A)] - [r(SA) - r\ (B_A)]$

$= (8\% - 6.7\%) - (7\% - 6.7\%)$

$= 1.3\% - 0.3\% = 1\%$

Any fund's overall performance can be thus decomposed into: (i) due to selectivity, and (ii) due to risk taking.

Example: Mr. Rajkamal's firm is trying to decide between two investment funds. From past performance they were able to calculate the following average returns and standard deviations for these funds. The current risk-free rate is 8% and the firm will use this as a measure of the risk-free rate.

	HDFC fund	ICICI Fund
Average return (R) (percent)	18	16
Standard deviation	20	15
Risk-free rate, T = 8.0%		

Compare the performance of these two funds.

Solution:

Using the Sharpe performance measure, the risk-return measurements for these two funds are:

$$SP{:}HDFC = \frac{0.18 - 0.080}{0.15} = 0.500$$

$$SP{:}ICICI = \frac{0.16 - 0.80}{0.533} = 0.533$$

It is clear that HDFC fund has a slightly better performance and would be the better alternative of the two.

Notes

13.3 Market Timing

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

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

Portfolio managers can also achieve superior performance by picking up high beta stocks during a market upswing and moving out of equity, one could calculate the quarterly returns for a fund and for the market index like Bombay Stock Exchange's National Index of a 5-year period.

13.4 Benchmark Portfolios for Performance Evaluation

Benchmark portfolio is a tool for the meaningful evaluation of the performance of a portfolio manager. The more the benchmark reflects the manager's stated style, the more accurately the performance due to a manager's skills can be assessed. Specialized benchmarks are called "normal portfolios." They are specially constructed by mutual consent of the client and the manager to reflect the client's needs and the manager's style. Some management firms develop a normal portfolio, which they can use for all clients, and some develop it separately for each type of client. When benchmarks are designed in advance, the portfolio manager knows what the specific objectives are and tailors the portfolio accordingly. The benchmark should reflect the appropriate investment universe in which the manager works. Without a yardstick for proper comparison, it becomes difficult to distinguish between active management skills and random results.

Rather than using a market index like the Bombay Stock Exchange's Sensitive Index to the Economic Times Index, a benchmark portfolio would use a portfolio with predominantly value-oriented shares for a value manager, growth-oriented shares for a growth manager and small capitalization shares for a small cap (size) manager. It is quite possible for an investment manager to perform better than the benchmark, though the benchmark may itself under-perform in relation to a market index. The process of constructing a benchmark portfolio involves:

1. Defining the universe of stock to be used for the benchmark portfolio, and
2. Defining the weightage of the stocks in the universe.

Performance attribution analysis, as mentioned earlier, is a means of evaluating an investment manager's performance, the return and the sources of return relative to a benchmark portfolio. This analysis looks at an investment manager's total 'excess' return, or 'active management return' (AMR) relative to its benchmark over the given period.

Notes

13.5 Summary

- Whenever an investor employs resources, be it in the form of hiring employees for his company, establishing a charitable fund or investing money in an investment fund he will want to measure the performance of his investment.
- In any of the above named cases the investor will establish an evaluation system that provides him with the feedback needed to determine whether the investment generates the predetermined utility.
- The investment manager will be bound to the investment policy and subject to a constant evaluation of his achievements.
- His achievement will be the return on the capital the investor provided.
- The first question the investor will want to address is the question of performance.
- What is good and what is poor performance and where is the line in between - the benchmark - and what to take as the benchmark.
- We have examined the issues associated with portfolio evaluation by constructing simple model of NAV and Dollar-Weighted Rate of Return; methods of computing portfolio return viz. Value-Weighted Return and Risk-adjusted Rate of Return.
- We have also distinguished between performance measurement and performance evaluation and highlighted the primary components of performance namely stock selection and market timing and also the concepts and method of construction of a benchmark portfolio for comparison and evaluation with a managed portfolio.
- And further, a detailed discussion is provided on risk-adjusted methods like Sharpe Treynor and Jensen's Measures. In addition a focus is made on the performance determinants.

13.6 Keywords

Benchmark Portfolio: A tool for the meaningful evaluation of the performance of a portfolio manager.

Jensen's Measure: It is an absolute measure of performance, adjusted for risk.

The Sharpe Measure: It evaluates the portfolio manager on the basis of both rate of return and diversification.

13.7 Self Assessment

Fill in the blanks

1. ..... analysis, is a means of evaluating an investment manager's performance, the return and the sources of return relative to a benchmark portfolio.
2. Specialized benchmarks are called ..... portfolios.
3. Portfolio managers can also achieve superior performance by picking up ..... beta stocks during a market upswing.
4. If a portfolio is constructed by concentrating on stock selection rather than keeping the market timing in mind, the average beta of the portfolio stands fairly .....

Notes

5. Managers with a forecast of a declining market can position a portfolio by shifting resources from stocks to .....
6. The ..... performance measures primarily provide an analysis on the overall performance of a portfolio.
7. The Jensen measure does not evaluate the ability of the portfolio manager to .....
8. ..... measure is an absolute measure of performance, adjusted for risk.
9. The ..... measure evaluates the portfolio manager on the basis of both rate of return and diversification.
10. The less diversified fund will show ..... risk when using standard deviation.
11. A larger T_i value indicates a larger slope and a better portfolio for all investors regardless of their risk .....
12. A variation of the Sharpe ratio is the ..... ratio, which removes the effects of upward price movements on standard deviation.
13. When ..... cash flows are generated, new units can be added to the existing portfolio.
14. ..... rate of return is the weighted average of the internal rates of return for the sub-periods between the cash flows and it is weighted by the length of the sub-periods.
15. The calculation of portfolio return becomes complicated when there exist certain additions or withdrawals into the funds during the specific .....period.

13.8 Review Questions

1. Using a recent NSE and BSE website, find the closing value of the NIFTY stock and Sensex and compare the same. Write a comment on variation, if any.
2. Under what performance measurement circumstances might the dollar-weighted return be preferred to the time-weighted one?
3. How is unit value method different from the dollar-weighted rate method?
4. Mr. Hasanabba provides you following data for a particular period of one month:

	Portfolio (P)	**Market (M)**
Average Return	0.35	0.28
Beta	1.2	1.0
Standard deviation	0.42	0.30
Non-systematic risk	0.18	0

   Calculate the following performance measure for portfolio P and the market: Sharpe, Jenson, Treynor, Appraisal ratio. The risk-free rate during the period was 0.06. By which measures did portfolio P outperform the market?

5. With a risk-free rate of 10% and with the market portfolio having an expected return of 20% with a standard deviation of 8%, what is the Sharpe index for portfolio Mahindra, with a mean of 14% and a standard deviation of 18%? For portfolio HDFC, having a return of 20% and a standard deviation of 16%, would you rather be in the market portfolio or one of the other two portfolios?

Notes

6. Suppose the standard deviations, betas and average rates of return of several managed portfolio are given below, along with the standard deviation and average rate of return of the market index. The beta of the index is assumed to be 1. Further assume the T-Bills rate average 7% during the time period performance measurement. Compare these funds on performance using the Sharpe, Treynor and Jensen measures.

Fund	Average Return	Std. Deviation	Beta
A	0.15	0.25	1.25
B	0.12	0.30	0.75
C	0.10	0.20	1.00
~ Rm	0.12	0.25	1.00

7. SBI and ICICI are two mutual funds. SBI has a sample mean of success 0.13 and fund ICICI has a sample mean of success 0.18, with the riskier fund ICICI having double the beta at 2.0 as fund SBI. The respective standard deviations are 15% of ICICI and 19% of SBI. The mean return for market index is 0.12, while the risk-free return is 8%.

   (a) Compute the Jensen index for each of the funds. What does it indicate?

   (b) Compute the Treynor index for the funds. Interpret the results and compare it to the Jensen index.

   (c) Compute the Sharpe index for funds and the market.

8. Assume that you are an administrator of a large pension fund (i.e. Terry Teague of Boeing) and you are decide whether to renew your contracts with your three money managers. You must measure how they have performed. Assume you have the following results for each individual's performance: Market return 14%, Risk-free 8% and Beta 1.

Investment Manager	Average Annual Rate of Return	Beta
Z	0.12	0.90
B	0.16	1.05
Y	0.18	1.2

9. Shares of ICICI Co. pay a ₹ 2 dividend at the end of every year on December 31. An investor buys two shares of the stock on January 1, at a price of ₹ 20 each, sells one of those shares for ₹ 22 a year later on the next January 1, and sells the second share an additional year later for ₹ 19. Find the time and rupee-weighted rates of return on the 2-year investment.

Time	Action	Cash Flow
0	Buy two shares	-4
1	Collect dividends, then sell one of the shares	4+22
2	Collect dividend on remaining shares, then sell it	2+19

10. What do you think to be the two most important objectives of portfolio performance evaluation?

11. Examine the concepts of plain Sharpe's Ratio, Treynor's Measure, and Jensen's Differential Return.

12. Which method of calculating portfolio returns do you think to be the best and why?

Notes

Answer: Self Assessment

1. Performance attribution
2. normal
3. high
4. constant
5. bonds
6. risk-adjusted
7. diversify
8. Jensen's
9. Sharpe
10. greater
11. preferences
12. Sortino
13. intermediate
14. Time-weighted
15. evaluating

13.9 Further Readings

Books

Doodhan, Kersi D., *Stock Exchange in a Developing Economy*, University of Bombay, Bombay, 1962.

Hull J.C., *Introduction to Futures & Options Markets*, Prentice Hall, Englewood Cliffs, New Jersey, 1995.

Jessup, Paul F., *Competing for Stock Market Profits NY*, Wiley, 1974.

Johnson, Timothy E., *Investment Principles*, NJ Prentice Hall, 1978.

Yasaswy, N.J., *Personal Investment and Tax Planning*, Vision, 1997.

Online links

www.igidr.ac.in

www.information-management.com

www.singerllc.com

Notes

Unit 14: Portfolio Revision

CONTENTS

Objectives

Introduction

14.1 Need for Portfolio Revision

14.2 Portfolio Revision Strategies

14.3 Formula Plans

14.4 Summary

14.5 Keywords

14.6 Self Assessment

14.7 Review Questions

14.8 Further Readings

Objectives

After studying this unit, you will be able to:

- Discuss need for portfolio revision
- Explain portfolio revision strategies
- Describe portfolio revision practices
- Discuss constraints in portfolio revision
- Analyze formula plans

Introduction

In the entire process of portfolio management, portfolio revision is as important as portfolios analysis and selection. Keeping in mind the risk-return objectives, an investor selects a mix of securities from the given investment universe. In a dynamic world of investment, it is only natural that the portfolio may not perform as desired or opportunities might arise turning the desired into less that desired. In every such situation, a portfolio revision is warranted. Portfolio revision involves changing the existing mix of securities. The objective of portfolio revision is similar to the objective of portfolio selection i.e. maximizing the return for a given level of risk or minimizing the risk for a given level of return. The process of portfolio revision may also be similar to the process of portfolio selection. This is particularly true where active portfolio revision strategy is followed. Where passive portfolio revision strategy is followed, use of mechanical formula plans may be made. What are these formula plans? We shall discuss these and other aspects of portfolio revision in this unit. Let us begin by highlighting the need for portfolio revision.

14.1 Need for Portfolio Revision

No plan can be perfect to the extent that it would not need revision sooner or later. Investment plans are certainly not. In the context of portfolio management, the need for revision is ever

Notes

more because the financial markets are continually changing. Thus the need for portfolio revision might simply arise because the market witnessed some significant changes since the creation of the portfolio. Further, the need for portfolio revision may arise because of some investor-related factors such as

1. Availability of additional wealth,
2. Change in the risk attitude and the utility function of the investor,
3. Change in the investment goals of the investors and
4. The need to liquidate a part of the portfolio to provide funds for some alternative uses. The other valid reasons for portfolio revision such as short-term price fluctuations in the market do also exist. There are, thus, numerous factors, which may be broadly called market related and investor-related, which spell need for portfolio revision.

14.2 Portfolio Revision Strategies

As are there numerous factors motivating revision of portfolio, so are there numerous strategies of portfolio revision. Broadly speaking, investors may, depending on their investment objectives, skill and resources, follow active or passive strategies for portfolio revision. Active strategy of portfolio revision involves a process similar to portfolio analysis and selection, which is based on an analysis of fundamental factors covering economy, industries and companies as well as technical factors.

An active revision strategy seeks "beating the market by anticipating" or reacting to the perceived events or information. Passive revision strategy, on the other hand, seeks 'performing as the market.' The followers of active revision strategy are found among believers in the 'market inefficiency', whereas passive revision strategy is the choice of believers in 'market efficiency.' The frequency of trading transaction, as is obvious, will be more under active revision strategy than under passive revision strategy and so will be the time, money and resources required for implementing active revision strategy than for passive revision strategy. In other words, active and passive revision strategies differ in terms of purpose, process and cost involved. The choice between the two strategies is certainly not very straightforward. One has to compare relevant costs and benefits. On the face of it, active revision strategy might appear quite appealing but in actual practice, there exist a number of constraints in undertaking portfolio revision itself.

1. ***Portfolio Revision Practices:*** In the US, both active and passive portfolio revision strategies have been prevalent. Studies about portfolio revision strategies followed by US investors show that the efficient market hypothesis is slowly but continuously gaining believers and these converts revise their portfolio much less often than they were doing previously because of their rising faith in market efficiency. Institutional investors in the US, on the other hand, have shown a definite tendency in the recent past for active revision of their portfolios. This is reportedly motivated by their desire to achieve superior performance by frequent trading to take advantage of their supposedly superior investment skills.

   Some research studies undertaken in the US about the market timing and portfolio revision suggested as follows:

   F. Black (1973) found that monthly and weekly revision could be rewarding strategy. Though when transactions costs were considered, the results were less impressive, but of course, still significantly positive.

   H.A. Latane *et al.* (1974) concluded that complete portfolio revision every six months would have been a rewarding strategy.

Notes

Sharpe (1975) wrote: "A manager who attempts to time the market must be right roughly three times out of four, in order to out perform the buy-and-hold portfolio. If the manager is right less often, the relative performance will be inferior because of transaction costs and the manager will often have funds in cash equivalents when they could be earning the higher returns available from common stock."

Institutional investors who continue to be dominant in the Indian stock market do not seem to resort to active portfolio revision mainly for statutory reasons. Another feature of their portfolio revision is that they continue to emphasize individual securities rather than portfolio risk-return changes.

2. ***Constraints in Portfolio Revision:*** A look into the portfolio revision practices as discussed above highlight that there are a number of constraints in portfolio revision, in general and active portfolio revision, in particular. Let us indicate some common constraints in portfolio revision as follows:

   (a) *Transaction cost:* As you know, buying and selling of securities involve transaction costs, including brokers' fee. Frequent buying and selling for portfolio revision may push up transaction costs beyond gainful limits.

   (b) *Taxes:* In most countries, capital gains are taxed at concessional rates. But for any income to qualify as capital gains, it should be earned after the lapse of a certain period. In many cases, the period is 36 months. Frequently selling portfolio revision may mean foregoing capital gains tax concessions. Higher the tax differential (between rates of tax for income and capital gains), the higher the constraints rise. Even for tax switches, which mean that one stock is sold to establish a tax loss and a comparable security is purchased to replace it in the investor's portfolio, one must wait for a minimum period after selling a stock and before repurchasing it, to be declare the gain or loss. If the stock is repurchased before the minimum fixed period, it is considered a wash sale, and no gain or loss can be claimed for tax purposes.

   (c) *Statutory Stipulation:* In many countries like India, statutory stipulations have been made as to the percentage of investible funds that can be invested by investment companies/mutual funds in the shares/debentures of a company or industry. In such a situation, the initiative to revise the portfolio is most likely to get stifled under the burden of various stipulations. Government-owned investment companies and mutual funds are quite often called upon to support sagging markets (albeit counters) or to cool down heated markets, which put limits on the active portfolio revision by these companies.

   (d) *No Single Formula:* Portfolio revision is not an exact science. Even today, there does not exist a clear-cut answer to the overall question of whether, when and how to revise a portfolio. The entire process is fairly cumbersome and time-consuming. Investment literature does provide some formula plans, which we shall discuss in the following section, but they have their own assumptions and limitations.

14.3 Formula Plans

1. ***Formula Investing:*** Investment technique is based on a predetermined timing or asset allocation model that eliminates emotional decisions. One type of formula investing, called dollar cost averaging, involves putting the same amount of money into a stock or mutual fund at regular intervals, so that more shares will be bought when the price is low and less when the price is high. Another formula investing method calls for shifting funds from stocks to bonds or vice versa as the stock market reaches particular price levels.

Notes

If stocks rise to a particular point, a certain amount of the stock portfolio is sold and put in bonds. On the other hand, if stocks fall to a particular low price, money is brought out of bonds into stocks.

Somewhat similar to the constant-dollar plan is the constant-ratio formula. It is one of the oldest formulas in existence, having been used as long as 20 years ago. More important, it still stands up today, and is widely used, despite the drastic changes, which have taken place in the market.

It fulfils, perhaps, better than any other formula, the basic theoretical requirements of formula investing. It permits the investor to participate to some extent in bull markets, while at the same time protecting him from serious price declines. And because it is not married to a fixed-dollar amount in stocks (as in the constant-dollar plan) or a 'norm' (as in the variable-ratio plans to be discussed in the next unit), the method has a high degree of flexibility. One reason for its durability and its effectiveness is that no forecast whatsoever is made about the character of future markets, other than that they will continue to fluctuate, which is hardly a hazardous assumption.

Because of the clear-cut advantages of this plan, it has been widely used by institutions, such as trust, endowment and pension funds. Its first use, as will be seen later, was in a college endowment fund. In past years, however, its popularity with some institutional investors has waned (although others are still quite satisfied), and it has been adopted more and more by individuals.

Here is how it works: The total investment fund is divided into two equal portions, one half to be invested in stocks, the other in bonds. As the market rises, stocks are sold and bonds are bought to restore the 50-50 relationship. If the market goes down, the reverse procedure is followed, bonds being sold and stocks bought to return to the 50-50 ratio.

The two plans do share some characteristics, of course, and the object of both is the same. But the constant-ratio plan does not present the investor with quite so many knotty decisions during its operation, and results over the long-term have tended to be somewhat better.

As in the constant-dollar plan, the bond and stock portions of the account may be readjusted according to changes in the value of stocks held, or in a stock index. As before, the adjustments can be made as shifts of a certain specified minimum percentage occur, or at regular intervals. Here again, it is recommended that the investor make the necessary shifts of bonds and stocks at regular intervals. Studies show that this procedure produces good results – in addition, of course, to its greater convenience.

As noticed above, the problem of portfolio revision essentially boils down to timing the buying and selling the securities. Ideally, investors should buy when prices are low, and then sell these securities when their prices are high. But as stock prices fluctuate, the natural tendencies of investors often cause them to react in a way opposite to one that would enable them to benefit from these fluctuations. The investors are hesitant to buy when prices are low for fear that prices will fall further lower, or far fear that prices won't move upward again. When prices are high, investors are hesitant to sell because they feel that prices may rise further and they may realize larger profits. It requires skill and discipline to buy when stock prices are low and pessimism abounds and to sell when stock prices are high and optimism prevails. Mechanical portfolio revision techniques have been developed to ease the problem of whether and when to revise to achieve the benefits of buying stocks when prices are low and selling stocks when prices are high. These techniques are referred to as formula plans. Constant-Dollar-Value Plan, Constant Ratio Plan and Variable Ratio Plan are three very popular formula plans. Before discussing each

Notes

one of these, we may point out basic assumptions and ground rules of formula plans as follows:

2. ***Basic Assumptions and Ground Rules of Formula Plan***

The formula plans are based on the following assumption.

(a) The stock prices move up and down in cycle.

(b) The stock prices and the high-grade bond prices move in the opposite directions.

(c) The investors cannot or are not inclined to forecast direction of the next fluctuations in stock prices, which may be due to lack of skill and resources or their belief in market efficiency or both.

The use of formula plans call for the investor to divide his investment funds into two portfolios, one aggressive and the other conservative or defensive. The aggressive portfolio usually consists of stocks while conservative portfolio consists of bonds. The formula plans specify predesignated rules for the transfer of funds from that aggressive into the conservative and vice-versa such that it automatically causes the investors to sell stocks when their prices are rising and buy stocks when their prices are falling. Let us now discuss, one by one, the three formula plans.

Did u know?

What is Constant Dollar-Value Plan?

Constant Dollar value plan is a investment strategy designed to reduce volatility in which securities, typically mutual funds, are purchased in fixed dollar amounts at regular intervals, regardless of what direction the market is moving. Thus, as prices of securities rise, fewer units are bought, and as prices fall, more units are bought also called constant dollar plan, also called dollar cost averaging.

3. ***Dollar Cost Averaging:*** Periodic investment of a fixed dollar amount, as in a particular stock or fund or in the market as a whole, on the belief that the average value of the investment will rise over time and that it is not possible to foresee the intermediate highs and lows.

Dollar-Cost Averaging – DCA: It is a technique of buying a fixed dollar amount of a particular investment on a regular schedule, regardless of the share price. More shares are purchased when prices are low, and fewer shares are bought when prices are high. Also referred to as "constant dollar plan".

Investopedia says: "Eventually, the average cost per share of the security will become smaller and smaller. Dollar-cost averaging lessens the risk of investing a large amount in a single investment at the wrong time. In the UK, it is known as "pound-cost averaging."

The *Constant-Dollar-Value Plan (CDVP)* asserts that the dollar value (or rupee value in Indian context) of the stock portion of the portfolio will remain constant. This in operational terms, would mean that as the stock rises, the investor must automatically sell some of the shares to keep the value of his aggressive portfolio constant. If, on the other hand, the prices of the stocks fall, the investors must buy additional stocks to keep the value of the aggressive portfolio constant. By specifying that the aggressive portfolio will remain constant in dollar value, the plan implies that the remainder of the total fund will be invested in the conservative fund. In order to implement this plan, an important question to answer is what will be the action points? Or, in other words, when will the investor make the transfer called for to keep the dollar value of the aggressive portfolio constant? Will it be made with every change in the prices of the stocks comprising the aggressive

Notes

portfolio? Or, will it be set pre-specified period of time or percentage change in some economic or market index or percentage change in the value of the aggressive portfolio?

Example of a Constant-Dollar-Value Formula Plan

1	2	3	4	5	6	7
Stock Price Index	**Value of Buy-and-Hold Strategy (800 shares x Col. 1)**	**Value of Conservative Portfolio (Col.5-Col.4)**	**Value of Aggressive Portfolio (Col.8xCol.1)**	**Total Value of Constant Dollar Portfolio (Col.3+Col.4)**	**Revaluation Action**	**Total Number of Shares in Aggressive Portfolio**
	(₹)	(₹)	(₹)	(₹)		
25	20,000	10,000	10,000	20,000		400
22	17,600	10,000	8,800	18,800		400
20	16,000	10,000	8,000	18,000		400
20	16,000	8,000	10,000	18,000	Buy 10 Shares at 20*	500
22	17,600	8,000	11,000	19,000		500
24	19,200	8,000	12,000	20,000		500
24	19,200	10,000	10,000	20,000	Sell 83.3 Shares at 24	416.7
26	20,800	10,000	10,830	20,830		416.7
28.8	23,040	10,000	12,000	22,000		416.7
28.8	23,040	12,000	10,000	22,000	Sell 69.5 Shares at 28.8	347.2
25	20,000	12,000	8,700	20,700		347.2

* To restore the stock portfolio to ₹ 10,000, ₹ 2,000 is transferred from the conservative portfolio and used to purchase 100 shares at ₹ 20 per share.

The investor must choose predetermined action points, also called revaluation points, very carefully; the action points can have significant effect on the returns of the investor. Action points placed at every change or too close would cause excessive transaction costs that reduce return and the action points place too far apart may cause the loss of opportunity to profit from fluctuations that take place between them. Let us take an example to clarify the working of constant-dollar-value-plan. The table presents the relevant data.

In our example, an investor with ₹ 20,000 for investment decides that the constant dollar (rupee) value of his aggressive portfolio will be ₹ 10,000. The balance of ₹ 10,000 will make up his conservative portfolio at the beginning. He purchases 400 shares selling at ₹ 25 per share. He also determines that he will take action to transfer funds from an aggressive portfolio to a conservative portfolio or vice-versa each time the value of his aggressive portfolio reaches 20% above or below the constant value of ₹ 10,000. The position and actions of the investor during the complete cycle of the price fluctuations of stocks comprise the portfolio. Although the example refers to the investment in one stock, the concepts are identical for a portfolio of stocks, as the value change will be for the total

Notes

portfolio. In this example, we have used fractional shares and have ignored transaction costs to simply the example. In order to highlight the revaluation actions of our investors, we have shown them 'boxed' in Table. The value of the buy-and-hold strategy is shown in column (2) to enable comparison with the total value of our investors' portfolio column (5) as per constant-dollar-value plan of portfolio revision. Notice the revaluation actions (represented by boxed areas in Table taken when the price fluctuated to ₹ 20, 24 and 28.8, since the value of the aggressive fund became 20% greater or less than the constant value of ₹ 10,000. Notice also that the investor using the constant-dollar-value formula plan has increased the total value of his fund to ₹ 20,700 after the complete cycle, while the buy-and-hold strategy yielded only ₹ 20,700. Let us now illustrate another formula plan, namely, constant-ratio-plan.

4. ***Constant-ratio Plan:*** This is an investment strategy in which the portfolio's composition by asset class is maintained at a certain level through periodic adjustments. When the balance is upset, it is periodically restored by moving money from over-performing assets to under performing ones.

Notes This system prevents one asset class from dominating the portfolio. This is one way to maintain a desirable asset allocation.

The constant-ratio plan specifies that the value of the aggressive portfolio to the value of the conservative portfolio will be held constant at the predetermined ratio. This plan automatically forces the investor to sell stocks as their prices rise, in order to keep the ratio of the value of their aggressive portfolio to the value of the conservative portfolio constant. Likewise, the investor is forced to transfer funds from conservative portfolios to aggressive portfolios as the price of stocks fall. We may clarify the operations of this plan with the help of an example.

Example: For the sake of our example, the starting point and other information are the same as in the previous example. The desired ratio is 1:1. The initial fund of ₹ 20,000 is thus divided into equal portfolios of ₹ 10,000 each. The action points are predetermined at + .10 from the desired ratio of 1.00. The table shows, in boxes, the actions taken by our investor to readjust the values of the two portfolios to re-obtain the desired ratio.

Example of Constant-Ratio Formula Plan

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Stock Price Index	**Value of Buy-and-Hold Strategy (800 shares xCol.1)**	**Value of Conservative Portfolio (Col.5-Col.4)**	**Value of Aggressive Portfolio (Col.8xCol.1)**	**Total Value of Constant Ratio Portfolio (Col.3+Col.4)**	**Ratio (4): (3)**	**Revaluation Action**	**Total No. of Shares in Aggressive Portfolio**
	(₹)	**(₹)**	**(₹)**	**(₹)**			
25	20,000	10,000	10,000	20,000	1.00		400
23	18,400	10,000	9,200	19,200	0.92		400
22.5	18,000	10,000	9,000	19,000	0.90		400

Contd...

Notes

22.5	18,000	9,500	9,500	19,000	1.00	Buy 22.2	422.2
						Shares	
						at 22.5 *	
20.25 20.25	16,200 16,200	9,500 9,020	8,540 9,020	18,040 18,040	0.90 1.00	Buy 23.7	422.2 445.9
						Shares at 20.25	
20	16,000	9,020	8,910	17,930	0.99		445.9
22.4	17,920	9,020	9,920	18,940	1.10		445.9
22.4	17,920	9,470	9,470	18,940	1.00	Sell 20.1 Shares at 22.4	445.9
24.6	19,920	9,470	10,430	19,900	1.10		425.8

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Stock Price Index	**Value of Buy-and-Hold Strategy (800 shares xCol.1)**	**Value of Conservative Portfolio (Col.5-Col.4)**	**Value of Aggressive Portfolio (Col.8xCol.1)**	**Total Value of Constant Ratio Portfolio (Col.3+Col.4)**	**Ratio (4): (3)**	**Revaluation Action**	**Total No. of Shares in Aggressive Portfolio**
	(₹)	**(₹)**	**(₹)**	**(₹)**			
24.6	19,920	9,950	9,950	19,900	1.00	Sell 19.5 Shares at 24.6	406.3
27.0	21,600	9,950	10,950	20,900	1.10		406.3
27.0	21,600	10,450	10,450	20,900	1.00	Sell 18.5 Shares at 27.0	387.8
28.8	23,040	10,450	11,170	21,620	1.07		387.8
27.0	21,600	10,450	10,450	20,900	1.00		387.8
25	20,000	10,450	9,670	20,120	0.93		387.8

* To restore the ratio from .90 to 1.00, total value of the fund, ₹ 19,000, is simply split in two equal segments of ₹ 9,500; and ₹ 9500/9,500 = 1.00. The ₹ 500 transferred from the conservative portfolio will buy 22.2 Shares at the prevailing price of ₹ 22.50.

You may notice that the constant-ratio plan calls for more transactions than the constant-dollar-value plan did, but the actions triggered by this plan are less aggressive. This plan yielded an increase in total value at the end of the cycle compared with the total value yielded under constant-dollar-value plan. It did, however, outperform the buy-and-hold strategy. Let us now explain and illustrate variable-ratio plan.

5. ***Variable-ratio Plan:*** Variable-ratio plan is a more flexible variation of constant ratio plan. Under the variable ratio plan, it is provided that if the value of aggressive portfolio changes by certain percentage or more, the initial ratio between the aggressive portfolio and conservative portfolio will be allowed to change as per the pre-determined schedule. Some variations of this plan provide for the ratios to vary according to economic or

Notes

market indices rather than the value of the aggressive portfolio. Still others use moving averages of indicators. In order to illustrate the working of variable ratio plan let us continue with the previous example with the following modifications:

The variable-ratio plan states that if the value of the aggressive portfolio rises by 20% or more from the present price of ₹ 25, the appropriate ratio of the aggressive portfolio will be 3:7 instead of the initial ratio of 1:1. Likewise, if the value of the aggressive portfolio decreases by 20% or more from the present price of ₹ 25, the appropriate percentage of aggressive portfolio to conservative portfolio will be. The table presents, in boxes, the actions taken by our investor to readjust the value of the aggressive portfolio as per variable-ratio plan.

Example of Variable-Ratio Formula Plan

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Stock Price Index	**Value of Buy-and-Hold Strategy (800shares xCol.1)**	**Value of Conservative Portfolio (Col.5-Col.4)**	**Value of Aggressive Portfolio (Col.8xCol.1)**	**Total Value of Constant Ratio Portfolio (Col.3+Col.4)**	**Value of Stock as % of Total Fund (Col.4+ Col.5)**	**Revaluation Action**	**Total No. of Shares in Aggressive Portfolio**
	(₹)	(₹)	(₹)	(₹)	(%)		
25	20,000	10,000	10,000	20,000	50		400
22	17,600	10,600	8,800	18,800	47		400
20	16,000	10,000	8,000	18,000	44.5		400
20	16,000	5,400	12,600	18,000	70	Buy 230 Shares at 20	630
22	17,600	5,400	13,860	19,260	72		630
25	20,000	5,400	15,760	21,160	74.5		630
25	20,000	10,580	10,580	21,160	50	Sell 207 Shares at 25	423
26	20,800	10,580	11,000	20,580	53		423
28.8	23,040	10,580	12,180	22,760	54		423
25	20,000	10,580	10,580	21,160	50		423

You may notice that the increase in the total value of the portfolio after the complete cycle under this plan is ₹ 1160, which is greater than the increase registered under the other two formula plans. The revaluation actions/transactions undertaken are also fewer under this plan compared to other two plans. Variable ratio plan may, thus, be more profitable comparable to constant-dollar-value plan and the constant-ratio plan. But, as is obvious, variable ratio plan demands more forecasting than the other formula plans. You must have observed, the variable ratio plan requires forecasting of the range of fluctuations both above and below the initial price (or say median price) to establish the varying ratios at different level of portfolio values. Beyond a point, it might become questionable as to whether the variable ratio plan is less complicated than the extensive analysis and forecasting that it was supposed to replace

Notes

Task Analyse the limitations of formula plans and give a brief write up.

Case Study

What is the P/E Ratio?

Ramesh: Manubhai, I read in your report yesterday that you are recommending HLL. And your report said you like it because it is cheap. But it is 2,400 rupees per share. Better than that, why don't you recommend Henkel Spic instead? It is only 130 rupees.

Manubhai: Ramesh, price mut dekho. Price earnings ratio dekho. Speak to my analysts. They will explain that you cannot judge cheap or expensive by price.

What is a price-earnings ratio?

The normal reaction when we look at share prices is that a ₹ 40 stock is cheap, and a ₹ 1,000 stock is expensive. Let's say we were buying onions. One subziwala said ₹ 20; another said ₹ 50. Would we simply jump and say that ₹ 20 was a great deal? What if one was saying ₹ 20 for half kg of onions and another was offering 5 kg for ₹ 50? There's a lesson here: Price itself is not enough. It actually takes a ratio to determine cheap or expensive. And the ratio is price per unit of whatever we are buying.

But someone might still say that stock prices are already ₹ (AQ?) per share. So ₹ 40 per share and ₹ 1,000 per share should be comparable. This is where we need to look beyond the piece of paper (or with demat stocks, not even the paper). What are we buying when we buy a share?

When we buy a company's share, we buy a share of the company's profits, both current and future. As an example, let's take HLL. During the period January 1998 to December 1998, HLL made a net profit of ₹ 805 cr.; it currently has a total of 20 cr. shares. Each share (and therefore its owner) owns ₹ 40.3 (₹ 805 cr. divided by 20 cr. shares) of HLL's net profit. This ₹ 40.3 is then referred to as earnings per share of HLL.

So, when we buy one share of HLL, we are buying ₹ 40.3 of net profit, together with the right to future net profits. If HLL were to make a net profit of ₹ 500 cr. this year, and were to issue another 5 cr. shares, the earnings per share for next year would be ₹ 40: ₹ 500 cr. divided by (20cr. old shares + 5cr. new shares = 25cr shares) = ₹ 40 per share.

Keeping this in mind, now let's go back to our original problem. How do we figure out if a stock is cheap or expensive? If we buy a share for ₹ 500, and the earnings per share for the company is ₹ 50, then we are paying ₹ 5 for each rupee of net profit we buy into. If we buy a share of another company for ₹ 40, which has earnings per share of ₹ 2, then we pay ₹ 20 for each rupee of net profit we buy into. Which one is cheaper?

When we look at a share price, we should also look at earnings per share. Looking at both of them is the only way to determine whether the share is cheap or expensive. To make it easy for themselves, research analysts have created a simple formula: Price Earnings Ratio = Price per share/Earnings per Share where, Earnings per Share = Net profit/Number of issued shares. So when they want to know whether a share is cheap or expensive, they just calculate this ratio. And lower the ratio, cheaper the stock is.

Contd...

Notes

Questions

1. Is a stock that quotes at a lower PE always a better buy? Why/why not?
2. When we buy a share, we actually buy a share of the net profit of the company. On what does this profit depend?

14.4 Summary

- The portfolio revision strategies adopted by investors can be broadly classified as 'active' and 'passive' revision strategies.
- This unit also points out that while both 'active' and 'passive' revision strategies are followed by investors and portfolio managers, "passive' strategy is followed by believers of market efficiency or those who lack portfolio analysis and selection skills and resources.
- Major constraints, which come in the way of portfolio revision, are transaction costs, taxes, statutory stipulations and lack of ideal formula.
- This unit also discusses and illustrates three formula plans of portfolio revision, namely, constant-dollar-value plan, constant-ratio plan and variable-ratio plan.
- Before closing the discussion about formula plans, it is noted that these formula plans are not a royal road to riches.
- They have their own limitations.
- The choice of portfolio revision strategy or plan is, thus, no simple question. The choice will involve cost benefit analysis.
- No plan can be perfect to the extent that it would not need revision sooner or later.
- Investment plans certainly are not.
- In the context of portfolio management the need for revision is ever more because the financial markets are continually changing. Thus the need for portfolio revision might simply arise because market witnessed some significant changes since the creation of the portfolio.
- Further, the need for portfolio revision may arise because of some investor-related factors such as (i) availability of additional wealth, (ii) change in the risk attitude and the utility function of the investor, (iii) change in the investment goals of the investors, and (iv) the need to liquidate a part of the portfolio to provide funds for some alternative uses.
- The other valid reasons for portfolio revision such as short-term price fluctuations in the market do also exist.
- There are, thus, numerous factors, which may be broadly called market-related and investor-related, which spell need for portfolio revision.

14.5 Keywords

Constant Dollar Value Plan: An investment strategy designed to reduce volatility in which securities, typically mutual funds, are purchased in fixed dollar amounts at regular intervals, regardless of what direction the market is moving.

Constant-ratio Plan: This is an investment strategy in which the portfolio's composition by asset class is maintained at a certain level through periodic adjustments.

Notes

Formula Plan: The buying and/or selling of securities according to a predetermined formula. This approach to investment decisions is intended to eliminate the investor's emotions and instead to follow a mechanical set of rules.

Variable-ratio Plan: It is a more flexible variation of constant ratio plan. Under the variable ratio plan, it is provided that if the value of aggressive portfolio changes by certain percentage or more, the initial ratio between the aggressive portfolio and conservative portfolio will be allowed to change as per the pre-determined schedule.

14.6 Self Assessment

Fill in the blanks

1. ..... plan is a more flexible variation of constant ratio plan.
2. ..... plan is an investment strategy in which the portfolio's composition by asset class is maintained at a certain level through periodic adjustments.
3. In the absence of much faith in the market efficiency, particularly in the developing stock markets, there may not be many followers of .....for portfolio revision.
4. The portfolio revision strategies adopted by investors can be broadly classified as ..... and ..... revision strategies.
5. Major constraints, which come in the way of portfolio revision, are ....., ..., ... and lack of ideal formula.
6. As prices of securities rise, ... units are bought.
7. Formula plan can be understood as the buying and/or selling of securities according to a ..... formula.
8. ..... is a technique of buying a fixed dollar amount of a particular investment on a regular schedule, regardless of the share price.
9. Frequent buying and selling for portfolio revision may push up transaction costs beyond ..... limits.
10. If the stock is repurchased before the minimum fixed period, it is considered a .....sale.
11. Even today, there does not exist a clear-cut answer to the overall question of ....., ...and .....to revise a portfolio.
12. Portfolio revision involves changing the ..... of securities.
13. No plan can be ..... to the extent that it would not need revision sooner or later.
14. The need for portfolio revision might simply arise because the market witnessed some significant ..... since the creation of the portfolio.
15. ..... strategy of portfolio revision involves a process similar to portfolio analysis and selection.

Notes

14.7 Review Questions

1. Analyse the theory of portfolio revision.
2. What do you think as the need for portfolio revision?
3. Examine various portfolio revision strategies.
4. Critically evaluate various portfolio revision practices.
5. How would you overcome the constraints in portfolio revision.
6. What are the basic assumptions and ground rules of formula plans? Are they realistic?
7. When will the investor make the transfer called for to keep the dollar value of the aggressive portfolio constant? Will it be made with every change in the prices of the stocks comprising the aggressive portfolio?
8. The problem of portfolio revision essentially boils down to timing the buying and selling the securities. Comment.
9. Portfolio revision is not an exact science. Comment.
10. What do you think as the reason behind the dominant Indian Institutional investors not resorting to active portfolio revision?

Answers: Self Assessment

1.	Variable-ratio	2.	Constant-ratio
3.	formula plans	4.	'active', 'passive'
5.	transaction costs, taxes, statutory stipulations		
6.	fewer	7.	predetermined
8.	Dollar-Cost Averaging - DCA	9.	gainful
10.	wash	11.	whether, when, how
12.	existing mix	13.	perfect
14.	changes	15.	Active

14.8 Further Readings

Books

Dicksler, James L. and Samuelson, Paul A., *Investment Portfolio Decision-Making*, London, Lexington Books, 1974.

Fabozzi, Frank J, *Investment Management*, Prentice Hall, Englewood Cliffs, New Jersey, 1995.

Hester, Donald D. and Tobin, J. (ed.), *Risk Aversion and Portfolio Choke*, Cowles - Foundation for Research in Economics, Yale University, Monograph 19.

Lund, Phillips J., *Investment: The Study of Economic Aggregates*, Edinburgh, Oliver and Boyd., 1971.

Notes

Online links

financial-dictionary.thefreedictionary.com

www.nabble.com