CHAPTER-4

INVESTMENT AND RISK

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INVESTMENT: THE CHANGING FRAMEWORK AND METHODS OF INVESTMENT MANAGEMENT

Overview:

An investment is a sacrifice of current money or other resources for future benefits. Investment may be defined as the process of sacrificing something now for the prospect of gaining something later. This definition implies that there are three dimensions to an investment – time today's, sacrifice and prospective gain.

Investor can think of a number of transactions, which will qualify as investments as per given definition:

- In order to settle down, a young couple buys a house for Rs. 30 lakhs in Jaipur.
- A wealthy farmer pays Rs. 15 lakhs for a piece of land in his village.
- A cricket fan bets Rs. 1000 on the outcome of a test match in England.
- A government officer buys units of Unit Trust of India worth Rs. 10,000.
- A college professor buys, in anticipation of good return 100 shares of Reliance Industries Ltd. for Rs. 1,15,000.
- A lady clerk deposits Rs. 5000 in a Post office saving account.
- Based on the rumor that it would be a hot issue in the market in no distant future, Mr. Deepak invests all his savings in the newly floated share issue by Altera electronics Ltd. Company intending to manufacture audio and video magnetic tapes.

A common feature of all these transactions is that something is sacrificed now for the prospects of gaining something later. For example, the wealthy farmer in transaction 2 sacrifices Rs. 15 lakh now for the prospects of crop income later. The lady clerk in transaction 6 sacrifices Rs. 5000 now for the prospect of getting a larger amount later due to interest earned on the savings.

In all these cases it can be seen that investment involves employment of funds with the aim of achieving additional income or growth in values. The essential quality of an investment is that it involves waiting for a reward. Investment involves the commitment of resources, which have been saved in the hope that some benefits will accrue in future.

Numerous avenues of investment are available today. You can either deposit money in a bank account or purchase a long-term government bond or invest in equity shares of a company or contribute to a provident fund account or buy a stock option or acquire a plot of land or invest in some other form.

The two key aspects of any investment are time and risk. The sacrifice takes place now and is certain. The benefit is expected in the future and tends to be uncertain. In some investments (like government bonds) the time element is the dominant attribute. In other investments (like stock options) the risk element is the dominate attribute. In yet other investments (like equity shares) both time and risk are important.

Almost everyone owns a portfolio of investments. The portfolio is likely to comprise of financial assets (bank deposits, bonds, stocks, and so on) and real assets (car, house, and so on). The portfolio may be the result of a series of haphazard decisions or may be the result of deliberate and careful planning.

Concept and Definition:

According to Fisher, investment may be defined as ***"a commitment of funds made in the expectation of some positive rate of return".*** Expectation of return is an essential element of investment. Since the return is expected to be realized in future, there is a possibility that the return actually realized is lower than the return expected to be realized. This possibility of variation in the actual return is known as investment risk. Thus, every investment involves return and risk.

According to Dr. Kevin ***"Investment is an activity that is engaged by people who have savings, i.e. investments are made from savings, or in other words, people invest their savings. But all savers are not investors. Investment is an activity which is different from saving. It means many things to many persons."***

The following are the features of the Investment Programme:

- ***Safety of Principal:*** The safety sought in investment is not absolute or complete; it rather implies protection against loss under reasonably likely conditions or variations. It calls for careful review of economic and industry

trends before deciding types and/or timing of investments. Thus, it recognizes that errors are unavoidable for which extensive diversification is suggested as an antidote. Adequate diversification means assortment of investment commitments in different ways. Those who are not familiar with the aggressive-defensive approach nevertheless often carry out the theory of hedging against inflation-deflation. Diversification may be geographical, wherever possible, because regional or local storms, floods, droughts, etc. can cause extensive real estate damage. Vertical and horizontal diversification can also be opted for the same. Vertical diversification occurs when securities of various companies engaged in different phases of production from raw material to finished goods are held in the portfolio. On the other hand, horizontal diversification is the holding by an investor in various companies all of which carry on activity in the secure stage of production.

Another way to diversify security is to classify them according to bonds and shares and reclassify according to types of bonds and types of share. Again, they can also be classified according to the issuers, according to the dividend or interest income dates, according to the products which are made by the firms represented by the securities. But over diversification is undesirable. By limiting investments to a few issues, the investor has an excellent opportunity to maintain knowledge of the circumstances in accordance with each issue. Probably the simplest and most effective diversification is accomplished by holding different media at the same time having reasonable concentration in each.

- ***Adequate liquidity and collateral value:*** An investment is a liquid asset if it can be converted into cash without delay at full market value in any quantity. For an investment to be liquid it must be reversible or marketable. Reversibility is the process whereby the transaction is reversed or terminated while marketability involves the sale of the investment in the market for cash. To meet emergencies, every investor must have a sound portfolio to be sure of the additional funds which may be needed for the business

opportunities. Whether money can be raised by sale or by borrowing, it will be easier if portfolio contains a planned proportion of high-grade and readily saleable investment.

- ***Stability of income:*** An investor must consider stability of monetary income and stability of purchasing power of income. However, emphasis upon income stability may not always be consistent with other investment principles. If monetary income stability is stressed, capital growth and diversification will be limited.

- ***Capital growth:*** Capital appreciation has today become an important principle. Recognizing the connection between corporation and industry growth and very large capital appreciation, investors and their advisors constantly are seeking "growth stocks." It is exceedingly difficult to make a successful choice. The ideal "growth stock" is the right issue in the right industry, bought at the right time.

- ***Tax Benefits:*** To plan an investment programme without regard to one's tax status may be costly to the investor. There are really two problems involved here, one concerned with the amount of income paid by the investment and the other with the burden of income tax upon that income. When investors' income is small, they are anxious to have maximum cash returns on their investment, and are prone to take excessive risk. On the other hand, investors who are not pressed for cash income often find that income tax deplete certain types of investment income less than others, thus affecting their choices.

- ***Purchasing power stability:*** Since an investment nearly always involves the commitment of current funds with the objective of receiving greater amounts of future funds, the purchasing power of the future fund should be considered by the investor. For maintaining purchasing power stability, investors should carefully study: the degree of price level inflation they expect, the possibilities of gain and loss in the investment available to them, and the limitations imposed by personal and family consideration.

- ***Concealability:*** To be safe from social disorder, government confiscation or unacceptable levels of taxation, property must be concealable and leave no record of income received from its use or sale. Gold and precious stones have long been esteemed for these purposes because they combine high value with small bulk and are readily transferable.

Perception of Investment:

Investment has got three perceptions:

1. ***Financial Perception:*** Investment is the allocation of monetary resources to assets that are expected to yield some gain or positive return over a given period of time. These assets range from safe investments to risky investments. Investments in this form are also called as "financial investments".
2. ***Economic Perception:*** To the economists 'Investment' means the net additions to the economy's capital stock which consist of goods and services that are used in the production of other goods and services. In this context, the term investment, therefore, implies the formation of new and productive capital in the form of new construction, new producer's durable equipment such as plant and equipment.
3. ***Social Perception:*** An investment made to ensure communal harmony and social benefit such as investment in polio campaign, etc.

Investment avenues:

There are a large number of investment avenues for savers in India. An investor has to choose from wide array of investment alternatives which are broadly classified as under:

Type of Asset	Duration	Risk	Safety	Return	Liquidity	Value Appreciation	Type of Return	Redeemable
Government Securities	Medium to long	Low	High	Low to moderate	Low	No	Fixed	Yes
Bank Deposits	Medium	Low	High	Low to moderate	High	No	Fixed	Yes
Recurring Deposits at bank	Medium	Low	High	Low to moderate	Low / Moderate	No	Fixed	Yes
Recurring Deposits at post office	Medium	Low	High	Low to moderate	Low / Moderate	No	Fixed	Yes
Other Saving Schemes of Post Office	Medium to long	Low	High	Low to moderate	Low / Moderate	In some schemes	Fixed	Yes
Debentures	Medium / Long	Moderate	Moderate	Moderate	Low / Moderate	No	Fixed	Yes
Preference Shares	Medium / Long	Moderate	Moderate	Moderate	Moderate	No	Fixed	Yes
Convertible Debentures	Medium / Long	Moderate to high	Moderate to low	Moderate to low	Low / Moderate	Sometimes	Fixed to variable	No
Bonds	Medium / Long	Moderate to high	Moderate to low	Moderate	Low	No	Fixed	Yes
Equity Shares	Long	High	Low	Unpredictable	High / Low	Unpredictable	Unpredictable	No
Physical Assets like gold, silver, diamond, real estate, etc.	Long	Moderate to high	Low	Unpredictable	Low	Unpredictable	Unpredictable	No

Non – Marketable Financial Assets:

A good portion of financial assets is represented by non – marketable financial assets. These can be classified into the following broad categories:

- Bank Deposits
- Post office Deposits
- Company Deposits
- Provident fund Deposits

Equity Shares:

Equity shares represent ownership capital. As an equity shareholder, investor has an ownership stake in the company. This essentially means that investor has a residual interest in income and wealth. Perhaps, the most romantic among various investment alternatives, equity shares are classified into the following broad categories by stock market analysts:

- Blue chip shares
- Growth shares
- Income shares
- Cyclical shares
- Speculative shares

Bonds:

Bonds or debentures represent long-term debt instruments. The issuer of a bond promises to pay a stipulated stream of cash flows. Bonds may be classified into the following categories:

- Government securities
- Government of India relief bonds
- Government agency securities
- PSU bonds
- Debentures of private sector companies
- Preference shares

Money Market Instruments:

Debt instruments which have a maturity of less than one year at the time of issue are called money market instruments. The important money market instruments are as follows:

- Treasury bills
- Commercial paper
- Certificates of deposit

Mutual Funds:

Instead of directly buying equity shares and / or fixed income instruments, investor can participate in various schemes floated by mutual fund houses which, in turn, invest in equity shares and fixed income securities. There are three broad types of mutual fund schemes:

- Equity schemes
- Debt schemes
- Balanced schemes

A mutual fund represents a vehicle for collective investment. When investor participates in a scheme of a mutual fund, investor becomes a part – owner of the investments held under that scheme. Till 1986 the Unit Trust of India was the only mutual fund in India. From there on, public sector banks and insurance companies were allowed to set up subsidiaries to undertake mutual fund business. So, State Bank of India, Canara Bank, LIC, GIC and a few other public sector banks entered the mutual fund industry. From 1992 onwards, the mutual fund industry was opened to the private sector. In response, a number of private sector mutual funds such as Alliance Capital Mutual Fund, Birla Mutual Fund, DSP Merrill Lynch Mutual Fund, HDFC Mutual Fund, Morgan Stanley Mutual Fund, Pioneer ITI Mutual Fund, Prudential ICICI Mutual Fund, Reliance Mutual Fund, Standard Chartered Mutual Fund, Tata Mutual Fund, Templeton India Mutual Fund, and Zurich India Mutual Fund have been set up. While UTI continues to be the dominant player in the mutual fund industry, its share has decreased over time, thanks to the intense competition provided by the private sector entrants in the field. Though the mutual fund industry

in India has registered a healthy growth over the last 15 years, still it is very small in relation to other intermediaries like banks and insurance companies.

Life Insurance:

In a broad sense, life insurance may be viewed as an investment. Insurance premium represents 'the sacrifice' and the sum assured depicts 'the benefit'. The important types of insurance policies in India are:

- Endowment assurance policy
- Money back policy
- Whole life policy
- Term assurance policy

Precious Objects:

Precious objects are items that are generally small in size but highly valuable in monetary terms. Some important precious objects are:

- Gold and Silver
- Precious Stones
- Metals
- Oil and Gas

Financial Derivatives:

A financial derivative is an instrument whose value is derived from the value of an underlying asset. It may be viewed as a side bet on the asset. The most important financial derivatives from the point of view of investors are:

- Options
- Futures

Comparison of Investment Alternatives:

A summary evaluation of various investment alternatives like equity shares, fixed income securities, deposits, real assets are compared in terms of key investment attributes, which is as under:

	Current Yield	Capital Appreciation	Risk	Marketability/ Liquidity	Tax Shelter	Convenience
Equity Shares	Low	High	High	Fairly High	Yes	High
Non Convertible Debentures	High	Negligible	Low	Average	Nil	High
Equity Schemes	Low	High	High	High	Yes	Very high
Debt Schemes	High	Low	Low	High	Yes	Very high
Bank Deposits	Moderate	Nil	Negligible	High	Yes	Very high
Public Provident Fund	Nil	High	Nil	Average	Yes	Very high
Life Insurance Policies	Nil	Moderate	Nil	Average	Yes	Very high
Residential House	Moderate	Moderate	Negligible	Low	Yes	Fair
Gold and Silver	Nil	Moderate	Average	Average	Nil	Average

Investment attributes:

For evaluating an investment avenue, the following attributes are relevant.

- Rate of Return
- Risk
- Marketability
- Tax shelter
- Convenience

Rate of Return:

The rate of return on an investment for a period (which is usually a period of one year) is defined as follows:

$$\text{Rate of Return} = \frac{\text{Annual income} + (\text{Ending price} - \text{Beginning price})}{\text{Beginning price}}$$

Risk:

The rate of return from investments like equity shares, real estate, silver, and gold can vary rather widely. The risk of an investment refers to the variability of its rate of return: How much do individual outcomes deviate from the expected value?

Marketability:

An investment is highly marketable or liquid if:

- It can be transacted quickly
- The transaction cost is low
- The price change between two successive transactions is negligible.

The liquidity of a market may be judged in terms of its depth, breadth, and resilience. Depth refers to the existence of buy as well as sell orders around the current market price. Breadth implies the presence of such orders in substantial volume. Resilience means that new orders emerge in response to price changes.

Tax Shelter:

Some investments provide tax benefits; others do not.

Tax benefits are of the following three kinds:

- ***Initial Tax Benefit:*** An initial tax benefit refers to the tax relief enjoyed at the time of making the investment.
- ***Continuing Tax Benefit:*** A continuing tax benefit represents the tax shield associated with the periodic returns from the investment.
- ***Terminal Tax Benefit:*** A terminal tax benefit refers to relief from taxation when an investment is realized or liquidated.

Convenience:

Convenience refers to the ease with which the investment can be made and looked after. The degree of convenience associated with investments varies widely. At one end of spectrum is the deposit in a savings bank account that can be made readily and that does not require any maintenance effort. At the other end of the spectrum is the purchase of a property that may involve a lot of procedural and legal hassles at the time of acquisition and a great deal of maintenance effort subsequently.

Characteristics of Investment:

All investments are characterized by certain features; few among them are mentioned below:

Return:

All investments are characterized by the expectation of a return. In fact, investments are made with the primary objective of deriving a return. The return may be received in the form of yield plus capital appreciation. The difference between the sale price and the purchase price is capital appreciation. The dividend or interest received from the investment is the yield. Different types of investments promise different rates of return. The return from an investment depends upon the nature of the investment, the maturity period and a host of other factors.

Risk:

Risk is inherent in any investment. The risk may relate to loss of capital, delay in repayment of capital, non-payment of interest, or variability of returns. The risk of an investment depends on the following factors:

- The longer the maturity period, the larger is the risk.
- The lower the credit worthiness of the borrower, the higher is the risk.
- The risk varies with the nature of investment. Investments in ownership securities like equity shares carry higher risk compared to investments in debt instruments like debentures and bonds.

Risk and return of an investment are related i.e. the higher the risk, the higher is the return.

Safety:

The safety of an investment implies the certainty of return of capital without loss of money or time. Safety is another feature which an investor desires for his investments. Every investor expects to get back his capital on maturity without loss and without delay.

Liquidity:

An investment which is easily saleable or marketable without loss of money and without loss of time is said to possess liquidity. An investor generally prefers liquidity for his investments, safety of his funds and good return with minimum risk.

Objectives of Investment:

An investor has various alternative avenues of investment for his savings to flow. Savings kept as cash are barren and do not earn anything. Hence savings are invested in assets depending on their risk and return characteristics. The objective of investor is to minimize the risk involved in investment and maximize the return from the investment. All savings kept as cash are not only barren because they do not earn anything, but also loses its value to the extent of rise in prices. Thus, rise in prices or inflation erodes the values of money. Savings are invested to provide a hedge or protection against inflation. If the investments cannot earn as much as the rise in prices, the real rate of return would be negative. Thus, if inflation is at an average annual rate of 10 percent, then the return from an investment should be above 10 percent to induce savings to flow into investment.

Thus, objectives of an investor can be stated as:

- Maximization of return
- Minimization of risk
- Hedge against inflation

The investors in the financial market have different attitudes towards risk and varying levels of risk bearing capacity. Some investors are risk averse, while some may have an affinity to risk. The risk bearing capacity of an investor, on the other hand, is a function of his income. A person with higher income is assumed to have a higher risk bearing capacity. Each investor tries to maximize his wealth by choosing the optimum combination of risk and expected return in accordance with his preference and capacity.

Types of Investors:

Investors can be broadly classified as under:

- Individual investors, and
- Institutional investors

Individual investors are large in number but their investable resources are comparatively smaller. They generally lack the skill to carry out extensive evaluation and analysis before investing. Moreover, they do not have the time and resources to engage in such analysis.

Institutional investors are the organizations with surplus funds who engage in investment activities. Mutual funds, investment companies, banking and non-banking companies, insurance corporations, etc. are the organizations with large amounts of surplus funds to be invested in various profitable avenues. These institutional investors are fewer in number compared to individual investors, but their investable resources are much larger. The institutional investors engage professional fund managers to carry out extensive analysis and evaluation of different investment opportunities. As a result their investment activity tends to be more rational and scientific. They have a better chance of maximizing returns and minimizing risk.

Qualities for successful investing:

The game of investment requires certain qualities and virtues on the part of the investors, to be successful in the long run.

According to John Train, following are the list of traits:

- He is realistic
- He is intelligent to the point of genius; or else
- He is utterly dedicated to his craft
- He is disciplined and patient
- He is a loner

Other major qualities for successful investing which an investor should possess are as under:

- Contrary thinking
- Patience
- Composure
- Flexibility and openness
- Decisiveness

Contrary thinking:

Investors tend to have a hard mentality and follow the crowd. Two factors explain this behaviour. First, there is a natural desire on the part of human beings to be a part of a group. Second, in a complex field like investment, most people do not have enough confidence in their own judgment. This impels them to substitute other's opinion for their own. Following the crowd behaviour, however, often produces poor investment results.

Given the risk of imitating others and joining the crowd, you must cultivate the habit of contrary thinking. This may be difficult to do because it is so tempting and convenient to fall in line with others. Perhaps the best way to resist such a tendency is to recognize that investment requires a different mode of thinking than what is appropriate to everyday living. Thus, one should go with the market during incipient and intermediate phases of bullishness and bearishness but go against the market when it moves towards the extremes.

Some suggestions to cultivate the contrary approach to investment are as under:

- Avoid stocks which have a high price-earnings ratio. A high relative price-earnings ratio reflects that the stock is very popular with investors.
- Recognize that in the world of investment, many people have the temptation to play the wrong game.
- Sell to the optimists and buy from the pessimists. While the former hope that the future will be marvelous, the latter fear that it will be awful. Reality often lies somewhere in between. So it is a good investment policy to bet against the two extremes.

Patience:

As a virtue, patience is strangely distributed among investors. Young investors, with all the time in the world to reap the benefits of patient and diligent investing, seem to be the most impatient. They look for instantaneous results and often check prices on a daily basis. Old investors, on the other hand, display a high degree of patience even though they have little chance of enjoying the fruits of patience.

The game of investment requires patience and diligence. In the short run, the factor of luck may be important because of randomness in stock price behaviour but in the long run, however, investor performance depends mainly on patience and diligence, because the random movements tend to even out.

Composure:

Rudyard Kipling said that an important virtue for becoming a mature adult is to keep your head when all around you are losing theirs. The ability to maintain composure is also a virtue required to be a successful investor.

Thus, an investor should try to

- Understand his/her own impulses and instincts towards greed and fear;
- Surmount these emotions that can wrap his/her judgment; and
- Capitalize on the greed and fear of other investors.

  Greed and fear are two most powerful forces that influence investment decisions. Greed and fear tend to be insidiously contagious. Some suggestions to overcome greed and fear are as under:

- Maintain a certain distance from the market place. Your vulnerability to the contagious influences of greed and fear diminishes, if your contact with others caught in the whirlpool of market psychology decreases.
- According to Benjamin Graham, widely regarded as the father of security analysis, “investor should rely more on hard numbers and less on judgment.”

Flexibility and Openness:

Nothing is more certain than change in the world of investments. Macroeconomic conditions change, new technologies and industries emerge,

consumer tastes and preferences shift, investment habits alter, and so on. All these developments have a bearing on industry and company prospects on the one hand and investor expectations on the other.

Despite the inexorability of change, most of us adjust to it poorly. We often base our expectations assuming that the status quo will continue.

J.M. Keynes said: "The facts of the existing situation enter, in a sense disproportionately into the formation of our long-term expectations; our usual practice being to take the existing situation and project it into a future modified only to the extent that we have more or less definite reasons for expecting a change."

Arthur Zeikel said: "We tend to develop a 'defensive' interpretation of new developments, and this cripples our capacity to make good judgments about the future."

Barton M. Briggs said: "Flexibility of thinking and willingness to change is required for the successful investor. In the stock market, in investing, there is nothing permanent except change. The investment manager should try to cultivate a mix of healthy skepticism, open-mindedness, and willingness to listen."

John Train said: "Their temperament does not change, so they go on repeating the same patterns, in this as in all matters. And the extraordinary thing is that they have more confidence, not less as they repeat the same mistakes, because they think they have learned from their previous misfortunes."

Decisiveness:

An investor often has to act in face of imperfect information and ambiguous signals. Investment decisions generally call for reaching conclusions on the basis of inadequate premises. To succeed in the investment game, the investor should be decisive. If he procrastinates, he may miss valuable opportunities; if he dillydallies, he may have to forego gains.

Decisiveness refers to an ability to quickly weigh and balance a variety of factors, form a basic judgment, and act promptly. It reflects the ability to take decisions, after doing the necessary homework of course, without being overwhelmed by uncertainties characterizing the investment situation. The most successful investors tend to be those who are willing to make bold positions consistent with their convictions.

RISK:

Meaning of Risk:

A person making an investment expects to get some return from the investment in the future. But, as future is uncertain, so is the future expected return. It is this uncertainty associated with the returns from an investment that introduces risk into the investment.

Risk arises when there is a possibility of variation between expectations and realizations with regard to an investment. Thus, "Risk is the potential for variability in returns." An investment whose returns are fairly stable is considered to be a low-risk investment, whereas an investment whose returns fluctuate significantly is considered to be a high-risk investment.

Elements of Risk:

The essence of risk in an investment is the variation in its returns. This variation in returns is caused by a number of factors, commonly known as elements of risk.

The elements of risk may be broadly classified into two groups, as under:

- ***First group:*** Factors that are external to a company and affect a large number of securities simultaneously – mostly uncontrollable in nature.
- ***Second group:*** Factors that are internal to companies and affect only those particular companies – controllable to a great extent.

The risk produced by the first group of factors is known as systematic risk, and that produced by the second group is known as unsystematic risk.

The total variability in returns of a security represents the total risk of that security. Systematic and unsystematic risks are the two components of total risk. Thus,

Total risk = Systematic Risk + Unsystematic Risk

Systematic Risk:

The impact of economic, political and social changes is system-wide and that portion of total variability in security terms caused by such system-wide factors is referred to as "systematic risk". Systematic risk is further subdivided into:

- Interest rate risk,
- Market risk, and
- Purchasing power risk

Interest Rate Risk:

Interest rate risk is a type of systematic risk that particularly affects debt securities like bonds and debentures. In other words, the variation in bond prices caused due to the variations in interest rates is known as interest rate risk. The interest rate variations have an indirect impact on stock prices also. Interest rate risk is a systematic risk which affects bonds directly and shares indirectly.

Market Risk:

Market risk is a type of systematic risk that affects shares i.e. the variation in returns caused by the volatility of the stock market.

Purchasing power Risk:

Purchasing power risk refers to the variation in investor returns caused by inflation. The two important sources of inflation are rising costs of production and excess demand for goods and services in relation to their supply. They are known as cost-push and demand-pull inflation respectively. When demand is increasing but supply cannot be increased, price of the goods increases thereby forcing out some of the excess demand and bringing the demand and supply into equilibrium. This phenomenon is known as demand pull inflation. Cost push inflation occurs when the

cost of production increases and this increase in cost is passed on to the consumers by the producers through higher prices of goods.

Unsystematic Risk:

When variability of returns occurs because of firm-specific factors, it is known as unsystematic risk. This risk is unique or peculiar to a company or industry and affects it in addition to the systematic risk affecting all securities.

The unsystematic risk or unique risk affecting specific securities arises from two sources:

- The operating environment of the company, and
- The financial pattern adopted by the company.

These two types of unsystematic risk are referred to as **business risk** and **financial risk** respectively.

Business Risk:

Business risk is a function of the operating conditions faced by a company and is the variability in operating income caused by the operating conditions of the company.

Financial Risk:

Financial risk is a function of financial leverage which is the use of debt in the capital structure. The variability in EPS (earnings per share) due to the presence of debt in the capital structure of a company is referred to as financial risk. This is specific to each company and forms part of its unsystematic risk. Financial risk is an avoidable risk in so far as a company is free to finance its activities without resorting to debt.

Measurement of Risk:

The quantification of risk is necessary for investment analysis. Risk in investment is associated with return. The risk of an investment cannot be measured without reference to return. The return, in turn, depends on the cash inflows to be received from the investment.

Example:

Purchase of a share: While purchasing an equity share, an investor expects to receive future dividends declared by the company. In addition, he expects to receive the selling price when the share is finally sold.

Suppose a share is currently selling at Rs. 120. An investor who is interested in the share anticipates that the company will pay a dividend of Rs. 5 in the next year. Moreover, he expects to sell the share at Rs. 175 after one year. The expected return from this investment can be calculated as follows:

$$R = \frac{\text{Forecasted dividend + Forecasted end of the period stock price}}{\text{Initial Investment}} - 1$$

$$R = \frac{\text{Rs. 5 + Rs. 175}}{\text{Rs. 120}} - 1 = 0.5 \text{ or } 50 \text{ per cent}$$

In this case, the investor expects to get a return of 50 per cent in the future. But the future is uncertain. The dividend declared by the company may turn out to be either more or less than the figure anticipated by the investor. Similarly, the selling price of the stock may be less than the price anticipated by the investor at the time of investment. It may sometimes be even more. Thus, there is a possibility that the future return may be more than 50 per cent or less than 50 per cent. Since the future is uncertain the investor has to consider the probability of several other possible returns. The expected returns may be 30 per cent, 40 per cent, 50 per cent, 60 per cent or 70 per cent. The investor now has to assign the probability of occurrence of these possible alternative returns. An example is given below:

Possible returns (in per cent) X_i	***Probability of occurrence*** $p(X_i)$
30	0.10
40	0.30
50	0.40
60	0.10
70	0.10

This table gives the probability distribution of possible returns from an investment in shares. Such a distribution can be developed by the investor by studying the past data and modifying it appropriately for the changes he expects to occur in the future.

The information contained in the probability distribution has to be reduced to two simple statistical measures in order to aid investment decision-making. These measures are summary statistics. One measure would indicate the expected return from the investment and the other measure would indicate the risk of the investment.

Expected Return:

The expected return of the investment is the probability weighted average of all the possible returns. If the possible returns are denoted by X_i and the related probabilities are $p(X_i)$, the expected return may be represented as $\overline{X}$ and can be calculated as:

$$\overline{X} = \sum_{i=1}^{n} X_i P(X_i)$$

It is the sum of the products of possible returns with their respective probabilities.

The expected return of the share in the example given above can be calculated as shown below:

Calculation of Expected Return

Possible Returns X_i	**Probability $p(X_i)$**	**$X_i\ p(X_i)$**
30	0.10	3.0
40	0.30	12.0
50	0.40	20.0
60	0.10	6.0
70	0.10	7.0
		$\sum_{i=1}^{n} X_i P(X_i) = 48.0$

Here, the expected return is 48 per cent.

Risk:

Expected returns are insufficient for decision-making. The risk aspect should also be considered. The most popular measure of risk is the variance or standard deviation of the probability distribution of possible returns.

Variance is usually denoted by σ^2 and calculated by the following formula:

$$\sigma^2 = \sum_{i=1}^{n} [(X_i - \overline{X})^2 \ p\ (X_i)]$$

The table below provides the required calculations in the case of our example:

Possible return X_i	**Probability $p(X_i)$**	**Deviation $(Xi - \overline{X})$**	**Deviation squared $(Xi - \overline{X})^2$**	**Product $(Xi - X)^2 p(X_i)$**
30	0.10	-18	324	32.4
40	0.30	-8	64	19.2
50	0.40	2	4	1.6
60	0.10	12	144	14.4
70	0.10	22	484	48.4
				$\sigma^2 = 116.0$

Variance = 116 per cent

Standard deviation is the square root of the variance and is represented as σ. The standard deviation in our example is $\sqrt{116} = 10.77$ per cent.

The variance and standard deviation measure the extent of variability of possible returns from the expected return. Several other measures such as range, semi-variance and mean absolute deviation have been used to measure risk, but standard deviation has been the most popularly accepted measure.

In the method described above, the probability distribution of possible returns from an investment proposal is used to estimate the expected return from the investment and its variability. The mean gives the expected value and the variance

or standard deviation gives the variability. This procedure for assessing risk is known as the mean-variance approach.

The standard deviation or variance provides a measure of the total risk associated with a security. Total risk comprises of two components: systematic risk and unsystematic risk. Unsystematic risk is the risk which is specific or unique to a company. Unsystematic risk associated with the security of a particular company can be reduced by combining it with another security having opposite characteristics. This process is known as ***diversification of investment***. As a result of diversification, the investment is spread over a group of securities with different characteristics. This group of securities is called a ***portfolio***.

The unsystematic risk is not very important as it can be reduced or eliminated through diversification. It is an irrelevant risk. The risk that is relevant in investment decision-making is the systematic risk because it is undiversifiable. Hence, the investor seeks to measure the systematic risk of a security.

Measurement of Systematic Risk:

Systematic risk is the variability in security returns caused by changes in the economy or the market. All securities are affected by such changes to some extent, but some securities exhibit greater variability in response to market changes. Such securities are said to have higher systematic risk. The average effect of a change in the economy can be represented by the change in the stock market index. The systematic risk of a security can be measured by relating that security's variability with the variability in the stock market index. A higher variability would indicate higher systematic risk and vice versa.

The systematic risk of a security is measured by a statistical measure called Beta. The input data required for the calculation of beta are the historical data of returns of the individual security as well as the returns of a representative stock market index. Methods used for calculation of beta are:

- The correlation method
- The regression method

Volatility:

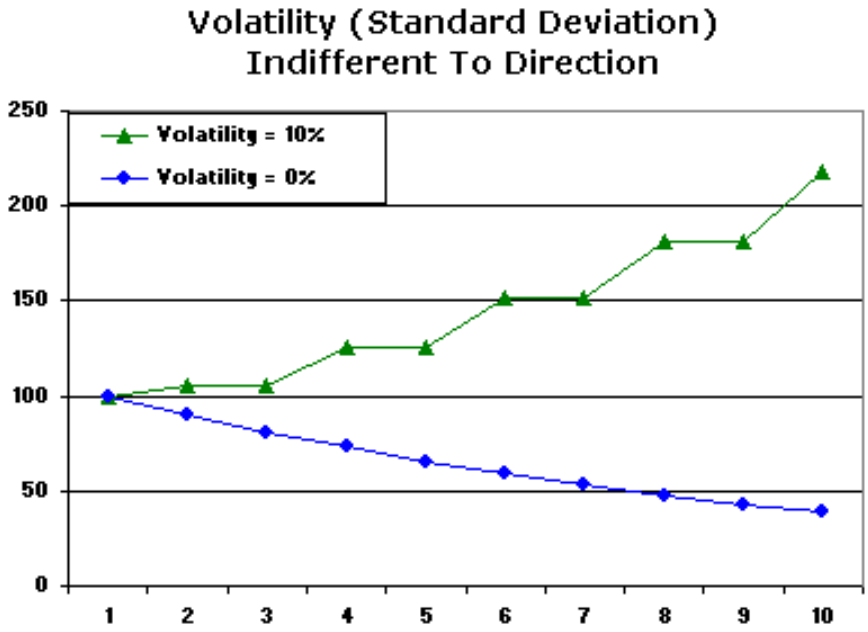
Investors like to focus on the promise of high returns, but they should also ask how much risk they must assume in exchange for these returns. Thus there exist formal expressions of the risk-reward relationship. For example, the Sharpe ratio measures excess return per unit of risk, where risk is calculated as volatility, which is a traditional and popular risk measure. Its statistical properties are well known and it feeds into several frameworks, such as modern portfolio theory and the Black-Scholes model.

***Annualized Standard Deviation**:*

Unlike implied volatility - which belongs to option pricing theory and is a forward-looking estimate based on a market consensus - regular volatility looks backward. Specifically, it is the annualized standard deviation of historical returns.
Traditional risk frameworks that rely on standard deviation generally assume that returns conform to a normal bell-shaped distribution. Normal distributions give us handy guidelines: about two-thirds of the time (68.3%), returns should fall within one standard deviation (+/-); and 95% of the time, returns should fall within two standard deviations. Two qualities of a normal distribution graph are skinny "tails" and perfect symmetry. Skinny tails imply a very low occurrence (about 0.3% of the time) of returns that are more than three standard deviations away from the average. Symmetry implies that the frequency and magnitude of upside gains is a mirror image of downside losses.

Consequently, traditional models treat all uncertainty as risk, regardless of direction. As many people have shown, there is a problem if returns are not symmetrical - investors worry about their losses "to the left" of the average, but they do not worry about gains to the right of the average.

The same can be illustrated with the help of following two fictional stocks. The falling stock (blue line) is utterly without dispersion and therefore produces a volatility of zero, but the rising stock - because it exhibits several upside shocks but not a single drop - produces volatility (standard deviation) of 10%.



Thus, volatility is annualized standard deviation of returns. In the traditional theoretical framework, it not only measures risk, but affects the expectation of long-term (multi-period) returns. As such, it asks us to accept the dubious assumptions that interval returns are normally distributed and independent. If these assumptions are true, high volatility is a double-edged sword: it erodes investor's expected long-term return (it reduces the arithmetic average to the geometric average), but it also provides him with more chances to make a few big gains.