**CHAPTER ONE**

**RISK AND RELATED TOPICS**

* 1. **Definition of Risk**

There is no one universal and comprehensive definition of risk that exists so far. It is defined in different forms by several authors with some differences in the wordings used. The essence, however, is very similar. Economists, behavioural scientists, risk theorists, statisticians, and actuaries each have their own concept of risk. Some of the definitions of different scholars are shown below:

* Risk is the variation in outcomes that could accumulate over a specified period in a given condition (Brian A. Burt).
* Risk is a chance of a loss, and this depends on three elements, hazard, vulnerability and exposure (William’s and Heins).
* Risk is the actual exposure of something of human value to a hazard and is often regarded as the combination of probability and loss (Smith, 1996)
* Risk is the objectified uncertainty as to occurrence of an undesired event (Stanchion, 1997).
* Risk is expected losses due to a particular hazard for a given area and reference period (Blong, 1996)
* Risk is the possibility that actual results may differ from predicted average results.

Based on the above stated definition of risk, we can conclude that risk is defined as the uncertainty concerning the occurrence of a loss. This means that the loss may or may not happen. If a loss is certain to occur, it may be planned in advance and treated as a definite. However, if there is uncertainty about the occurrence of a loss, then the risk becomes an important problem.

* 1. **Risk Vs Uncertainty**

If we observe from many text books and researchs, there has been a major debate on the differences and common features of risk and uncertainty. In many textbooks both notions are related but they do not coincide. However, the difference between the two must be distinguished. The “risk versus uncertainty” debate is long-running and far from resolved at present. Although the two are closely related, quite many authors make a distinction between the two terms. Uncertainty refers to the doubt as to the occurrence of a certain desired outcome. It is more of subjective belief. Subjective in a sense that it is based on the knowledge and attitudes of the person viewing the situation. As a result, different subjective uncertainties are possible for different individuals under identical circumstances of the external world. Prefer has distinguished the difference between risk and uncertainty as “Risk is a combination of hazards and is measured by probability; uncertainty is measured by the degree of belief. Risk is a state of the world; uncertainty is a state of the mind.

Knight defined “risk” as a measurable uncertainty that can be determined by objective analysis based on prior experience. In contrast, “uncertainty” referred to events when randomness could not be expressed in terms of mathematical probability that is of a more subjective nature because it is without precedent. Risk is dealt with every day by weighing probabilities and surveying options but uncertainty can be debilitating, even paralyzing, because so much is new and unknown. The practical difference between the two categories, risk and uncertainty is that risk is determinant and thus presents foreseeble consequences. Therefore, it is objective and not dependent on any one individual, while, uncertainty is indeterminate and characterized by unforeseeable. Thus, it is subjective that cannot be measured objectively. It is the state of mankind of predicting the future.

In general, it can be concluded that many writers specified so as to risk is objective phenomenon that can be measured mathematically or statistically. It is independent of the individuals’ belief. Whereas, uncertainty is subjective that cannot be measured objectively. Of course, risk and uncertainty may have some relationship. Uncertainty results from the imperfection of knowledge of mankind of predicting the future. The higher the lack of knowledge about the future, the higher the uncertainty. But, it is debatable to say that higher uncertainty leads to higher risk. The presence and absence of uncertain does not necessarily mean the presence and absence of risk respectively.

* 1. **Risk and Probability**

It is important to identify carefully the difference between risk and probability. Risk is differentiated from probability by concept in relative variation. The probability associated with a certain outcome is the relative likelihood that outcome will occur. And probability varies between 0 and 1. If the probability is 0, that outcome will not occur, if the probability is 1, that outcome will occur. Probabilities are generally assigned to events that are expected to happen in the future. There may be a number of possible events that will take place under given set of conditions; and these events may occur in equal or different chance of occurrence. The weights given to each possible event may depend on prior knowledge, past experience, statistical or mathematical estimation of relevant data or psychological belief. Thus, to each possible event is assigned a corresponding probability of occurrence that leads to probability distribution. This means that probability relates to a single possible event. Risk on the other hand refers to the variation in the possible outcomes. This means that risk depends on the entire probability distribution. It specifies the concept of variability. Thus, the concepts of risk and probability are two different things.

The following example shows the difference between risk and probability. Assume the occurrence of a particular event is to be considered. One extreme is that this event is certainly to take place. Thus, the probability that this event will take place is 1. There is certainty as to the occurrence of this event with prefect foresight in this regard. Accordingly, there is no risk. The other extreme is that the event will not take place at all. Hence, the probability of occurrence is zero. Here, there is certainty and therefore, there is no risk. In between these two extremes there could be several occurrences of the events with the corresponding probabilities of occurrence. It is therefore; risk and probability are different but related concepts.

* 1. **Risk, Peril and Hazard**

Many persons commonly employ the terms "risky," "hazardous," and "perilous" synonymously. Although, the three concepts have one common characteristic in transmitting bad experience or feeling, they are differentiated as follows:

**Peril:** Peril is defined as the cause of loss. If a house burns because of fire, the peril (the cause of loss) is the fire. Likewise, some common perils that cause damage or loss to the property include lightening, windstorm, tornadoes, earthquakes, theft and burglary.

**Hazard:** refers to the condition that may create or increase the chance of a loss arising from a given peril. These hazards are not themselves the cause of the loss, but they can increase or decrease the effect loss. Thus, they affect the magnitude and frequency of a loss. The more hazardous conditions are, the higher the chance of loss.

There are three major types of hazards: Moral hazard, Physical hazards, Morale hazard.

**Physical hazards:** This is related with the physical properties of the thing exposed to risk, such as the nature of construction of a building, the nature of the road. Examples are:

- Type of construction material such as wood, bricks,

- Location of property such as near to fuel station, near to flood area, near to earthquake area, etc.

**Moral hazard:** Moral hazard is dishonesty or character defects in an individual that increase the frequency or severity of loss. For example, the dishonest persons may fake an accident to collect the insurance or they intentionally burn unsold merchandise that is insured. Moral hazard is present in all forms of insurance and it is difficult to control. Dishonest individuals often rationalize their actions on the ground that “the insurers has plenty of money”. However, this view is incorrect because the insurer can pay claims only by collecting premiums from other insured. Because of moral hazard, premiums are higher for everyone.

**Morale hazard:** it initiated from act of carelessness which leading to the occurrence of a loss. Thus, it occurs due to lack of concern for events. Examples of Morale hazard include the leaving car keys in an unlocked car, poor house keeping in stores, leaving a door unlocked that allows a burglar to enter, etc.

* 1. **Classification of Risk**

Risk can be classified in several ways according to the cause, their economic effect, or some other dimensions. The following summarizes the different ways of classifying risks.

1. **Objective and Subjective Risk**

Some authors make a careful distinction between objective and subjective risk. These two types of risk are also mentioned as measurable and Non-measurable risk.

**Objective risk:** is defined as the relative variation of the actual loss from expected loss. However, each individual’s estimate of the objective risk varies due to a number of factors. Thus, the estimate of the objective risk which depends on the person’s psychological belief is the subjective risk. The problem, however, is that it is difficult to obtain the true objective risk in most business situation.

Objective risk can be statistically measured by some measure of dispersion, such as the standard deviation or the coefficient of variation. Since objective risk can be measured, it is an extremely useful concept for an insurer or a corporate risk manager. As the number of exposures increases, an insurer can predict its future loss experience more accurately because it can rely on the law of large numbers.The law of large numbers states that as the number of exposure units increases, the more closely will the actual loss experience approach the probable loss experience. For example as the number of homes under observation increases, the greater is the degree of accuracy in predicting the proportion of homes that will burn.

**Subjective risk**- is defined as uncertainty based on a person’s mental condition or state of mind. For example, an individual is drinking heavily in a bar and attempts to derive home. The driver may be uncertain whether he or she will arrive home safely without being arrested by the police for drunk driving. This mental uncertainty is called subjective risk. Often subjective risk is expressed in terms of the degree of belief.

The impact of subjective risk varies depending on the individual. Two persons in the same situation may have a different perception of risk, and their conduct may be altered accordingly. If an individual experiences great mental uncertainty concerning the occurrence of a loss, that person’s conduct may be affected. High subjective risk often results in less conservative conduct, while low subjective risk may result in less conservative conduct. A driver may have been previously arrested for drunk driving and is aware that he or she has consumed too much alcohol. The driver may then compensate for mental uncertainty by getting someone else to drive him or her home or by taking a cab. Another driver in the same situation may perceive the risk of arrested as slight. The second driver may drive in more careless and reckless manner; a low subjective risk results in less conservative driving behavior.

1. **Financial and Non-Financial Risk**

We have already said that risk implies a situation where there is uncertainty about the outcome. A financial risk is one where the outcome can be measured in monetary terms. This is easy to see in the case of material damage to property, theft of property or lost business profit following a fire. In cases of personal injury, it can also be possible to measure financial loss in terms of a court award of damages, or as a result of negotiation between lawyers and insurers. In any of these cases, the outcome of the risky situation can be measured financially. On another hand, non-financial risk does not have financial implication. This means in this case the outcome measured in monetary terms is not possible. Take the case of the choice of a new car, or the selection of an item from a restaurant menu. These could be taken as risky situations, not because the outcome will cause financial loss, but because the outcome could be uncomfortable or disliked in some other way. For example, network connection failure, death/injury of an employee.

1. **Pure and Speculative Risks**

The distinction between pure and speculative risks based on situations where there is only the possibility of loss and those where a gain may also result. Pure risks refer to the situation in which only a loss or no loss would occur. The outcome can only be unfavorable to us, or leave us in the same position as we enjoyed before the event occurred. Examples of pure risks include premature death, risks of a motor accident, catastrophic medical expenses, lightning, flood, fire at a factory, theft of goods from a store, or injury at work are all pure risks with no element of gain. It is a loss or no loss that can result from such risks.

Pure risks are further classified in to three categories: property risk, personal risk, and liability risk.

1. **Property risk**

It refers to losses associated with ownership of property such as destruction of property by fire. Ownership of property puts a person or a firm to property exposure, i.e. the property will be exposed to a wide range of perils. There are two major types of loss associated with the destruction or theft of property;

 **Direct loss**: a direct loss is defined as a financial loss that results from the physical damage, destruction, or theft of the property. For example, assume that you own a restaurant, and the building is insured by a property insurance policy. If the building is damaged by a fire, the physical damage to the property is known as a direct loss. In other words, property suffers a direct loss when the property itself is directly damaged or destroyed or disappears because of contact with a physical or social peril.

**Indirect or consequential loss**: an indirect loss is a financial loss that results indirectly from the occurrence of a direct physical damage, destruction, or theft. Thus, in addition to the physical damage loss, the restaurant would lose profits for several months while it is being rebuilt. The loss of profits would be a consequential loss. Other examples of consequential loss would be the loss of the use of the building, the loss of rents, and the loss of a market.

Extra expenses are another type of indirect or consequential loss. For example, suppose you own a newspaper, bank, or dairy. If a loss occurs, you must continue to operate regardless of cost; otherwise, you will lose customers to your competitors. It may be necessary to set up a temporary operation at some alternative location, and substantial extra expenses would then be incurred.

1. **Personal risk**

This refers to the possibility of loss to a person such as death, disability, loss of earning power, etc. There are losses to a firm regarding its employees and their families. Personal risks may arise due to accidents while off duty, industrial accident, occupational disease, retirement, sickness, etc. Generally, financial losses caused by the death, poor health, retirement, or unemployment of people are considered as personal losses. Either the workers and their families or their employers may suffer such losses. There are four major personal risks:

**Risk of premature death:** is defined as the death of a family head with unfulfilled financial obligations. These obligations can include dependents to support, mortgage to be paid off, or children to educate. If the surviving family members receive an insufficient amount of replacement income from other sources or have insufficient financial assets to replace the lost income, they may be financially insecure. Therefore, premature death can cause financial problems only if the deceased has dependents to support or dies with unsatisfied financial obligations. Thus, the death of a child age seven is not premature in the economic sense.

**Risk of insufficient income during retirement:** this risk is a major risk that associated with old age. The most majority of workers retire befor eage of 65. When they retire, they loss their earned income. Unless they have sufficient financial assets on which to draw, or access to other sources of retirement income, they will be exposed to financial insecurity during retirement.

**Risk of poor health:** includes both the payment of catastrophic medical bills and the loss of earned income. The payment of catastrophic medical bills is a major cause of financial insecurity if the costs of major surgery are increased. As well as the loss of earned income is another major cause of financial insecurity if the disability is severe.

**Risk of unemployment:** this is another major threat to financial security. Unemployment can cause financial insecurity in three ways. First, workers loss their earned income and employee benefits. Unless there is adequate replacement income or past savings on which to draw, the unemployed worker will be financially insecure. Second, because of economic conditions, the worker may be able to work only part-time. The reduced income may be insufficient in terms of the worker’s needs. Finally, if the duration of unemployment is extended over a long period, past savings and unemployment benefits may be exhausted.

**c) Liability risk**

Liability risk is the possibility of loss arising from intentional or unintentional damage made to other persons or to their property. A person may begenerally obligated to another, because of moral or other reasons, to do or not to do something; the law, however, does not recognize moral responsibility alone as legally enforceable. One would be legally obliged to pay for the damage his/her infected upon other persons or their property.

**Speculative risk** is defined as a situation in which either profit or loss is possible. Expansion of plant, introduction of new product to the market, lottery, and gambling are good example. People are more adverse to pure risks as compared to speculative risks. In speculative risk situation, people may deliberately create the risk when they realize that the favourable outcome is, indeed, so promising. Generally both pure and speculative risks commonly exist at the same time. For instance,accidental damage to a building (pure risk) and rise or fall in property values caused by general economic conditions (speculative risk). Risk managers are concerned with most but not all pure risks.

1. **Static and Dynamic Risks**

Dynamic risk originates from changes in the overall economy such as price level changes, changes in consumer taster, income distribution, technological changes, political changes and the like. They are less predictable and hence beyond the control of risk managers some times. In contrast to a dynamic risk, static risk refers to those losses that can take place even though there were no changes in the overall economy. They are losses arising from causes other than changes in the economy. Unlike dynamic risks, they are predictable and could be controlled to some extent by taking loss prevention measures. Many of the perils fall under this category.

1. **Fundamental and Particular Risks**

**Fundamental risk** is a risk that affects the entire economy or large numbers of persons or groups within the economy. Examples include rapid inflation, natural disaster, cyclical unemployment, and war because large numbers of individuals are affected. Thus, fundamental risks affect the entire society or a large group of the population. They are usually beyond the control of individuals. Therefore, the responsibility for controlling these risks is left for the society itself.

**Particular riskis** a risk that affects only individuals and not the entire community. Examples include car thefts, bank robberies, property losses, death, disability and dwelling fires. Only individuals experiencing such losses are affected, not the entire economy or large groups of people. Therefore, particular risks affect each individual separately. They are usually personal in cause, almost always personal in their application. Because they are so largely personal in their nature, the individual has certain degree of control over their causes. Thus, particular risks are the responsibility of individuals. They can be controlled by purchasing insurance policies and other risk handling tools.