CHAPTER ONE : Risk and its Treatment

Objectives of studying this chapter:

After studying this chapter, the student has to be able to answer the following questions:

- What is the concept of risk and its definition
- What are terms related to risk (peril – Hazard)
- How can you distinguish between pure risks , speculative risks ,diversifiable risks and Enterprise risks
- How risk is a burden to society
- What are classifications of pure risks
- What are the major techniques for managing risks

- ***Teaching Note***

In presenting the material in this chapter, keep in mind that students must master a certain amount of new insurance terminology. Studying insurance is similar to becoming fluent in a foreign language. The student starts by building upon a basic vocabulary. The same is true for insurance. Insurance is a technical subject that requires a basic vocabulary.
It is also worthwhile to point out that there is no single definition of risk. However, risk has been traditionally defined as ***uncertainty concerning the occurrence of a loss.***

1.1- Concept of risk:

Since the Risk is considered the raw material of Insurance. So, before we study Insurance, we have to study risk, where there is no insurance without risk. Every Individual is exposing to a lot of risks.

These risks may injure Individual personally (i.e. premature death – disability – disease ----etc) , injure his property (i.e. collision risk for his car – fire risk for his house … etc) or injure his liabilities toward others (i.e. liabilities risks for owners' cars and owners' ships and owners' airplanes …. etc).

After the knowledge of individual that his life exposes to many risks, we can ask ourselves this question, ***How does the individual know that his life exposes to risks? The answer***, if he does not know, in advance the outcome of any work does it. For example the person does not know his car will expose to accident in the morning during his traveling to his work. The person does not know the time of his death … etc. Also the person does not know he will have an accident or illness requiring hospital care. Of course he does not know the answers of these questions, because he can not predict the future with any certainty, that is, the nature of risk, Ours is a world of countless risks, a world in which losses of many types happen suddenly and expectedly.

Hence, we can say the risk means ***uncertainty*** about future loss.

In other words, the inability to predict the occurrence of a loss.

1.2-Definition of risk

It is known, that a lot of authors in particular who have concerned with risk and insurance (i.e. risk theorists, statisticians, economists, actuaries, law men) have defined risk. So, there is no single definition of risk but there are a lot of definitions for example:

- REJDA has defined risk "*Uncertainty concerning the occurrence of a loss*"
- WILLIAMS, HEAD, HORN & GLENDENNING have defined risk" The possibility of loss"
- GREENE & TRIESCHMANN have defined risk" "Uncertainty as to loss"

By study and analysis the previous definitions, we can conclude three elements that they should be existed in definition of risk, they are:

I) *The probability of loss*: That means if risk exists, it must be possible for loss to occur. Loss may or may not occur under risk, but no risk exist when the probability of loss is either zero or 100% , and that is $1 > \text{probability} > 0$

II) *Measurement of the probability of loss*: That means, if the risk exists, the probability of loss should be measured. For example, probability of death should be measured by quantitative techniques (Mathematical and statistical methods) for premature death risk. Also the probability of fire should be measured for fire risk and so on.

III) *The financial loss*: That means, if risk had occurred and there was loss. That loss should be financial loss and applicable to be measured.

By taking the preceding elements into consideration, the risk may be defined from our viewpoint as ***"Uncertainty as to an event that it results in financial loss, and it can be measured quantitative"***

For example, the risk of premature death is existent, because uncertainty of time of death is present. The risk of fire for factories is existent, because uncertainty is present and so on.

Other examples 1- Car accident 2- flunking a college course 3- lung canser for smoking man ------ Why the risk is existent, because uncertainty is present.

Notice The risk may be A- Objective Risk or B- Subjective Risk

A. Objective Risk or *degree of risk*

1. Defined as *the relative variation of actual loss from expected loss*
2. Declines as the number of exposure units increases
3. Can be measured by using *the standard deviation* or *coefficient of variation*

Example 10000 houses insured and 1% on average will burn (i.e 100 houses). If 90 or 110 houses are burn there will be variation . So that is Objective Risk

B- Subjective Risk

1. Defined as *uncertainty based on one's mental condition or state of mind*
2. Difficult to measure

Example If a driver is drinking heavily in a bar, he may be uncertain whether he will arrive his home safely without being arrested by police for drinking. This mental uncertainty is called Subjective Risk.

1.3 - Some Terminologies are related to risk

Some terms related with risk have rather precise meanings when they are used in connection with risk. These terms are ***Chance of loss*** , ***Peril*** and ***Hazard***. In order to avoid the confusion of persons between these terms and the concept of risk discussed earlier, it is important to distinguish these terms as follows:

1.3.1- ***Chance of loss*** is defined as *the probability that an event will occur*

Notice :the probability may be 1- objective probability or 2- subjective probability.

1.3.2-Peril: A Peril is defined as " *the direst cause of a loss*" . People are surrounded by potential loss because the environment is filled with a lot of perils such as collision, theft, accidents ….. etc".

Examples of Peril:

I) If your car is damaged in a collision with another car, the *collision* is the peril or direct cause of loss.

II) If your flat is stolen, the ***theft*** is peril, or cause of loss. Commonly perils include collision, fire, burglary, theft, explosion, hail, tornadoes, and earthquakes, epidemic, vandalism, windstorm. A single peril may cause more than one type of loss. The collision of car with another can may result in some killed persons and some others injured.

A notice

Some Perils are generally insurable (i.e. theft – fire – collision – burglary) and some others perils are difficult to insure (i.e. flood, earthquake, epidemic, war, civil unrest).

1.3.3-Hazard: A hazard is defined as "*a condition that creates or increases the chance of loss due to a particular peril*". For example, *Poor car brakes* are a hazard making loss due to the collision peril more likely.

There are ***three*** types of hazard:

Physical hazard – Morale hazard – Morale hazard

I) **Physical hazard**: is a physical condition that increases the chance of loss. In other words, the tangible conditions of the environment that affect the frequency and severity of loss.

Examples of physical hazard:

- Poor car brakes - slippery roads that increase the chance of cars accidents
- Defective wiring in house that increases the chance of loss
– Icy roads (slippery roads)
- Defective lock on a door of house that increases the chance of loss - Dry forests.

II) **Moral Hazard** is the dishonesty or character defects in insured (Peron has insurance policy) that increase the frequency and / or severity of loss. In other words, a moral hazard exists when the insured person is one who may dishonestly cause loss. Generally, moral hazard exists when a person can gain from occurrence of a loss.

Examples of moral Hazards:

- Creating an accident for a car to collect indemnity from insurance company.

- Creating an intentionally fire in an unsold insured merchandise to collect indemnity from insurance company.
- Deliberately killing of the insured, to collect sum insured from insurance company

Moral hazard is existed in all types of insurance. So, the insurance companies try to avoid insurance in situations where there is evidence of moral hazard. Also, insurance companies try to control moral hazard by careful underwriting of applicants for insurance.

III) **Morale Hazard** is the attitudes of carelessness or indifference and lack of concern that increase the frequency of loss and severity of loss which can occur, because of insurance. For example, Person who instead of taking reasonable care of his insured house against fire risk, say "it is insured, so why should I worry?" That is considered indifference (morale hazard) because of insurance.

Examples of morale Hazards:

- Careless cigarette smoking that increases the probability of loss by fire.
- Leaving car keys in an unlocked car that increase the probability of theft,
- Leaving a door unlocked of your flat increase the probability of theft, because it allows a burglar to enter the flat.

1.4 - Classification of Risks

Risks may be classified in many ways, but from **our viewpoint** we can classify the risks as either 1-***pure*** ***risks*** or 2- ***speculative risks*** as illustrated by **Figure (1 – 1)**

1- **Pure risks** mean the situations that result only in loss or no loss. One of the best examples for pure risks is ownership of property for example *ownership of a house* will have a fire or it will not. Also *ownership a car* will be stolen or it will not be. The possible outcomes are loss or no loss. Premature death, flood ,lightining are considered other examples for ***pure*** ***risks***

2- **Speculative risks** mean the situations that result in loss or gain. *Gambling* is a good example of a speculative risk. In a gambling situation, risk is deliberately created in the hope of gain. A person who bets on ball games may either loss or wins. Business venture involve many speculative risks.

The investment made by a person in *stock of exchange* may be lost if the prices of shares and bounds had decreased, but this risk is born in return for the possibility of profit (i.e. if the prices had risen).

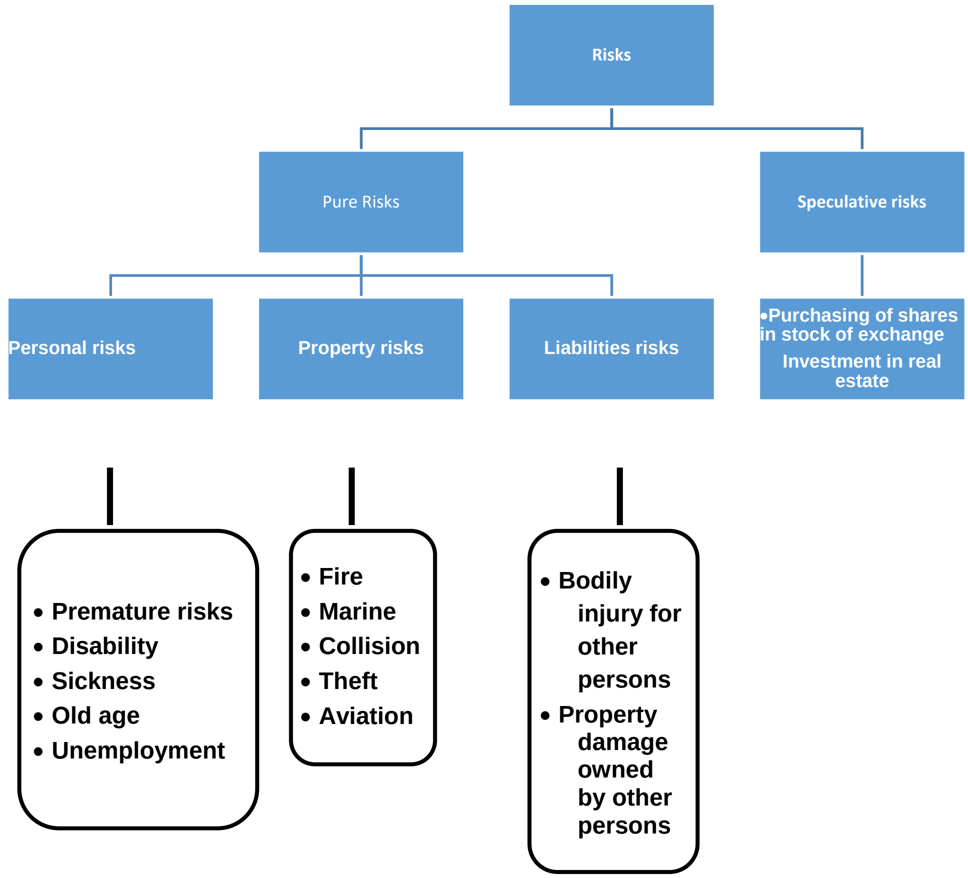

Figure (1 – 1) Classification of risks

The distinction (difference) between pure risks and speculative risks is important because normally only pure risks (situations in which there is no chance of profit) are *insurable*. The insurance is not concerned with the protection of individuals against those losses arising out of speculate risks, because the latter has two-dimensional (the possibility of loss - the possibility of gain) .Hence speculative risks are not *insurable*. So we can shed light upon pure risks as follows:-

Pure risks

Pure risks that exist for individual and business companies can be classified into 3 types, they are:

I) ***Personal risks*** are risks that directly affect an individual .They involve that possibility of loss of income or assets as a result of the loss of the ability to earn income.

There are five major personal risks:

* Premature death risk * Disability risk * old age risk * Sickness risk * Unemployment risk

II) ***Property risks*** are risks that affect not on individual but they affect his/her property. That is, any person owns property (car – house – ship – airplane …. etc) is exposing to property risks. Simply because such possessions can be destroyed or stolen. For example car can be damaged or destroyed because of collision. Also, Real estate and personal property can be destroyed or damaged because of fire, windstorms, Tornado, lightning and numerous other causes.

Property risks involve two types of loss (I) Direct Loss

(II) Indirect or Consequential loss.

The previous two types of property risks can be determined by this *example*:

If your house is destroyed by fire, you lose the value of the house, this is *a direct loss*. Over the time required to rebuild your house, you will charge additional expenses for living somewhere else by paying, a rent for other flat. This loss of use of the destroyed house is *indirect loss*.

III) ***Liability risks***: By virtue of these risks a person can be held legally if he does something that result in bodily injury or property damage to other person. Consequently, the court may order the person to pay substantial damages to the injured person. The liability risks may result from intentional or unintentional injury of other persons or damage to their property through negligence or carelessness

Examples of liabilities risks.

In fact, our life has many liabilities risks i.e.:

- Motorists can be held legally liable for negligent operation of their vehicles
- Business firms can be held legally liable for defective products that harm or injure customers
- Engineers, accountants and other professionals can be sued by clients because of alleged acts of malpractice
- Physicians ,and pharmaceutics, can be sued by patients because of alleged acts of malpractice.

Liabilities risks are of great importance for two reasons:

I) There is no maximum upper limit with respect to the amount of the loss. That is, the negligent person who causes accident that result in serious bodily injury to other driver, he can be sued for any amount 100.0000 L.E., 200.0000 L.E or million or more.

II) Legal defense costs can be enormous. In particular, if the person has no liability insurance, the cost of hiring attorney to defend him can be staggering.

Other ***Classifications for Risks***

1- **Diversifiable Risk and Nondiversifiable Risk**

- A diversifiable risk (particular risk) affects only individuals or small groups (car theft). It is also called nonsystematic or particular risk.
- A nondiversifiable risk(fundamental or general risk) affects the entire economy or large numbers of persons or groups within the economy (hurricane). It is also called systematic risk or fundamental risk.

Notice: Government assistance may be necessary to insure nondiversifiable risks

2- Enterprise risk encompasses all major risks faced by a business firm, which include: pure risk, speculative risk, strategic risk, operational risk, and financial risk

- Strategic Risk refers to uncertainty regarding the firm's financial goals and objectives.
- Operational risk results from the firm's business operations.
- Financial Risk refers to the uncertainty of loss because of adverse changes in commodity prices, interest rates, foreign exchange rates, and the value of money.

Notice : Enterprise Risk Management combines into a single unified treatment program all major risks faced by the firm (Pure risk -Speculative risk-Strategic risk- Operational risk- Financial risk)

1-5 Burden of Risk on Society

- The presence (existence) of risk results in three major burdens on society:
  - In the absence of insurance, individuals and business firms would have to maintain large emergency funds to pay for unexpected losses *for example* a person owns home and does not purchase insurance for his home
  - The risk of a liability lawsuit may discourage innovation, depriving society of certain goods and services *for example* , some companies discontinued for producing childhood vaccines because of liability lawsuits

- Risk causes worry and fear i.e fear of parents for theer teenage sons because of skiing trip

1-6 Techniques for Managing Risks ***(Methods of Handling Risks)***

It is known, that individual not only expose to risks, but the society as well. Thus, there is no escape from the presence of risks. So, the existence of risks is considered a source of discomfort to most individuals and enterprises, and the uncertainty accompanying them cause anxiety and worry. Consequently, the individuals and enterprises should accordingly seek methods of dealing with these risks in other words ***Techniques for Managing Risks***,. The optimal method to mange or to handle pure risks depends upon the nature of exposure units and the circumstances of individual or organization(enterprise) exposed to loss. Basically, individuals and organizations are dealing with risks by Two main ***Techniques, they are :***

First : **Risk Control** refers to techniques that reduce the frequency or severity of losses and comprise ***two*** major methods. They are:

1.6.1- Risk Avoidance: Risk avoidance means avoidance of activity that may lead to loss. That is, risk is avoided when the individual or organization refuse to accept the risk even for an instant.

Examples:

- The person can avoid the risk of drowning by staying away from water.
- The person can avoid the risk of divorce by not marriage
- The business firm can avoid the risk of being sued for defective product by not producing the product.
- The person can avoid the risk of death or disability in airplane crash by refusing to fly.

From *our viewpoint*, risk avoidance is a method of dealing the risk, but it is a negative rather than a positive technique. So, it is possible but it may not feasible. Not all risks should be avoided. For example, if you avoid the risks of death in airplane crash by refusing to fly by the airplane. How can you travel for example? To America or London, do you think, you can travel by car or bus, the answer, no. So, this method is not practical method.

1.6.2- Loss Control: By virtue of this method, the total amount of loss may be reduced. The total amount of loss is a function of loss frequency and loss severity. Thus, loss control represents *efforts* designated to reduce both frequency and severity of losses. These efforts generally have two objectives. They are:-

(i) Loss prevention (ii) Loss reduction.

I) ***Loss prevention:*** Loss prevention efforts are aimed at *reducing the probability of loss s*o that the frequency of losses is reduced.

Examples of loss prevention

- The number of heart attacks can be reduced if persons control their weight, give up smoking and eat healthy diets.
- The number of cars accidents can be reduced if the roads are lightning and motorists take a safe driving course.
- A boiler explosion in business can be prevented by periodic inspections by a safety engineer.
- Fires in factories can be prevented by forbidding workers to smoke in a building where highly flammable materials are used.

II) ***Loss Reduction:*** A loss reduction effort aims at *reducing* *the severity of loss*. In other words, loss reduction efforts are designed to lessen the severity of loss that does occur (i.e. after it occurs).

Examples of loss reduction:

- Factories can install sprinkler system at ceiling of stores, so that a fire will be promptly extinguished and consequently, the loss will be reduced.
- Factories can be constructed with fire resistant materials to minimize fire damage.

Finally, we can say loss control is not an alternative method to other methods of handling risks but it can used in additional to one or more of them.

Second : Risk Financing refers to techniques that provide for payment of losses after they occur and comprise ***three*** major methods. They are:

1.6.3-Risk Retention

Risk retention is considered the most common method of dealing with risk. It means the risks are kept (retained) by individuals or organizations exposed to them. It is known that individuals and organization face an unlimited array of risks. So, when nothing is done about these risks. That is individuals or organizations do not take positive action to avoid, reduce or transfer these risks. We can say, the losses involved in these risks are retained.

<u>Risk Retention</u> may be *deliberately* or *unintentionally*

I) *Deliberately Retention (*<u>Active retention</u>*)* : Means the individual is consciously aware of risk and deliberately plans to keep (retain) all or part of it. In other words, the individual perceives the risk and he does not like to transfer it or reduced it.

Examples of Deliberately Retention

- **A homeowner** may retain a small part of the risk of damage to home by purchasing a homeowners policy with substantial deductible.
- **Drivers of cars** may retain the risk of a small collision loss by purchasing a car insurance policy with a L.E. 500 or higher deductible.

Consequently, we can conclude, the deliberately retention may involve losses that are too small

II) *Unintentionally retention(*<u>PASSIVE retention</u> *)* : When the risk is not recognized, it is unintentionally retained

In these cases, the individuals who expose the risk , retain the financial consequences of the possible loss without realizing that they do so.

Example of unintentionally retention:

The workers who work in small factories in the city of RIYADH and they have earned income, but they are not insured against the risk of *permanent disability* under either an individual or group disability income plan. Therefore, those workers who are not insured against this risk are using the technique of risk retention in a most dangerous and in appropriate manner.

Notice : *Self Insurance* is a special form of planned retention by which part or all of a given loss exposure is retained by the firm

Our conclusion, risk retention is an appropriate for high frequency, low severity where potential losses are relative small. That is, risks that should be retained are risks that lead to relatively small losses.

1.6.4-Risk Transfer to Noninsurace Companies

By virtue of this method, the risk shifted to (transfer to) someone else other than insurance companies, and there are 3 mrthods ,they are

- **Transfer the risk by contract**

Example of risk transfer to noninsurance companies

- The risk of equipment breakage in laboratory in a school can be transferred to students by collecting 30 S.R "breakage fee" from all students in the school taking *chemistry classes* at the beginning of semester.
- The risk of a defective household appliances (Television – Receiver – Video – Stereo ….. etc) can be transferred to the retailer shop in exchange of responsibility for all repairs after the warranty expires.
    - Hedging is a technique for transferring the risk of unfavorable price fluctuations to a *speculator* by purchasing and selling futures contracts on an organized exchange
    - Incorporation of a business firm transfers to the creditors the risk of having

Our conclusion risk transfer to noninsurance companies is the sharing of risk by members of the group, but the most important and widely used means of transferring the risk is through insurance. That is the next method.

1.6.5- Insurance

The previous methods may not solve the problem of dealing with risks, but insurance can handle these risks by transferring them to an insurance organization. So ,**Insurance** is the most practical method for handling major risks, for most people and organizations because it has 3 characteristics, they are:-

- *Risk transfer* is used because a risk is transferred to the insurer.
- *The pooling technique* is used to spread the losses of the few over the entire group
- The risk may be reduced by *application of the law of large numbers* by which an *insurer* can predict future loss experience with greater xaccuracy.

Important concepts and terminologies to remember

Avoidance

Frequency of loss

Financial risk

Hazard

Insurance

Insurance policy

Insurance premium

Law of large number

Law of large numbers

Liability risks

Loss control

Loss exposure units

Loss preventions

Loss reduction

Mean

Measurement of risk

Moral hazard

Morale hazard

Peril

Personal risks

Physical hazard

Policyholders

Premium

Probability of loss

Property risks

Pure risks
Risk
Risk avoidance
Risk retention
Risk transfer
Severity of loss
Speculative risk
Standard deviation
Variance