Risk and its management

MODULE 1

What is risk ?

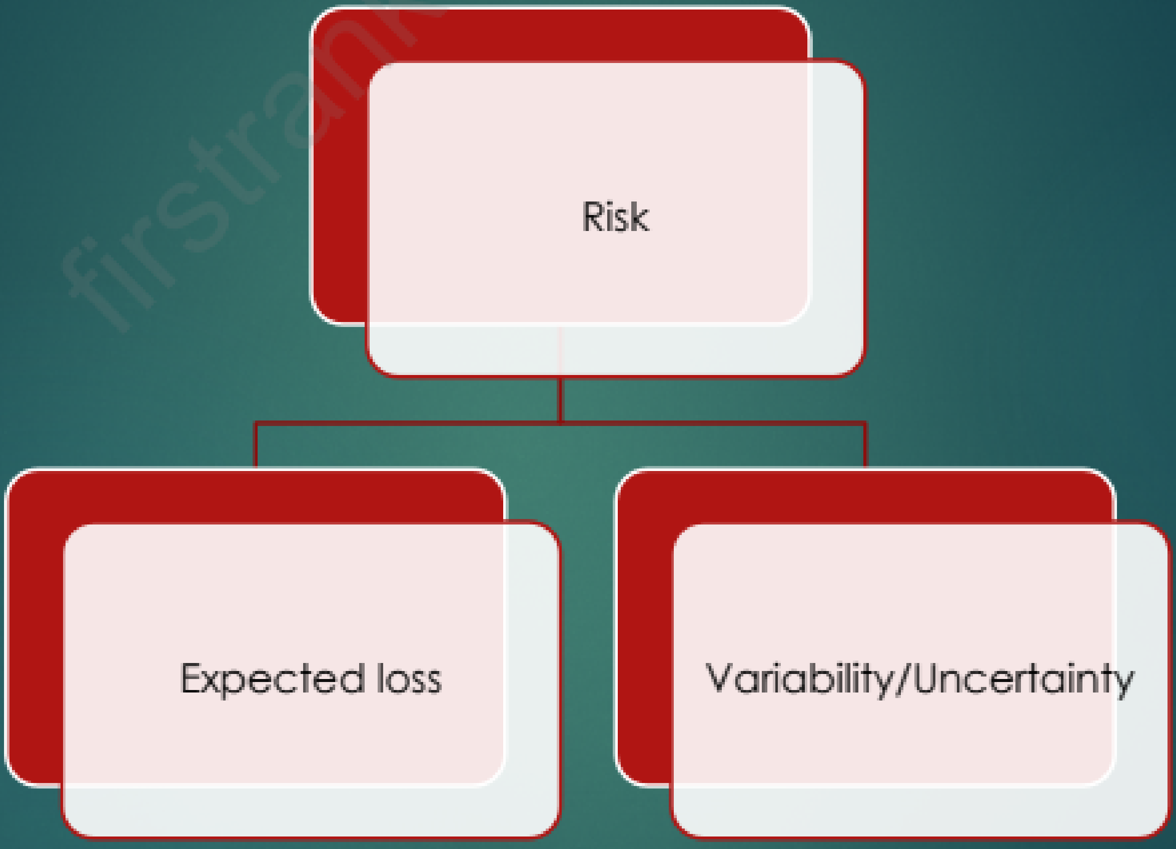
Risk is uncertainty about the outcome… in a g
sense

Possible *variability* in outcomes around *expected values*….Specific meaning us
events.

Expected value is outcome that would occu
average when a person or business is ex
repeatedly to the same type of risk.

Ex: Sachin's batting average is 67 based o
data. So the expected score he is likely to hit

However, there is a degree variability arou
value. He might duck out or hit a century.


Risk
Expected loss
Variability/Uncertainty

Risk v/s uncertainty

Risk	Uncertainty
Probability of the possible outcomes of the event is known	probability of th possible outco not known
Dispersion of the probability distribution is risk	Lack of confide that the estima probability distribution is co

Types of risks

- BUSINESS RISK

Business risk is possible reductions in value of business from a
source. Business value depends upon size, timing and risk va
in cash flows. Unexpected changes in future cash flows can
business risk.

There are three main risks involved in business:

Price risk, Credit risk and Pure risk

1. Price risk:

Refers to uncertainty over magnitude of cash flows due to p
changes in output and input prices. Analysis of price risk asso
with sale and production of existing and future products gai
strategic management. Three specific types of price risks are

Commodity price risk

Exchange rate risk

Interest rate risk (affects terms of credit, speed of repaymen
cost of borrowings)

Types of risk

2. Credit risk:

Risk that a firm's customers and the parties to which it has lent delay or fail to make promised payments is called credit risk. face credit risk from accounts receivables. Financial institution of default by borrowers. Firms carry risk of non-payment and bo Firms have to pay more to borrow money as risk increases.

3. Pure risk:

Risk management function traditionally concentrates on mana pure risk. Pure risk relates to losses associated with assets. It con

Damage to assets: (reduction of value of business assets due t damage, theft, and expropriation (seizure by foreign govt)

Legal liability: of harm to customers, suppliers, share holders, ot

Worker injury: risk of paying compensation and damages to em

Employee benefits: risk of death, illness and dis employees/families as per contracts/Acts.

Types of risk

4. Personal risk:

Earnings risk: refers to potential fluctuations in a family's ear
which can occur as a result of decline in in the value of an
earner's productivity due to death, disability, aging, or a ch
technology.

Medical expense risk:

Liability risk on auto and home

Risk of loss of value of physical assets like auto, home, boat
watercrafts, electronics. They can be lost stolen or damage

Risk of loss of value of financial assets like stocks and bonds

Longevity risk refers to retired people outliving their financia
resources.

This course…

- Much of this course talks about pure risk and its management.
- However, the principles and techniques discussed will apply to all types of risks.

Burden of risk

Risk results in certain social and economic eff

- Larger emergency fund: one needs huge fu take care of emergency requirements of re and loss of property. This affects business
- Loss of certain goods and services: becaus companies have discontinued manufactur certain goods and services. Eg: certain vac asbestos products, breast inplants, birth co devices due to fear of law suits
- Worry and fear: induced in the mind of peo when they encounter risk involved in jet flig writing exams, skiing etc

Sources of risk

External sources:

- Business factors
- Natural factors – earthquake, famine, cyclone, lightning,
- Political factors – change of govt, civil war, riot changes

Internal sources:

- Operational -
- Technological
- Human factors
- Technological
- physical

Degree of risk/objective risk

- Degree of risk is defined as relative variation of actual lo actual loss.
- Assume that out of 10000 houses, 1% ie 100 houses bun e In reality 110 houses or 90 houses may burn. Relative vari 10%. This is objective risk or degree of risk
- Objective risk declines with increase in number of expos specifically, objective risk varies inversely with the square number of cases under observation.
- Assume that 1 million houses are insured. Expected hous is 1% ie 10000. 10% relative variation is 100 houses. Objec therefore is 100/10000 = 1%
- Therefore square root of the number of house goes up 1 from 100 to 1000, the objective risk comes down to 10% original level.
- Objective risk can be statistically measured by measure dispersion like standard deviation. As the number of exp increases prediction will be more accurate as variation i

Risk management

- Risk management is the identification, asses and prioritization of risks followed by coord and economical application of resourc minimize monitor and control the prob and/or impact of unfortunate events.
- Jorin defined risk management as the proc which various risk exposures are iden measured and controlled.
- Risk management refers to the syste application of principles, approach processes to the tasks of identifying and ass risks and then planning and implementin responses.

Methods of risk manageme

- Broadly 3 methods:

- Loss control
- Loss financing
- Internal risk reduction

- 1 and 3 involves decisions to invest/not invest to reduce lo
while 2nd one refers to how to pay for losses if they do occ

1. Loss control

- Actions that reduce the expected cost of losses by r the frequency of losses and/or the severity (size) of l that occur are known as loss control. It is also somet known as risk control.
- Actions that reduce the frequency of losses are co called loss **prevention methods.** Eg: routine inspectio aircrafts. Actions that reduce the severity of losses a loss **reduction methods.** Eg: smoke detectors. Some eg: airbags in vehicles.
- There are 2 general approaches to loss control.

  - Reducing the level of risk activity (truck with toxic chemicals shifting over to other products)
  - increasing precautions against loss of activity

2. Loss financing

- Methods used to obtain funds to pay for or offs that occur is called loss financing
- Broad methods

- retention: business retains the right to pay up lo Also called self-insurance
- Insurance: pay premium and receive funds to r good losses. Risk transferred to insurers.
- Hedging: Derivatives like futures, forwards, opti swaps manage mainly the price risk.
- Other contractual risk transfers: indemnity take others (contractors) for damage/injury etc.

3. Internal risk reduction

- Businesses can reduce risk internally
- 1. Diversification: Businesses spread across different areas can help redu risk. Do not keep all eggs in the sam basket.
- 2. Invest on information: in order to superior forecasts of future cash flo thereby reducing variability.

Risk management process

- Identify all significant process
- Evaluate the potential frequency and se
  of losses
- Develop and select methods for manag
- Implement the risk management metho
  chosen
- Monitor the performance and suitability
  risk management methods and strategie
  an ongoing basis.

(Detailed explanations given in guide

Risk management by individ and corporations

- ASSIGNEMENTQUESTION

Objectives of risk managen

- To be consistent with corporate objectives of re
and safety
- To provide good service to customers
- Initiate action to reduce or prevent risk and its
- Minimise human costs of risk
- To meet statutory and legal obligations
- Minimise financial losses and claims
- Minimise the risks associated with new developr
and activities.
- To be able to make informed decisions and ma
choices on possible outcomes.

Need for a rationale for risk management in org

- ASSIGNMENT QUESTION

Cost of risk

- We know the actual cost only ex-post. Ex-ante estimate of loss is done on the basis of
- 1. expected loss
- 2. cost of loss control
- 3. cost of loss financing
- 4. cost of internal risk reduction
- 5. cost of any residual uncertainty that remains after 2,3,4 are implemented

Cost of risk

- 1. Expected loss = direct loss of the value of the asset + indir arising out of the event. If a house is destroyed additional in losses occur because of hotel expenses, additional food ex additional travel costs etc. This is in addition to the direct lo of house.

If a factory is destroyed, then,

- direct loss is the value of the factory, cost of repair, cost of p compensation,/claims, cost of defending liability claims.
- Indirect losses are:

- Loss of normal profit,
- Extra operating expenses
- Higher costs of funds
- Legal expenses and Bankruptcy costs
- Foregone investments
- Reorganisation and liquidating costs.

Cost of risk

- 2. cost of Loss control

Cost of actions that reduce the expected cost of los reducing the frequency of losses and/or the severity losses.

eg: cost of testing facilities, lost profit because of lim distribution of defective goods.

- 3. cost of loss financing:

Cost of methods used to obtain funds to pay for offset losses that occur is called loss financing. T includes cost of maintaining reserve funds for se insurance- tax on interest and opportunity cost, insurance premiums, transaction cost of arrangi negotiating and enforcing hedging arrangeme other risk transfers

Cost of risk

- 4. Cost of internal risk reduction methods:
- Transaction costs associated with achieving and managing diversification and cost of obtaining and analysing data to obtain more accurate cost forecasts. This may include consultancy costs of procuring more accurate data.
- 5. Cost of residual uncertainty:
- Cost of uncertainty left over after selecting and implementing loss control, loss financing, internal risk reduction is called cost of residual uncertainty. This increases the risk of business and increases the cost of holding that stock. Employees require higher wages.

Cost tradeoffs

- 1. Trade off between expected cost of direct/indirect loss and loss control costs
- 2. Tradeoff between expected cost of in loss and cost of loss financing /internal ris reduction
- 3. Tradeoff between cost of loss financin /internal risk reduction and cost of residu uncertainty.

An increase in the cost of one would red the cost of the other. Companies have to decide on the right mix of cost of each ri management tool.

Individual risk management a cost of risk

- Apart from pure risk under business risks, concep management applies to individual risk managem well. An individual would consider expected loss direct and indirect) from accidents, loss preventi activities (driving less at night), loss reduction act insurance , cost of gathering weather informatio would also consider cost of residual uncertainty depends upon the person's attitude towards risk
- Amount of risk management undertaken by an i depends upon degree of his risk aversion . Risk a the tendency to choose alternative with lesser o variability. Eg: 100, -100 v/s 1000, -1000 .
- Most people are risk averse. They are willing to p to reduce risk (more insurance). They also need

Risk management and societ welfare

- How to reduce the total aggregate cost c cost of losses, cost of risk control, loss finan internal risk reduction, and residual uncert
- Minimising the cost of risk for the society p an efficient level of risk. Efficient level is w the marginal benefit of risk reduction equ marginal cost of these methods.
- Maximising the value of resources with mi cost of risk makes the economy more effi
- Differential insurance premia in the societ differential taxes) works against maximisa wealth to some extent.

Risk management and societ welfare

- Minimising the cost of risk for a business do lead to minimising cost of risk to the societ works adversely as the employees/contra suppliers etc get exposed to more risk. The the business must build in the social cost o into its own private cost of risk. (Total cost society). Business value maximisation does result in minimising total social cost to soc
- Regulation from the governement legally care of the fact that businesses do not concentrate on reducing private cost to maximise profits which results in a higher r the society.