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## Risk identification



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#### **Risk identification**

Critical aspect of risk management Failure to identify risk exposures will to huge losses. There is no scientific method to identify risks and someti they may even bé unknown. It is us done on the basis of what is insural and on the basis of past experience "Risk identification is the process by which a business systematically an continuously identifies property, lia and personal exposures as soon as before they emerge" .... Williams a Heins www.FirstRanker.com



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#### **Risk identification**





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#### Identifying business risk exposures





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#### Types of property loss expos

- Direct loss: direct loss happening to the property eith or wholly on coming in contact with the incident . Eg P&M
- Indirect loss: indirect loss occuring while the direct do on some other property. Eg: factory being torn dowr facilitate rebuilding
- Net income loss: refers to reduction in net income (re expenses)
- Decrease in revenue may be because of loss of rent, interruption of operation, contingent business interrup (losses occuring because a loss eg loss of records)
- Increase in expenses: owing to spending extra mone wake of a damage. Eg: spending extra money to hire house/hotel room, spending extra money to continue the operation ./3P production.



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#### Value of exposures of physi assets

- Property insurance policies indemnifies insured on the basis of either... or...
- Actual Cash Value (ACV) : cost to repla repair damaged property less value of p depreciation and obsolescence.
- Replacement Cost : cost to replace or r damaged property with same or like-kin property WITHOUT any value of physical depreciation and obsolescence. Also c -instatement cost.

Value by second method is always high



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### Types of exposure to financia assets

- Risk of loss of financial assets like
- 1. credit exposure: debtors or accounts receiva to pay or delay payments. Bad-debts can lead losses. Delayed payments lead to loss of mone to interest cost.
- 2. currency exposure: involves losses in adverse movement of exchange rates. It affects compowhich are in international trade. Indirectly it also companies which have competitions from abro
- 3. country exposure: arising out of problems in t country of opeartion. Comprises of political risk, regulatory risk and economic risk.
- 4. Liquidity exposure: this refers to the risk of a fir asset like bond, debentures going illiquid.



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#### Features of financial asset

#### exposure

- Financial asset exposure depends upon its finan structure
- If the capital structure makes earnings unstable company may fail
- When company raises funds to finance its growth have impact on future earnings and stability
- Debt financing offers a low cost source of funds company and financial leverage to stock holder
- Large amounts of debt increases variability of ret the stock holders thereby increasing their risk
- Variability in returns is for shareholders is more in I firms than in unleveraged firms.



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#### Types of legal liability exposu

- Arising out of ownership/use/possession: puts onus to keep it risk free. And safe
- Arising from manufacture/distribution/sa owing to breach of warranty, defective product. May lead to penal provisions
- Arising from fiduciary relations: failure to discharge duty towards shareholders by directors
- Employers' liability: for job related injurie compensation to workmen. Usually disc by workmen compensation policies.



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#### Legal wrong

- A legal wrong is a violation of a person's legal r a failure to perform legal duty towards another or society.
- There are 3 broad categories of legal wrongs:

- a crime is a legal wrong against society and punishable by fines, imprisonment, death.

- a breach of contract is another legal wrong

- a tort is a legal wrong for which the remedy i form of money damages. It is a personal injury l Torts are of 3 types: intentional torts, absolute/s<sup>-</sup> liability and negligence.

A person who is harmed (plaintiff, claimant) ca for damages from the defendant or tortfeasor.



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#### Categories of legal liability

Criminal liability: comes under IPC generally directed at wrongs agai the society. Police begins the legal procedure and the court will impo penalty and/or imprisonment.

Civil liability: directed at wrongs ag individuals/organisations where on party files a liability suit against and Penalty in the form of indemnity for or punitive damages may be levie the court.



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#### Exposure of human assets/pers

- Exposure when employees/people get injured, reach old age, fall ill o jobs. Companies manage exposures either due to legal strictu as part of compensation/motivati employees.
- Employers resort to provisioning t pension, gratuity, life and h insurance cover and disability bene
- A special kind of risk is a key pe death or disability. Keyman insural available for this purpose.



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#### Exposure from external econo forces

- Losses arise from factors outsid the firm like,
- Changes in input/output prid changes in exchange rate, of financial distress experience important suppliers/buyers.



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#### Identifying personal risk expos





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#### Personal loss/injury exposures

- Loss of income to the family because of death of the family head
- Huge medical bills and loss of earnings during disability
- Insufficient income/assets durin retirement
- Loss of income from unemployr
   Identity theft



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#### Property loss exposures

- Direct physical damage to home/perso property because of fire, lightning, flooc earthquake, etc
- Indirect expenses arising out of above d physical loss like expenses for hotel, trav during period of reconstruction, loss of re of use of the building etc
- Theft of valuable personal property inclu money, securities, jewellery, electronics
- Direct physical damage to cars, Bykes, e from collision and non-collision reasons
- Theft of cars, bykes, and other vehicles



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#### Legal liability loss exposure

- Legal liability arising out of:
- Personal acts that cause bodily injury to others
- Libel, slander, defamation of character and similar exposure
- Negligent operation of vehicles
- Business or professional activitie
- Payment of attorney fees and a legal defense costs



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#### Probability and Statistics - cond

- Random Variable A variable whose outcouncertain. Eg: head or tail in a coin flip is uncertain.
- Discrete variable v/s continuous variable.
- All the possible outcome in a random varia their probabilities is identified in a probabilit distribution. This can be represented tabulc graphical. (propability of head and probal tail ccuring)
- In a graphical representation, you put outc on the X axis and probability on the Y axis.



Possible outcome for X	probability
\$1	0.5 or 50%
-\$1	0.5 or 50%





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# Another example Probability distribution for damages to your car.

Damages	Probability
0	0.5
500	0.3
1000	0.1
5000	0.06
10000	0.04







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### Characteristics of a probabilidistribution

In order to compare and analys different probability distributions following characteristics may be used:

Expected value

Variance and standard deviation

Skewness

Correlation



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#### Expected value

- Expected value of an outcome tells whe outcome tends to average
- Expected value
- = average
- = add up all (outcome\*probability)
- ► = x1p1+x2p2+x3p3+.....
- = Summation xipi (Sigma xipi)
- Graphically expected value = Mean car easily identified visually if the graph is symmetric.
- If not, it is a bit difficult. www.FirstRanker.com



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## What is the expected value damages?

Possible outcomes for damage (Rs)	probability
0	0.5
500	0.3
1000	0.1
5000	0.06
10000 www.FirstBanker.co	0.04



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## What is the expected value damages?

Possible outcomes for damage (Rs)	probability	xipi
0	0.5	0
500	0.3	150
1000	0.1	100
5000	0.06	300
10000 www.FirstRanker	0.04	400 to



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#### What is the expected liability

5000000 with probability of 0.
 1500000
 Loss of 500000
 0



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#### What is the expected liability

5000000 \* 0.004 = 20000
1500000 \* 0.025 = 37500
500000 \* 0.030 = 15000
0 \* 0.941 = 0
EXPECTED LIABILITY = 72500



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#### Variance & standard deviation

- Variance of a probability distribution provinformation about the likelihood and mag by which a particular outcome will differ f the expected value (or average)
- A low variance means that an actual out is very close to the expected value and a variance means that the actual outcome from the expected value.
- Variance = Sigma pi (xi-mu)<sup>2</sup>
- It is mathematically more convenient to w with the square root of variance which is a standard deviation.



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#### Solve...

What is the expected value outcome if you win Rs 1 for h and lose Rs 1 for tails; in a cc toss game?

Calculate the sample mean sample standard deviation is game is played 5 times with following results: T,T,H,T,H



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### $\blacktriangleright EXPECTED VALUE = 1*0.5+(-1)$ = () Sample mean = 1\*2/5 + (-1\*3)-0.2Sample standard deviation = root Summation pi(xi-mu)<sup>2</sup> ROOT OF 2/5(1-(-0.2))<sup>2</sup> + 3/5 $(-0.2))^2$ Root 0.96 = 0.98



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#### Skewness

Skewness measures the symme a distribution. A normal distribuhas zero skewness and is symme Most of the risk management distributions are skewed.

If one assumes a symmetric distribution then one would underestimate the likelihood of large losses which can be very harmful.



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#### Maximum probable loss

Maximum possible Loss is the maximum amount a firm may le given an incident. It is may be t total value of the assets

Maximum probable loss is the expected loss given the most lik probability of an event happen eg: MPL at 5% is 20 million, MPL 1% is 30 million







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#### Value-at-risk

- Value at risk is the value of the propert risk for a givedescribes probability distr for the value of a firm/portfolio that is s to loss.
- Fig 3.9; 5 million is the value at risk for a portfolio at 5% risk, the probability that firm will lose more than 5 million is 5% (c the left of 5 million is 0.05) similarly if 7.5 is the value at risk at 1% level, the prob that the firm will lose > 7.5 million is 1%
- Firms use value at risk concept to mea risk and rebalance portfolio by







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#### Normal distribution and VAR

Probability of VAR (mu+/-1.64 sigma) = 0.05
 Probability of VAR (mu+/- 2.3 sigma) = 0.01



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#### Correlation

- Correlation measures the relationsh between random variables.
- If the correlation between two rand variables is zero then they are not correlated. I means that knowing v of one will not reveal the value of the other. Eg: liability claims for an auto company and steel prices. They are independent or uncorrelated.
- on the other hand, demand for ne and steel prices are correlated.