Risk identification

MODULE 2

Risk identification

- Critical aspect of risk management. Failure to identify risk exposures will lead to huge losses. There is no scientific method to identify risks and sometimes they may even be unknown. ***It is usually done on the basis of what is insurable and on the basis of past experience***
- "Risk identification is the process by which a business systematically and continuously identifies property, liability and personal exposures as soon as or before they emerge" …. Williams and Heins

Risk identification

Identifying business risk exposures

1. Physical assets/property
2. Financial assets
3. Legal liability
4. Human assets/personnel
5. External economic forces

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 da 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.

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-kir property WITHOUT any value of physical depreciation and obsolescence. Also c -instatement cost.
- ~~Value by second method is always high~~

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 compa which are in international trade. Indirectly it als companies which have competitions from abr
- 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 fi asset like bond, debentures going illiquid.

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 variabilty of ret
the stock holders thereby increasing their risk
- Variability in returns is for shareholders is more in l
firms than in unleveraged firms.

Types of legal liability exposur

- Arising out of ownership/use/possession: puts onus to keep it risk free. And safe
- Arising from manufacture/distribution/sal 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 discl by workmen compensation policies.

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/st
liability and negligence.
- A person who is harmed (plaintiff, claimant) ca
for damages from the defendant or tortfeasor.

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 an Penalty in the form of indemnity fo or punitive damages may be levie the court.

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 insurar available for this purpose.

Exposure from external econo forces

Losses arise from factors outsic the firm like,

- Changes in input/output pric changes in exchange rate, c financial distress experience important suppliers/buyers.

Identifying personal risk expos

1. Personal loss/injury exposures
2. Property loss exposures
3. Legal liability loss exposures

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 during retirement
- Loss of income from unemploym
- Identity theft

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

Legal liability loss exposure

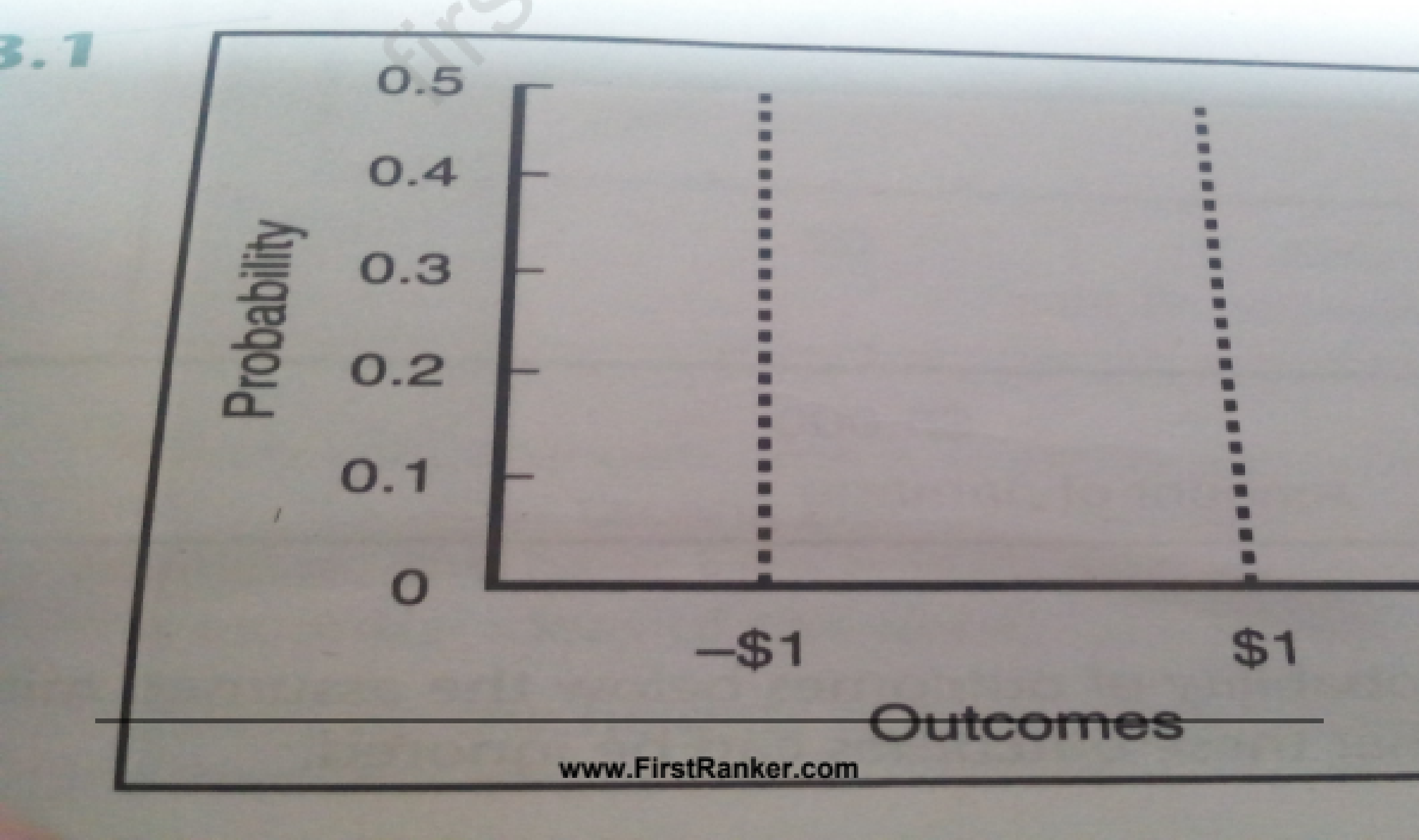
Legal liability arising out of:

- Personal acts that cause bodily injury to others
- Libel, slander, defamation of character and similar exposure
- Negligent operation of vehicles
- Business or professional activities
- Payment of attorney fees and other legal defense costs

Probability and Statistics - conc

- Random Variable – A variable whose outc uncertain. 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 tabula 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%

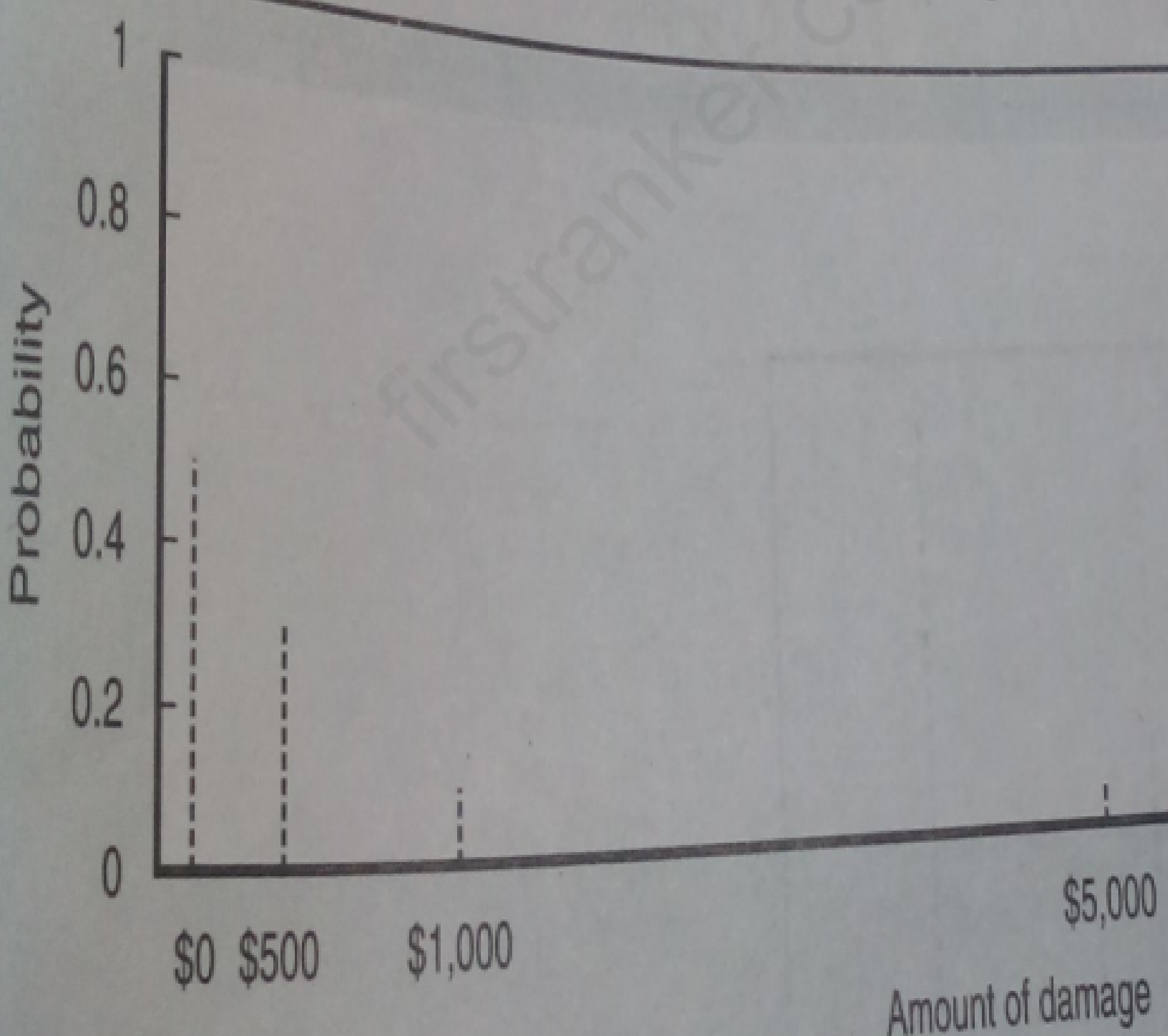


Another example

- Probability distribution for damages to your car.

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

...ility distribution for automobile damages.



Characteristics of a probabilit distribution

- In order to compare and analys different probability distributions following characteristics may be used:
- Expected value
- Variance and standard deviatio
- Skewness
- Correlation

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 ca
  easily identified visually if the graph is symmetric.
- If not, it is a bit difficult.

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	0.04

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~~	~~0.04~~	~~400~~ to

What is the expected liability

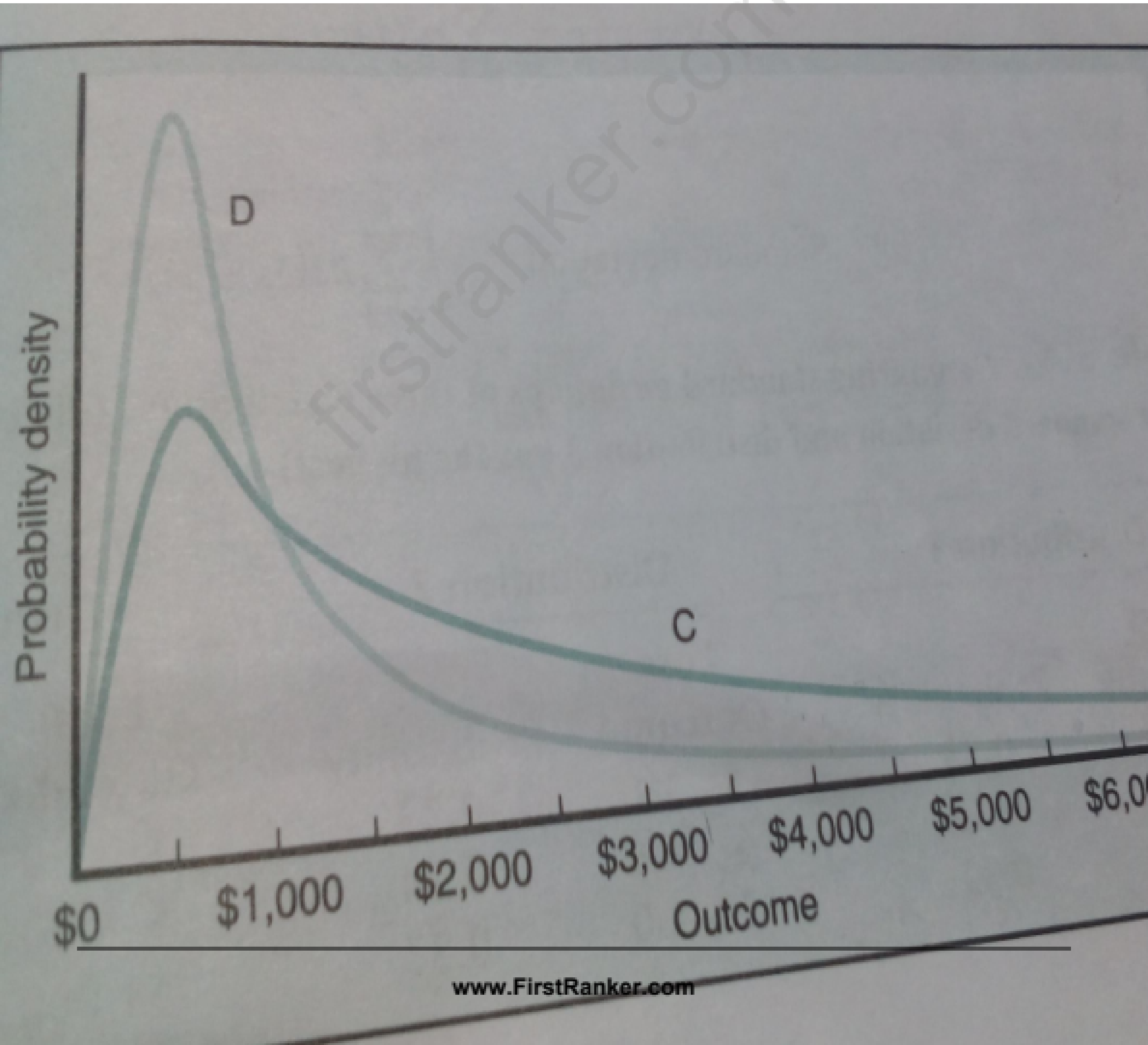
- 5000000 with probability of 0.
- 1500000 0.
- Loss of 500000 0
- 0 0

What is the expected liability

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

Variance & standard deviatio

- Variance of a probability distribution prov information 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 $(xi-mu)^2$
- It is mathematically more convenient to w with the square root of variance which is standard deviation.


D
C
Probability density
$0
$1,000
$2,000
$3,000
$4,000
$5,000
Outcome

Solve…

- What is the expected value outcome if you win Rs 1 for h and lose Rs 1 for tails; in a co toss game?
- Calculate the sample mean sample standard deviation i game is played 5 times with following results: T,T,H,T,H

- EXPECTED VALUE = 1*0.5+(-1
= 0
- Sample mean = 1*2/5 + (-1*3
-0.2
- Sample standard deviation =
root Summation pi(xi-mu)^2
- = ROOT OF 2/5(1-(-0.2))^2 + 3/5
(-0.2))^2
- Root 0.96 = 0.98

Skewness

- Skewness measures the symme
a distribution. A normal distribut
has zero skewness and is symm
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.

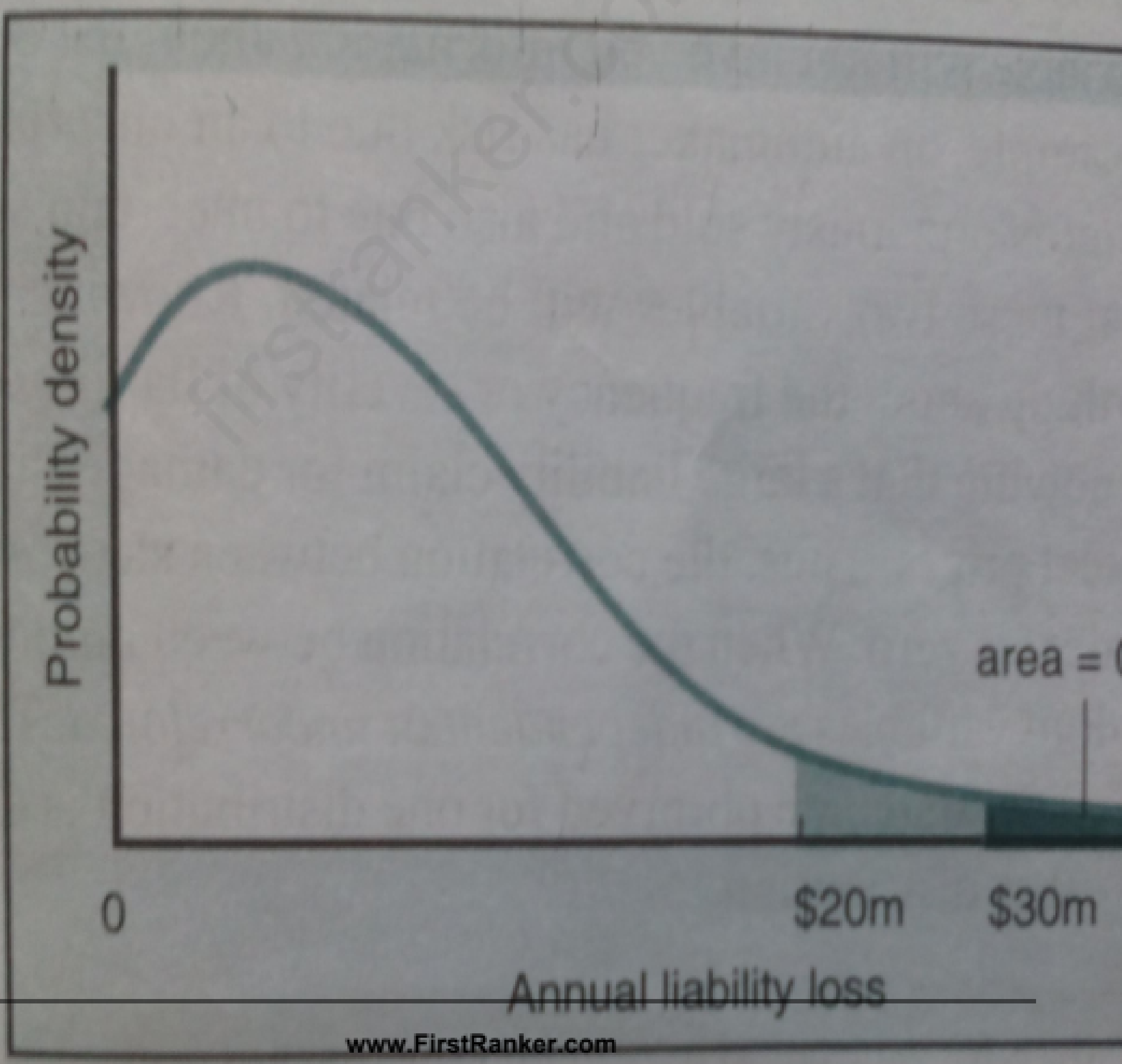
Maximum probable loss

- Maximum possible Loss is the maximum amount a firm may lo 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

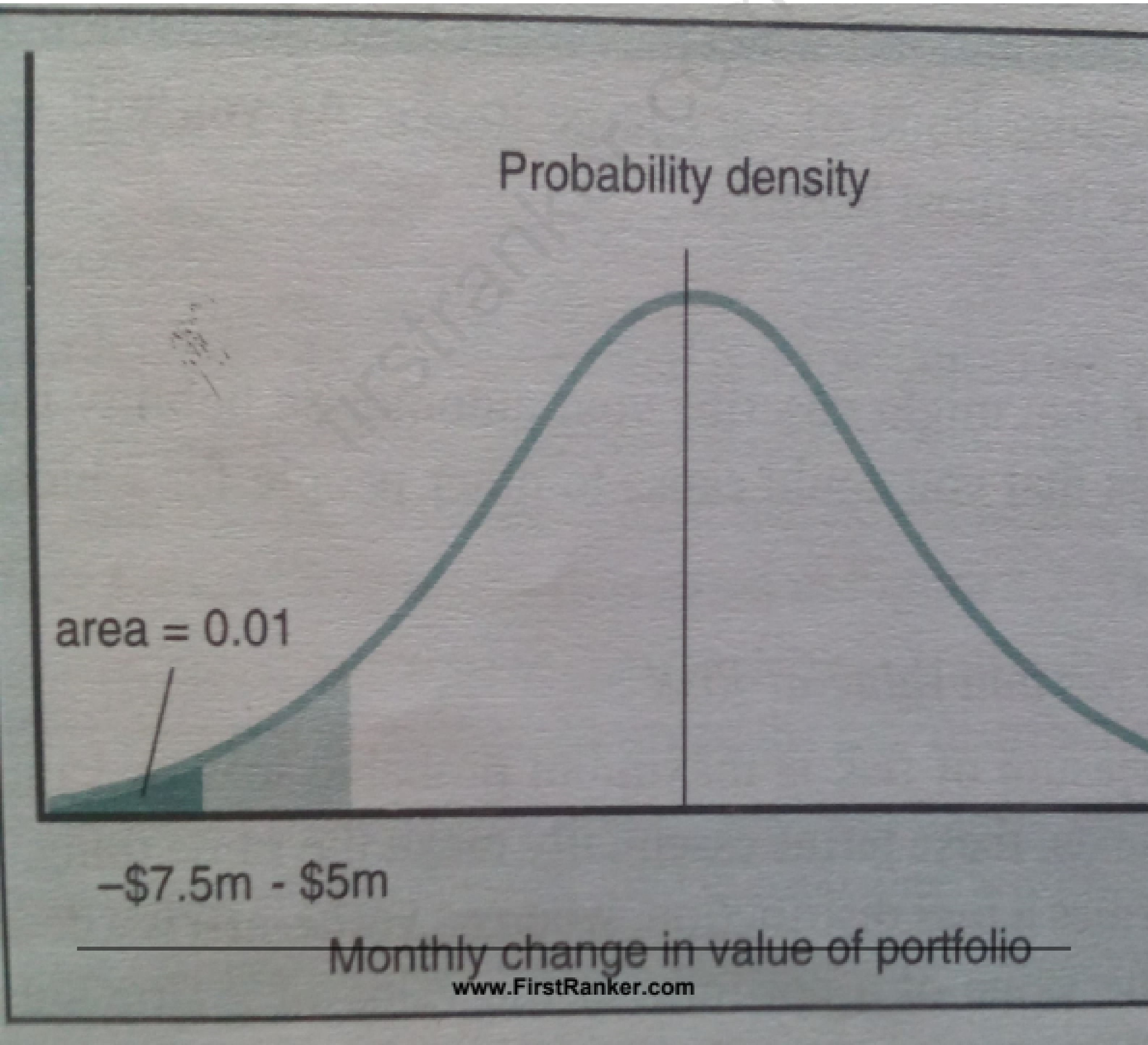
.8

oss.



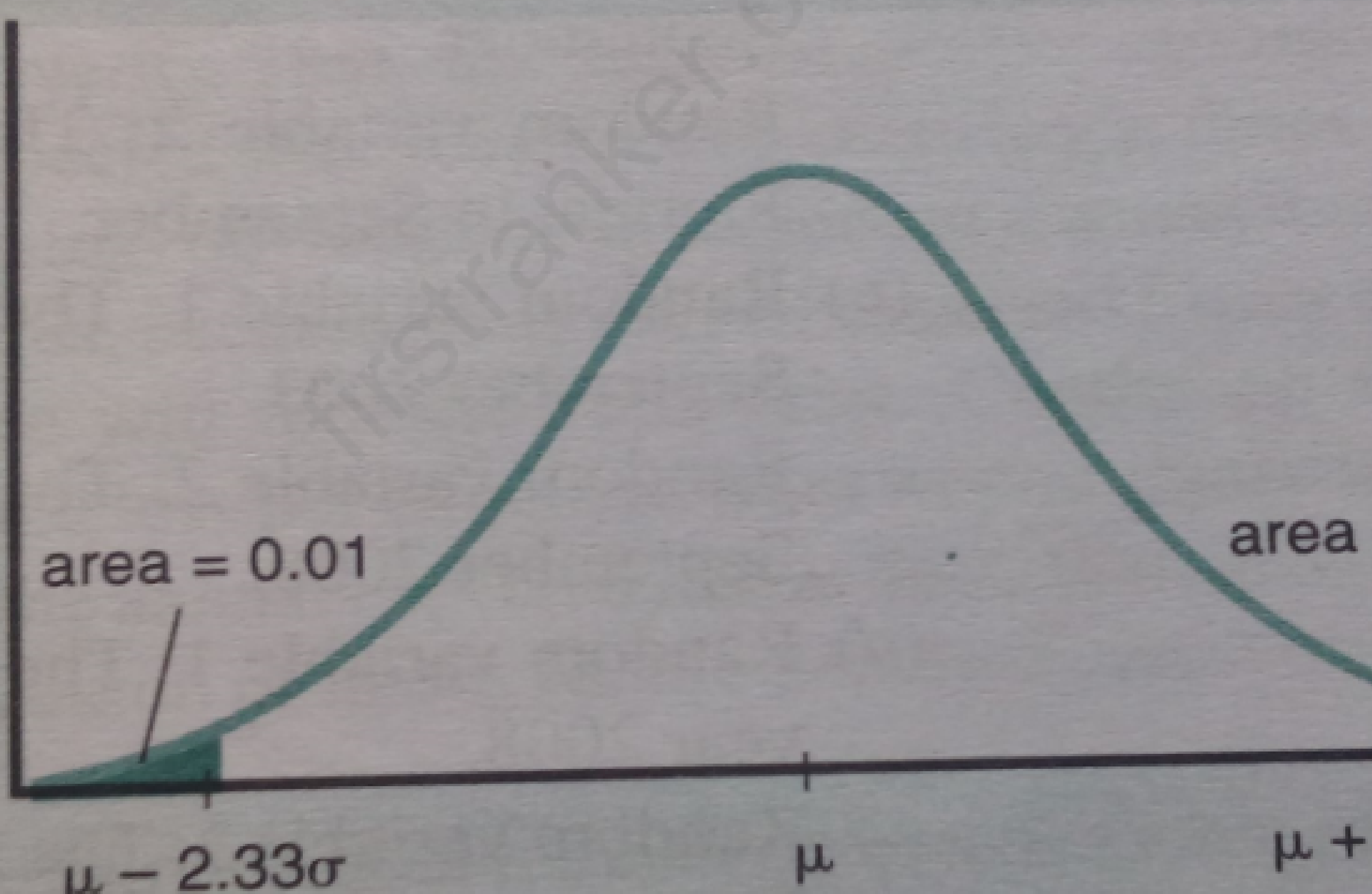
Value-at-risk

- 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%(a
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


Probability density
area = 0.01
–$7.5m - $5m
Monthly change in value of portfolio

Normal distribution and VAR

- Probability of VAR (mu+/-1.6
sigma) = 0.05
- Probability of VAR (mu+/- 2.3
sigma) = 0.01



Characteristics of the normal distributio

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 va
of one will not reveal the value of th
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.