BIMSTEC Course

Resource Mobilisation and Financial Management on Railways

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Financial Risk Management

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Structure of the Session

- Quick review of basics
- Some Concepts
- Tools for a Financial Engineer
- References

Quick Review of Basics

- Criteria for making investment decisions
- Assumptions

Making investment decisions

- Non-Discounting
  - Urgency
  - Payback
  - Accounting Rate of Return
- Discounting
  - Internal Rate of Return
  - Benefit-Cost Ratio
  - NPV

Assumptions

- Future is known and certain, that is,
  - Gestation period
  - Cash flow
  - Life of project
  - Discount rate

$$NPV = -I_0 + \sum_{t=1}^{n} \frac{C_t}{(1+r)^t}$$

Reality…

- Future is unknown and uncertain, that is,
  - Do not know when project will get completed
  - Do not know what cash flow will be there
  - Do not know how long will assets last
  - Do not know how the market will behave

$$\tilde{NPV} = -\tilde{I}_0 + \sum_{t=1}^{\tilde{n}} \frac{\tilde{C}_t}{(1+\tilde{r})^t}$$

Some Concepts

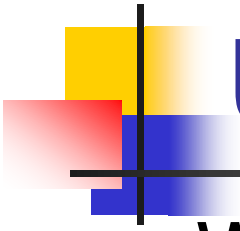
- Certainty
- Risk
- Uncertainty
- Probability

Certainty

- Outcome of each action can be determined and ordered precisely
- Choose the alternative that leads to the outcome which yields highest utility/value

Risk

- When only knowledge concerning the outcome state is their probability distribution
- Use this information to optimize over utility function



Uncertainty

- When we do not have any knowledge about the probability of outcome(s)
- Use fuzzy decision rules

Probability

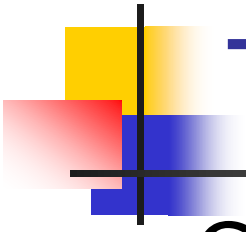
- Possibility/chance that a particular event will occur
- Example
  - Probability of a Head/Tail on toss of a ‘fair’ coin is 0.5/0.5

How to manage Risk?

- Avoidance
- Loss control
- Retention
- Insurance
- Non-insurance transfer

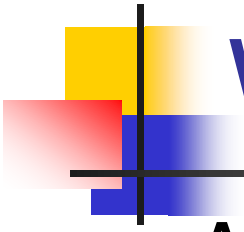
Non-Insurance Transfer

- Incorporation of a business firm
  - Limited liability v/s partnership v/s sole proprietorship
- Transfer by contract
  - Service contract, long term lease, etc.
- Hedging
  - 'Financial Engineering'



Tools for a Financial Engineer

- Generic name - Derivatives
  - Forwards
  - Futures
  - Options
  - Swaps

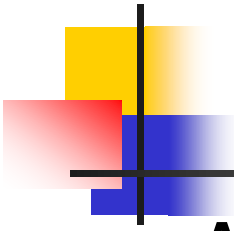


What is a derivative?

- An instrument whose value depends on the values of other more basic underlying variable(s)

Why do we need them?

- To hedge risks
- To speculate (take a view on the future direction of the market)
- To lock in an arbitrage profit
- To change the nature of a liability
- To change the nature of an investment (without incurring the costs of selling one portfolio and buying another)

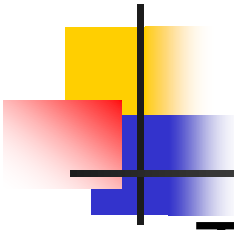


Forwards

- An agreement to buy/sell an asset at a certain price in the future at a certain price
- Custom made contract
- Enforcement could become problem

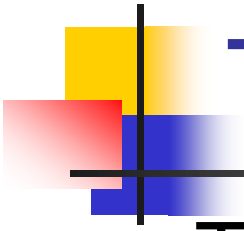
Futures Contract

- An agreement to buy or sell an asset at a certain time in the future for a certain price
- By contrast in a spot contract there is an agreement to buy or sell the asset immediately (or within a very short period of time)
- Organized market – 'Exchanges'



Futures Price

- The futures prices for a particular contract is the price at which you agree to buy or sell
- It is determined by supply and demand in the same way as a spot price



Terminology

- The party that has agreed to buy has a long position
- The party that has agreed to sell has a short position

Forwards vs. Futures

- Private contract between 2 parties
- Non-standard contract
- Usually 1 specified delivery date
- Settled at maturity
- Delivery or final cash Settlement usually occurs

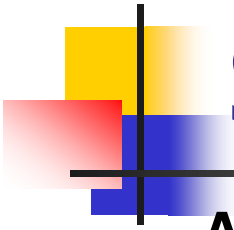
- Exchange traded
- Standard contract
- Range of delivery dates
- Settled daily
- Contract usually closed out prior to maturity

Options

- A call option is an option to buy a certain asset by a certain date for a certain price (the strike price)
- A put option is an option to sell a certain asset by a certain date for a certain price (the strike price)

Options vs. Forwards/Futures

- A futures/forward contract gives the holder the obligation to buy or sell at a certain price
- An option gives the holder the right to buy or sell at a certain price



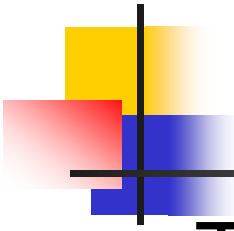
Swaps

- An agreement to exchange cash flows at specified future times according to certain specified rules
- Possibilities -
  - Interest Rate
  - Foreign Currency
  - Commodity
  - A combination of the above

Why Swaps?

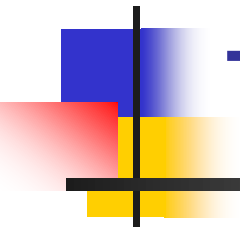
- Comparative Advantage
  - AAACorp wants to borrow floating
  - BBBCorp wants to borrow fixed

	Fixed	*Floating*
AAACorp	10.00%	6-month LIBOR + 0.30%
BBBCorp	11.20%	6-month LIBOR + 1.00%



References

- This is an ever growing area. Typical textbooks are:
- John C Hull
  - Options, Futures, and Other Derivatives
  - Introduction to Futures and Options Markets
- Salih N. Neftci
  - Principles of Financial Engineering



Thanks!