



How is Valuation of a Company done?

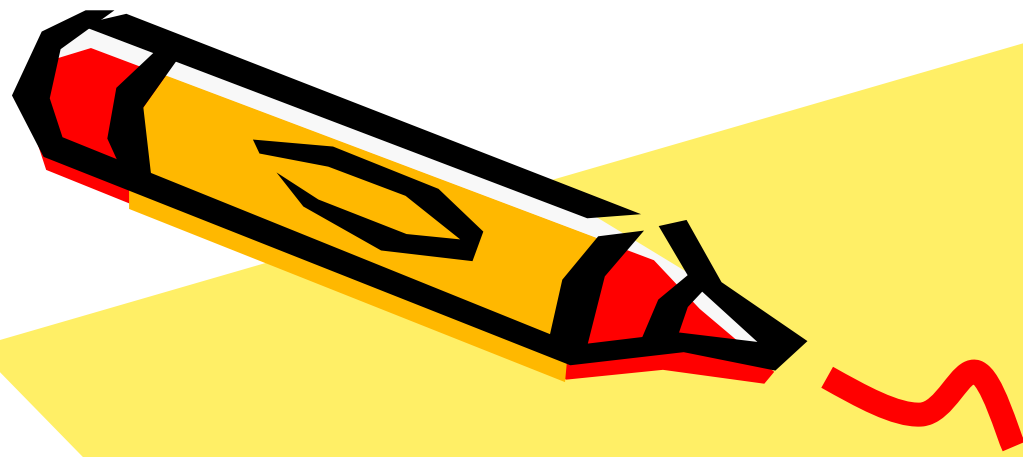
Balance Sheet, Scenario 1 (on books)

ASSETS	Amount	LIABILITIES	Amount.
Book Value of Assets	100	Debt (Lenders Money)	0
		Equity (Shareholders Funds)	100
Total	100	Total	100

Balance Sheet, Scenario 1 (in market value terms)

ASSETS	Amount	LIABILITIES	Amount.
Market Value of Assets	80	Debt (Lenders Money)	0
		Equity (Shareholders Funds)	100
Total	80	Total	100

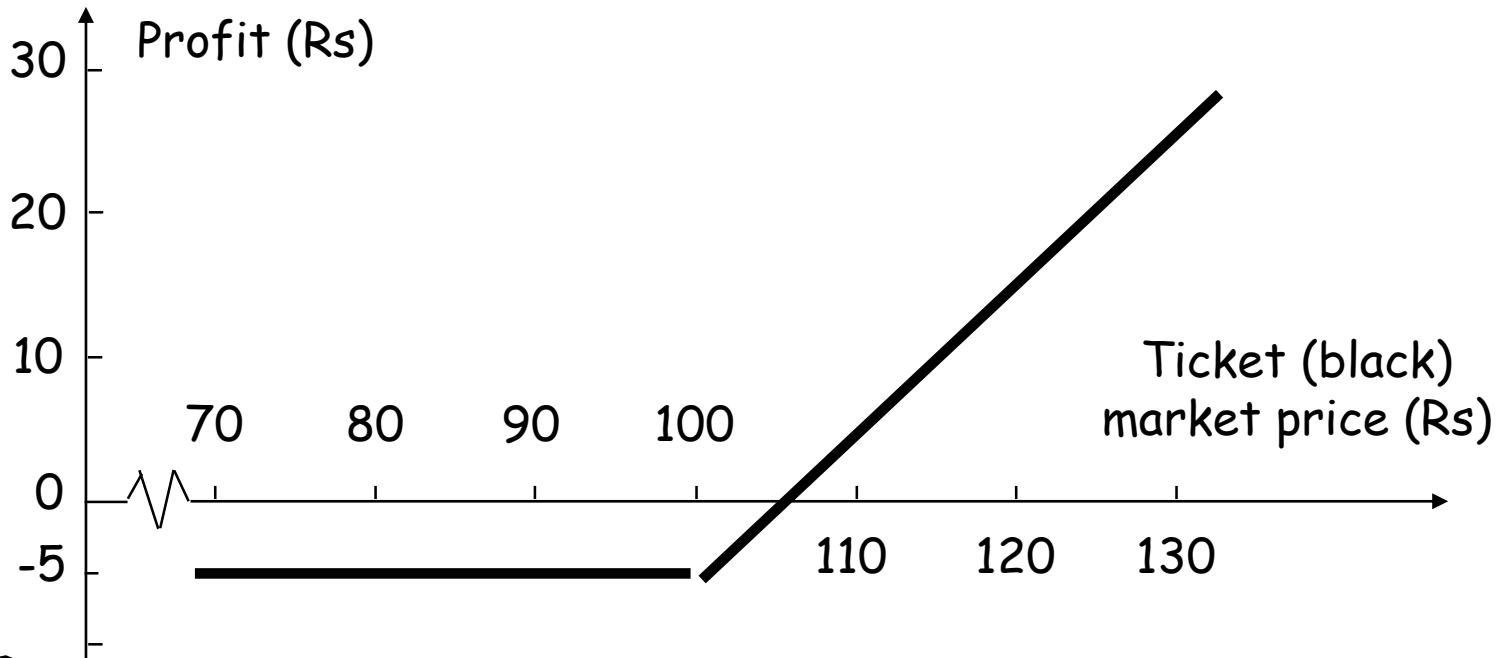




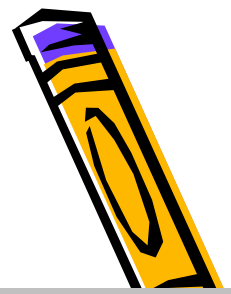
What is the Value of a
Railway Ticket (if black
marketing is permitted)?



Real Options Valuation



Option Obligations

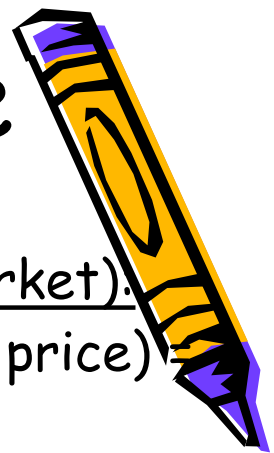


	Buyer	Seller
Call Option	Right to buy asset	Obligation to sell asset

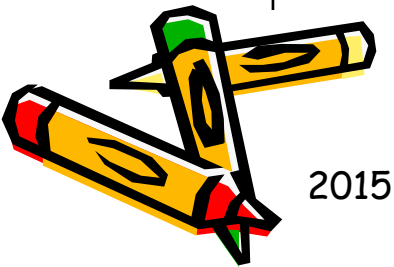
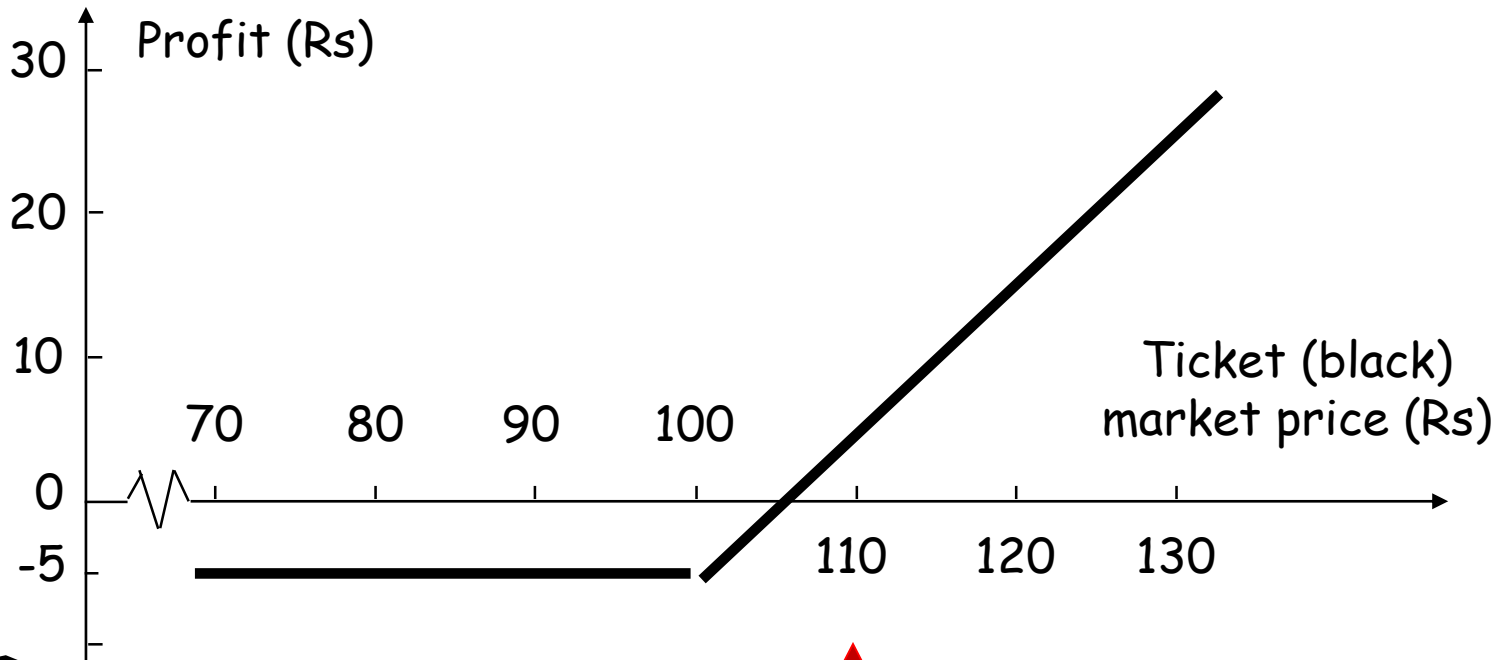
Option buyers have the right to buy (or sell) assets but option sellers are obligated to sell (or buy) the assets



Long Call Option Value



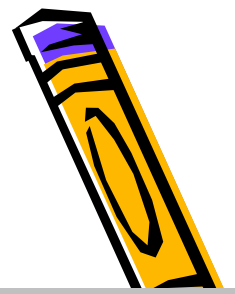
Profit from buying an call option (railway ticket black market).
option price (cancellation charge) = 5, strike price (ticket price) = 100, option life = 2 months



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Option Obligations



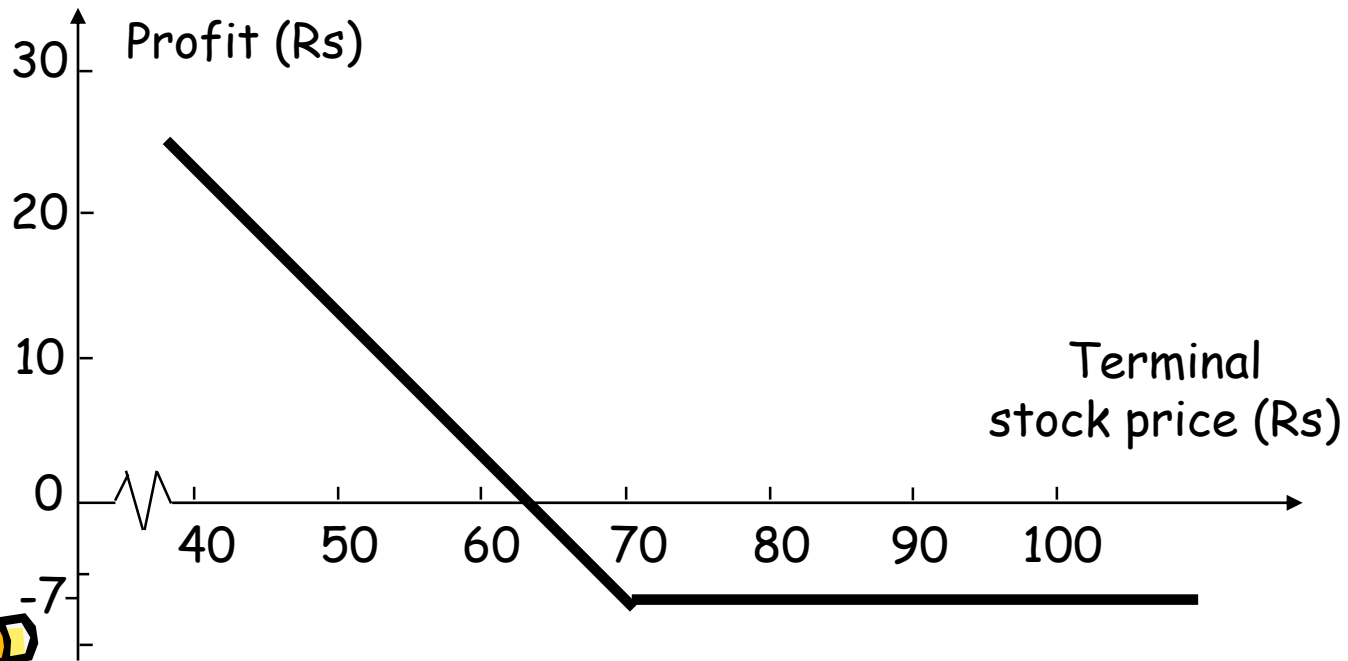
	Buyer	Seller
Call Option	Right to buy asset	Obligation to sell asset
Put Option	Right to sell asset	Obligation to buy asset

Option buyers have the right to buy (or sell) assets but option sellers are obligated to sell (or buy) the assets



Long Put Option Value

Profit from buying an put option: option price = 7, strike price = 70, option life = 3 months



Option Value Determinants

	Call	Put
1. Asset price	+	-
2. Exercise price	-	+
3. Interest rate	+	-
4. Volatility in the asset price	+	+
5. Expiration date	+	+

The value of a call option C_0 must fall within

$$\max(S_0 - E, 0) \leq C_0 \leq S_0.$$

The precise position will depend on these factors.



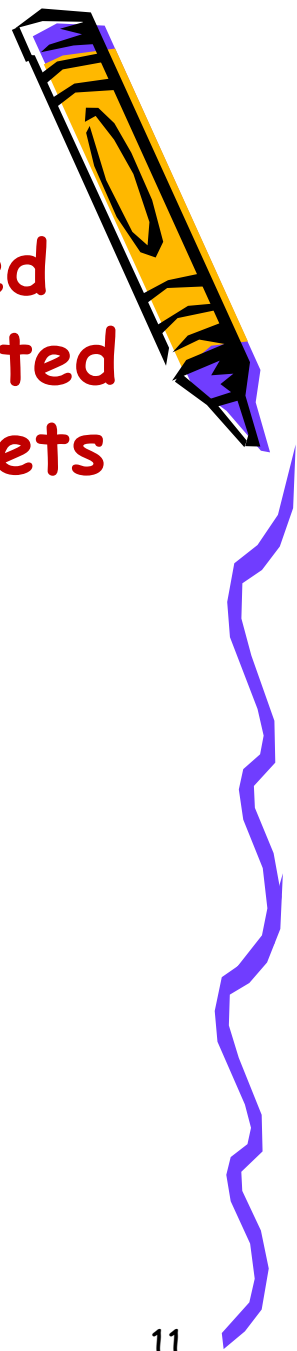


How do we decide on land value (price to pay)?

◆ Illustration: Value a Firm with an unused asset i.e., Land (say, a sick company listed on the stock market - with no other assets worth talking about)

- ◆ Land Price Rs 100 crores
- ◆ Outstanding Debt Rs 80 crores
- ◆ Life of the Option 10 years
- ◆ Standard Deviation 40%
- ◆ Riskless rate 10%

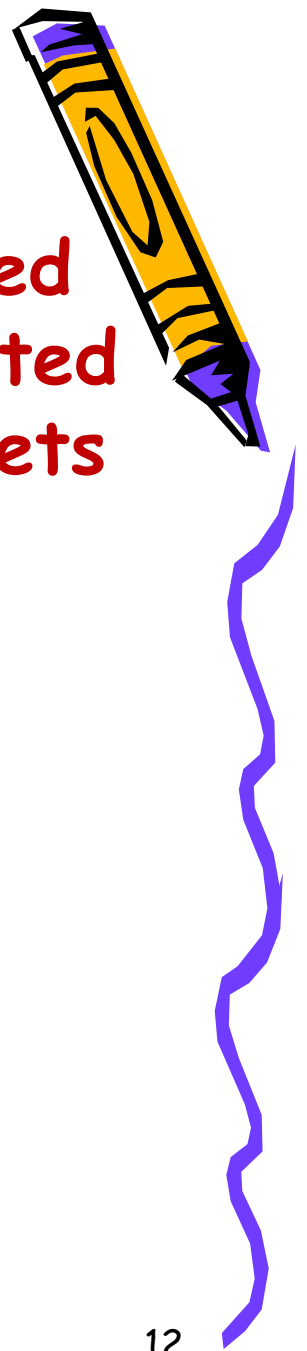
Value of the call option 75.94



◆ Illustration: Value a Firm with an unused asset i.e., Land (say, a sick company listed on the stock market - with no other assets worth talking about)

- ◆ Land Price Rs 50 crores
- ◆ Outstanding Debt Rs 80 crores
- ◆ Life of the Option 10 years
- ◆ Standard Deviation 40%
- ◆ Riskless rate 10%

◆ Value of the call option 29.86



◆ Illustration: Value a Firm with Land (say, a sick company listed on the stock market - with no other assets worth talking about)

◆ New Project by our Real Estate Company
(Topic: Lenders Vs Equityholders)

◆ Negative NPV Project ... & also more Volatile

◆ Land Price Rs 98 crores

◆ Outstanding Debt Rs 80 crores

◆ Life of the Option 10 years

◆ Standard Deviation 50%

◆ Riskless rate 10%

◆ Value of the call option 77.03





How is Valuation of a
"Sick Company" is done?



FIRM VALUE

- ◆ Present Value of Future Cash Flows from Existing Projects, *plus*
- ◆ *NPV of all future projects, plus*
 - ◆ In other words, if Jaiprakash Gaur Group announces a Rs 700 crores NPV project then its value should go up by that amount (i.e., share prices).
- ◆ Plus, Real Options in all the above projects



Managerial Real Options

Management flexibility to make future decisions that affect a project's expected cash flows, life, or future acceptance.

$$\text{Project Worth} = \text{NPV} + \text{Option(s) Value}$$





How is Valuation of a
"Power Sector Company"
with 2-Phase done?

Traditional Approach to Valuation - Illustration

Green field project ~ ingredients

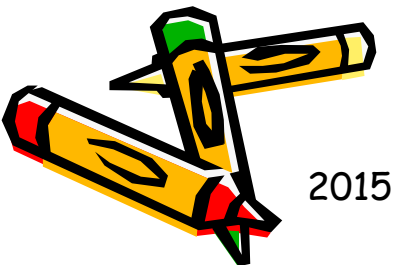
Initial Cash Invested

Project Cash Flows

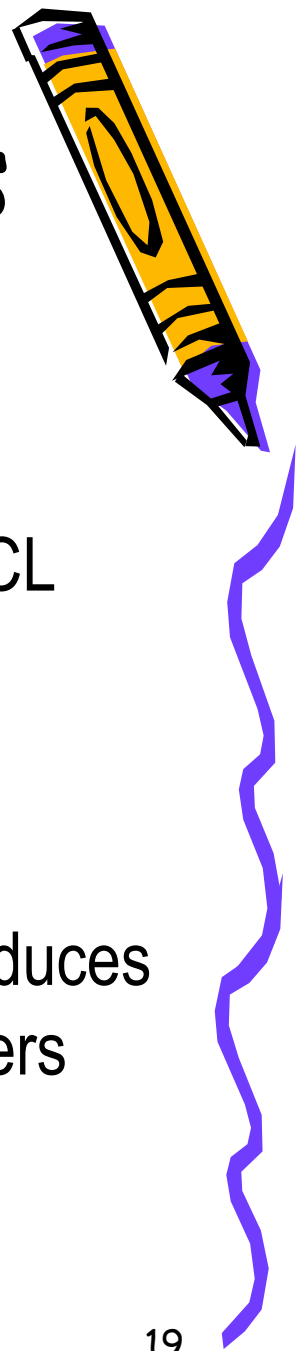
say, a Green field power project



Year	0	1	2	3	4	5	6	7	8	9	10	11	Total
Invested	-1100	-200	-1300	-300	-100								-3000
Operations		100	200	300	350	350	350	350	350	350	350	350	
Terminal Value												4550	
FCF	-1100	-100	-1100	0	250	350	350	350	350	350	350	4900	
IRR	14.5%												
Land Value	3%	-90											



Managerial Real Options



Expand (or Contract)

- Allows the firm to expand (contract) production if conditions become favorable (unfavorable) - GACL

Abandon

- Allows the project to be terminated early - Enron

Postpone (timing option)

- Allows the firm to delay undertaking a project (reduces uncertainty via new information) - Power Producers



Example of Natural Resources Valuation



- ✓ ONGC would bid based on ...
- ✓ The timing option in an offshore project (oil exploration field - a) not to develop; b) develop the reserve immediately; and c) postpone development and thus extend exploration phase;





Valuing Natural Resource Options: Inputs

- (a) Available reserves of the resource
- (b) Estimated cost of developing the resource
- (c) Time to expiration of the option
- (d) Variance in value of the underlying asset
- (e) Operating cash flow on underlying asset
- (f) Periodical Leakages (if any)



◆ Illustration: A Coal mine in Meghalaya

◆ Estimated inventory of 1 million tonnes. | Capacity output rate: 50,000 tonnes per year | Price of coal is expected to grow 3% a year | Firm owns rights to this mine for 20 years | Cost of opening the mine is Rs 1 crore | Average production cost is Rs 250 per tonne | Production cost is expected to grow by 5% | Riskless interest rate 9% | Standard Deviation in Coal Price 16% | Current market price of coal Rs 375 per tonne

◆ Value of the underlying asset is Present value of expected coal sales **Rs. 211 m**

◆ Exercise Price is Cost of opening the mine + present value of the cost of producing coal **Rs. 174 m**

◆ Dividend yield is loss in production for each year of delay 5%

◆ Value of the coal mine as a call option **Rs. 51.73 m**

◆ If you use capital budgeting then value is **Rs. 37.24 m**

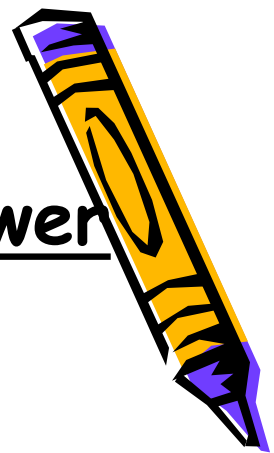


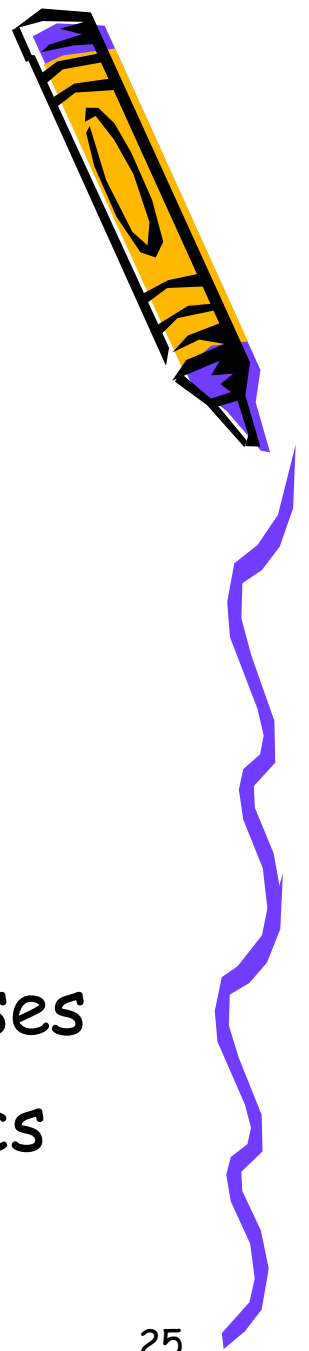
Illustration: Oil Reserve in Krishna-Godavari Basin

- ◆ Estimated Oil Reserve is 50 million barrels
- ◆ Present Value of the development cost \$12 per barrel (with 2 years of development lag)
- ◆ Firm owns rights to exploit the reserve 20 years
- ◆ Cost (Marginal value) per barrel of oil is \$12 per barrel
- ◆ Riskless rate 8%
- ◆ Standard Deviation in Oil Prices 9%
- ◆ Dividend yield 5%
- ◆ S \$544 and X \$600
- ◆ call option value \$97 million

Use of Real Options in this traditional Power Plant project for

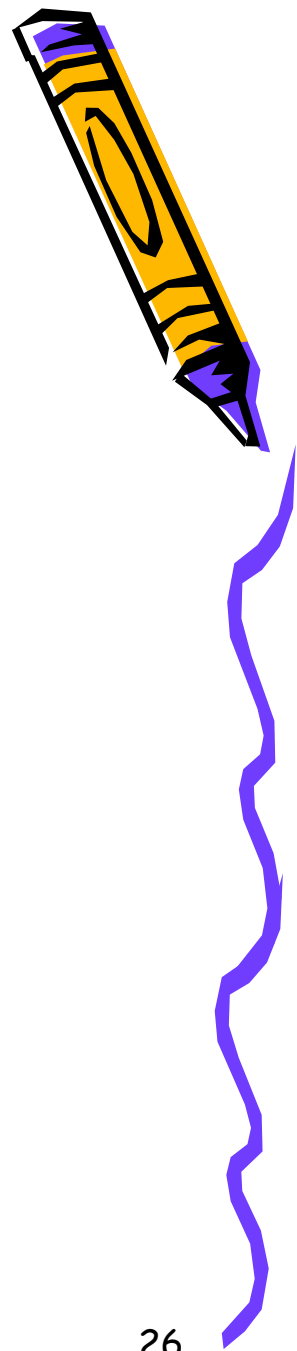
- (a) Pricing of land
- (b) Stretching the payments and sharing the upside
- (c) Acquiting of coal mines (in bidding)
- (d) Limiting the downside by creating put options (such as, making two phases of the power plant project)





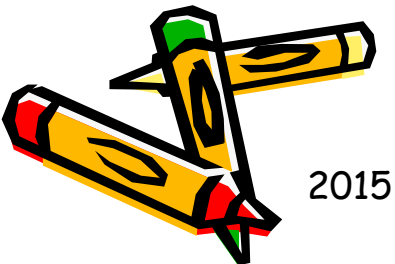
- ◆ Why Real Options in Land Acquisitions?
- ◆ Land is scarce; can use for multiple purposes
- ◆ Allocation of scarce resources is economics



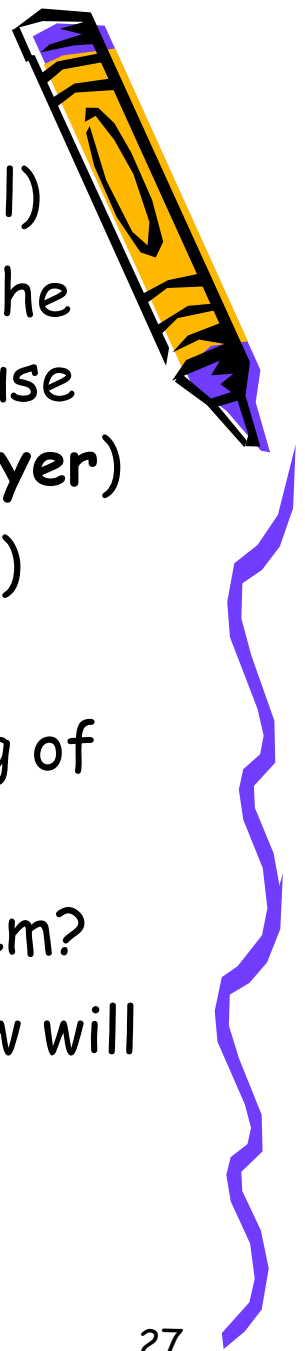


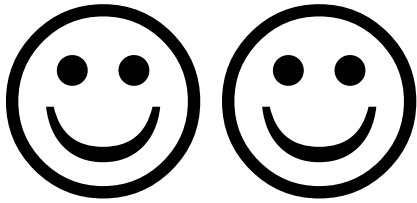
◆ Illustration: Project to develop land for commercial purpose

- ◆ Value of the underlying land Rs 500 crore
- ◆ Present value of cost of developing land Rs 400 crores
- ◆ Time to expire 25 years
- ◆ Standard Deviation of land prices 20%
- ◆ Riskless rate 7%
- ◆ Dividend Yield 4%
- ◆ Call value Rs 155 crores



- ◆ How does pricing of land take place:
- ◆ From a sellers perspective? (it is a one time deal)
- ◆ From a buyers perspective? (one should get at the cheapest possible price - pitch it as a national cause rather than self-gains cause **ALSO call option buyer**)
- ◆ From a state governments (and/or local people's) perspective? (Usually call **option writer**)
- ◆ Can the deal happen? What are the final sharing of gains or losses?
- ◆ Are there any gains? If yes, who would take them?
- ◆ What are the pay-offs (to each party)? And how will that be shared?





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