



Corporate Investment Appraisal

Masters in Finance

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Problem Set 2 (to solve in class):

Valuation of Financial Options (Introduction)

1. During next year the price of stock W can increase 19% or go down 16%. Currently the value of a stock is 100. The annual riskless interest rate is 4%.
 - (a) What is risk neutral probability of the scenario (state) “up”?
 - (b) What is the value of a European call option on a share of company W , with an exercise price of 90 and time to maturity 1 year?
 - (c) Based on put-call parity, compute the value of a put option on stock W , with time to maturity of 1 year and a strike price of 90.
 - (d) Determine the value of a put option on stock W with time to maturity of 2 years and an exercise price of 90.

2. The shares of firm Y have an annual volatility of 60% and are currently valued at \$50. The firm is not expected to pay dividends within the next 12 months. The annual risk-free interest rate (continuous compounding) is 10%.
 - (a) What is the value (BS) of a European call option on a share of firm Y , for a 1 year maturity, and with a strike price of \$50?
 - (b) What is the value (BS) of a European put option on a share of firm Y for a maturity of 1 year, and with an exercise price of \$50?

3. Consider the same data of problem 2, regarding firm Y: The annual stock volatility is 60%, and the current share price is \$50. No dividends are expected for the coming year. The annual riskless rate (continuous compounding) is 10%.
- (a) Make an estimate of parameters “u” and “d” of the binomial model for the stock price of firm Y, with an interval (time step) of 1 year. Estimate also the annual risk neutral probability of each state (u,d).
 - (b) Re-compute the value of the European call with maturity of 1 year and an exercise price of \$50, based on the binomial model.
 - (c) Repeat this valuation, considering quarterly intervals.