

Corporate Investment Appraisal

Masters in Finance

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Fall Semester

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Problem Set 3: Valuation of Financial Options

Guidelines to Solutions

1. The annual volatility of the return of company CJ's stock is 40%. Currently CJ's stock price is €4.25. The risk-free interest rate is 2% per annum (continuous).

Stock	
Sigma	0,4
S	4,25

Interest Rate	
Rf	2%

- (a) Compute the risk neutral probability of the scenario "up" in the context of the binomial model (1 year time step).

U	1,491825
D	0,67032
P	0,425903

- (b) What is the value of a European call option on a share of company CJ, with a strike price of €5.2 and time to maturity of 1 year? Use the binomial model.

Call	
K	5,2
T	1

Stock Tree	Year	0	1
		4,25	6,340255
			2,84886

Call Tree	Year	0	1
		0,476022	1,140255
			0

- (c) Estimate the value of a put option on a share of company CJ, with expiry date in 3 years time and an exercise price of €5.0.

Put	
K	5
T	3

Stock Tree	Year	0	1	2	3
		4,25	6,340255	9,458549	14,1105
			2,84886	4,25	6,340255
				1,909648	2,84886
					1,280075

Put Tree	Year	0	1	2	3
		1,516003	0,681189	0	0
			2,188668	1,210509	0
				2,991345	2,15114
					3,719925

2. The shares of firm MC have an annual volatility of 30% and are currently priced at \$5.0. There is no expectation of a dividend in the coming year. The riskless annual interest rate is 3% (continuous).

Stock	
Sigma	30%
S	5

Interest Rate	
Rf	3%

- (a) What is the value (BS) of a call option on share of firm MC, for a maturity of 1 year and an exercise price of \$6.5?

Call	
T	1 year
K	6,5

Using Black-Scholes

d1	-0,62455
d2	-0,92455

N(d1)	0,266134
N(d2)	0,177601

Call	0,210384
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