

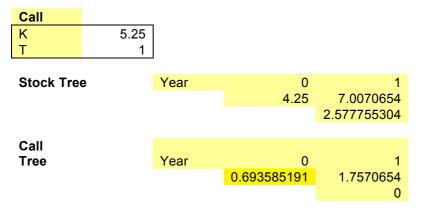
Corporate Investment Appraisal Masters in Finance 2015-2016 Fall Semester Clara C Raposo

Problem Set 3: Valuation of Financial Options

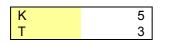
- The annual volatility of the return of company CJ's stock is 50%. Currently CJ's stock price is €4.25. The risk-free interest rate is 3% per annum (continuous).
- (a) Compute the risk neutral probability of the scenario "up" in the context of the binomial model (1 year time step).

u	1.648721271
d	0.60653066
р	0.406762323

(b) What is the value of a European call option on a share of company CJ, with a strike price of €5.25 and time to maturity of 1 year? Use the binomial model.



(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.



Stock Tree	Year	0 4.25	1 7.0070654	2 11.55269777	3 19.04717855
			2.577755304	4.25 1.563487625	7.0070654 2.577755304 0.948303181
Put Tree	Year	0 1.723817963	1 0.802819283 2.443808705	2 0 1.394498028 3.288740043	3 0 2.422244696 4.051696819

- The shares of firm MC have an annual volatility of 40% and are currently priced at \$4.0. There is no expectation of a dividend in the coming year. The riskless annual interest rate is 3% (continuous).
- (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 \$6.0?

		_
Т	1	year
K	6	

Using Black-Scholes

d1	-0.73866277
d2	-1.13866277
N(d1)	0.230055899
N(d2)	0.127421918
Call	0.178287407

(b) What is the value (BS) of a European put option on a share of Firm MC, with expiry date in 8 months time, and with an exercise price of \$6.0?

Put	
Т	0.67
К	6
d1	-1.016941719
d2	-1.343540352
N(d1)	0.154590578
N(d2)	0.089548535
Call	0.09
Put	1.97

 Consider again the data of problem 1, regarding company CJ: The annual stock volatility is 50% and the stock price is currently €4.25. No dividend is expected for the coming year. The riskless annual interest rate is 3% (continuous).

Re-compute the value of a call option with maturity of 1 year, with an exercise price of €5.25, based on the binomial model, considering intervals of four months (each branch is 4 months long).

Stock		_			
Sigma	0.5				
S	4.25				
Rf	3%				
				l	
Number of in	tervals	Ν	3		0.00
					0.33 3333 Time
Time to matu	rity	т	1	Dt	333 Step
Strike	Linty		I	DI	JJJ Step
Price		к	5.25		
u	1.334658074		0.20		
d	0.749255573				
		1			
р	0.445496208				
		•			
Stock					
Tree	_		_		
Month	0	4	8	12	
	4.25	5.672296814	7.57057674	10.10413137	
		3.184336186	4.25	5.672296814 3.184336186	
			2.385881634	1.787635111	
				1.707033111	
Call Tree					
Month	0	4	8	12	
	0.55180128	1.148816044	2.372815113	4.85413137	
		0.08215234	0.186259688	0.422296814	
			0	0	
				0	
		0.08215234		0	