LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

Corporate Investment Appraisal

Masters in Finance

2016-2017

Fall Semester

Clara C Raposo

Problem Set 10: Solutions

Valuation of Warrants, Rights and Convertible Bonds

HAND IN SOLUTIONS – CLASS OF DECEMBER 12TH, 2016

1.

N	4	million
N*Price	20	million
m	0,7	milion
Unit Price Warrant	6	
r	2	
K	5,5	
T	5	
sigma	0,3	
Rf	1%	

Price	5

a.

Lambda	0,259259259	
d1	0,552025823	
d2	-0,11879457	
N(d1)	0,709534669	
N(d2)	0,452719055	
Call	7,70	
Warrants	1,9954319	million
Each warrant	2,850616999	

b.

Share Price	5,551142025

c.

Ojective:B26=B6		
B26-B6	-3,149383001	"Tools"/"Goalseek"
Solution	2,177	

Explain.

d. Going back to the initial data, re-compute the value of the warrants using the binomial model (building a tree with 5 periods).

u	1,349858808
d	0,740818221
p	1,349858808

Tree "V" t=0	1	2	3	4	5
24,2	32,6665	44,09	59,52	80,34	108,4
	17,9278	24,2	32,66	44,09	59,52
		13,28	17,92	24,2	32,66
			9,838	13,28	17,92
				7,288	9,838
Tree Call					5,399
7,91921535	13,8630	23,43	37,95	58,56	86,45
	3,35250	6,531	12,34	22,31	37,52
		0,894	2,043	4,668	10,66
			0	0	0
				0	0
Warrants	2,053	mill			0
Each warrant	2,93304				

2.

N	2	million
mrK	2	million
Price	4	
m	2	million
r	?	
T	0,25	
K	4	
Fee Bank	0,4	million
sigma	0,3	
Rf	1%	

(a)
mrK=2 million
2*r*4=2

r	0,25	you need 4 shares to buy 1 new share

(b)

Lambda	0,2		
d1	0,091666667	considering fee fair-priced…	
d2	-0,058333333		
N(d1)	0,536518559		
N(d2)	0,476741558		
Call	0,49	million	considering fee fair-priced
Rights	0,097547786	million	

Right	0,048773893

(c)

Shares	7,902452214	million	considering fee fair-priced
Share	3,951226107		

(d)

Put	0,467764	million	considering fee fair-priced
Fee	0,093552782	million	THIS should be the fair price…

3.

Convertible Bond:		
Coupon	4,50%	
T	5	years
par		
Face Value	1000	
m	100000	
K	8	

Shares:	
N	40000000
Price	6
sigma	0,25

Market:	
Rf	1,00%
yield_standard	5%

(i) V(Straight Bond)

97294456,91

PV(Coupons) 19414378,6

(ii) Warrant Component

Inputs:

Lambda ?

mrK=8*100000

r	125
Lambda	0,238095238

V	320585621,4
F/Lambda	420000000
T	5
Rf	1,00%
sigma	0,25

d1	-0,11422787
d2	-0,67324486

N(d1)	0,454528579
N(d2)	0,250395761

Call	45678124,38
Warrants	10875743,9

(iii) Convertible Bonds

108170200,8

Comment.