University of Lisbon

ISEG

GESTÃO FINANCEIRA II

Problem Set 3

Licenciatura – Undergraduate Course

1st Semester 2017 - 2018

GESTÃO FINANCEIRA II

PROBLEM SET 3 | Chapter 19, 20 & 21 – Valuation and Financial Optioms

SUBMISSION DEADLINE: 11-12-2017, from 12:00H to 15:00H | Premises: Miguel Lupi's building at the reception desk

Your report must be written using a word processor as handwritten answers may not be considered. On Aquila you can find a template with the frontpage to answer the problem set. Its usage is mandatory.

1- (80 points) Pitagoras Company's management has the following information regarding the years 2014 to 2016.

	2014	**2015**	**2016**
Sales	22.500	24.750	26.730
Cost of goods sold	15.750	17.325	18.711
Other costs	2.250	2.475	2.673
EBITDA	4.500	4.950	5.346
Depreciation	2.025	2.066	2.107
EBIT	2.475	2.885	3.239
Tax at 25%	619	721	810
Profit after tax	1.856	2.163	2.429
Change in working capital	150	180	225
Investment (change in gross fixed assets)	2.700	3.200	3.250

For the projections, the management has made the following estimates:

- Sales growth rate is: 2017=6%; 2018=8%; 2019=6%; 2020=5% and 2021=5%
- Cost of goods sold is in average 70% of sales each year.
- Other costs are in average 10% of sales.
- Depreciation growth rate is 2% per year.
- Change in working capital (€,000) for the period is: 2017=80; 2018=95; 2019=110; 2020=127 and 2021=155.
- Investment growth rate is 2% per year.
- The WACC for Pitagoras is 10% and the long run growth rate after year 2021 is 3%.
- The company has 6,5 million euros debt and 1 million of shares outstanding.

What is the value per share?

2- (20 points) The table shows you a book balance sheet for the company Alphabeta.

Cash	180	Bank loan	680
Accounts receivable	420	Accounts payable	265
Inventory	100	Current liabilities	945
Current assets	700	Long term debt	1.975
Real estate	2.600	Equity	600
Other assets	220		
Total	**3.520**	**Total**	**3.520**

The company uses short term bank loans with a financial cost of 7% and secured debt with a financial cost of 5%. The company has 12 million shares outstanding. The stock price is 20 euros. The expected return on common stock is 15%. Calculate Alphabeta WACC. Assume that the book and the market values of the company's debt are the same and the marginal tax rate is 25%.

3- (15 points) In April 2014, a 18 month European Call on stock of XPTO with an exercise price of 120 euros, sold for 35.55 euros. The stock price was 120 euros. The risk-free interest rate was 4%. How much would you be willing to pay for a put on XPTO stock with the same maturity and exercise price? Assume that XPTO doesn't pay a dividend.

4- (85 points) Balalaya Corporation is a non-dividend company that is currently traded at €8 per share and has a standard deviation of 35%. The one-year risk-free interest rate is 2% and will remain constant in the nearby future. The company's stock has a three-month call option with a strike price of €8.5.

a. (25 points) Using the Binomial Model, calculate the price of mentioned call option. Consider a three timesteps tree. Use both replicating portfolio valuation and risk neutral valuation.

b. (25 points) Find now the value of the corresponding put option, using a binomial model. Use replication portfolio or risk neutral valuation at your will. Confirm the result with the put-call parity.

c. (25 points) Use also the Black-Scholes model to calculate the value of these call. Compare this price with that estimated in a), explaining eventual differences between them.

d. (10 points) Explain the difference between the risk-neutral and actual probabilities. In which states is one higher than the other? Why?