



## **CORPORATE INVESTMENT APPRAISAL**

**MASTERS IN FINANCE**

**EXAM**

**11 JANUARY 2018**

**2 HOURS + 15 minutes**

**INSTRUCTIONS TO READ BEFORE STARTING ANSWERING THE QUESTIONS**

1. Please fill in your name and student number.
2. The exam has 5 groups of questions, with marks clearly indicated.
3. You may use one A4 sheet of paper with notes.
4. The cumulative Normal distribution table is attached at the end.
5. You may un-staple the Normal table, and the scrap paper. Nothing else.

Good Luck!

Name \_\_\_\_\_ No. \_\_\_\_\_

### **PROFESSOR CLARA RAPOSO'S VIP AREA:**

<b>GROUP</b>	<b>GRADE</b>	<b>COMMENT</b>
<b>I (5 points)</b>		
<b>II (5 points)</b>		
<b>III (3 points)</b>		
<b>IV (4 points)</b>		
<b>V (3 points)</b>		
<b>TOTAL (20)</b>		

**GROUP I (5 points)**

*3Billboards* is a U.S. manufacturer of swimwear. It considers launching a new line of sports swimwear named *Angela*, for which the company already spent \$ 250 000 in research and development. Starting production of the new sports swimwear collection *Angela* requires investing today in new equipment that will cost \$500,000 and will last for five years. The equipment will be fully depreciated, straight line, at the end of 5 years. In order to make a final investment decision, *3Billboards* has estimated two scenarios for its consolidated income statement, a first scenario without the new project, and a second scenario including project *Angela*. It is also well-known that in this line of business, the annual net working capital is approximately 15% of total revenues. The forecasted annual income statements are presented below, and are supposed to be constant during the 5 years of this project.

<i>3Billboards'</i> Forecasted Annual Income Statement	without project <i>Angela</i>	with project <i>Angela</i>
Revenues	\$ 12,000,000	\$ 15,000,000
Cost of Sales	6,000,000	7,500,000
Selling, General & Admin Expenses	2,500,000	3,000,000
Depreciation	1,000,000	1,100,000
EBIT	2,500,000	3,400,000
Interest Expenses	750,000	750,000
Net Income	1,137,500	1,722,500

(I.a) (1.75 points) Compute the annual free cash flows of the project. Show your computations.

Tc=35%

t	0	1	2	3	4	5	6
EBIT	0	900000	900000	900000	900000	900000	
EBIT (1-Tc)	0	585000	585000	585000	585000	585000	
Deprec	0	100000	100000	100000	100000	100000	
CapEx	500000	0	0	0	0	0	
NWC	0	450000	450000	450000	450000	450000	0
Increase in NWC	0	450000	0	0	0	0	-450000
FCFFt	-500000	235000	685000	685000	685000	685000	450000

(I.b) (1.75 points) Considering *3Billboards'* Cost of Capital of 18%, should the company invest in project *Angela*? Explain your answer.

NPV@18%                      \$1 427 450,41    larger than zero. Excellent project. Go ahead.

(l.c) (1.5 points) How does this project *Angela* compare with an alternative project, known as *Hayes*, that would generate an equivalent annual annuity of \$ 475,000, with a life of 3 years, and a cost of capital of 15%? Explain your answer.

Annuity fact 5,18%	3,127171021	2,283225117	A 3, 15%
Equivalent Annuity	\$456 467,01	€475 000,00	
Perpetuity	\$2 535 927,84	€3 166 666,67	NO NEED
	\$1 427 450,41	\$1 084 531,93	NPV
	Angela	Hayes	

NPV

If it's one shot, actually Angela is better

EA

Hayes is better: higher equivalent annuity and lower risk.  
So Hayes better in the long run.

**GROUP II (5 points)**

Consider the following financial information regarding the *GetOut Corporation*:

**GetOut Corp.'s Market Value Balance Sheet (€ Millions) and Cost of Capital**

Assets		Liabilities&Equity		Betas	
Cash	50	Debt	750	Debt	0.3
Other Assets	1050	Equity	350	Equity	1.75
<i>Corporate Tax rate <math>\tau_c</math></i> 35%					

The company is now analyzing a new project called *Armitage* with estimated expected cash flows:

**GetOut.'s New Project *Armitage* Free Cash Flows (€ thousands)**

Year	0	1	2	3
Free Cash Flows	(550)	275	650	0

Assume that this new project is of average risk for the *GetOut Corp.* and that the firm wants to hold constant its debt to equity ratio. Currently the risk-free interest rate is 3.0% and the expected market risk premium is 5.75%.

(II.a) (1.25 points) Should *GetOut Corp.* invest in the new project *Armitage*? Explain.

E	350
D	700
E+D	1050
Bd	0,3
Be	1,75
Tc	35%
Rf	3%
Rm-Rf	5,75%
Re	13,0625%
Rd	4,725%
Rwacc	0,064016667

NPV €282,59 Should invest

(II.b) (1.25 points) What are the annual free cash flows to equity associated with project *Armitage*? Show your computations.

t	0	1	2
FCFFt	-550	275	650
VL	€832,59	€610,89	€0,00
D	€555,06	€407,26	€0,00
Net Borrowing	€555,06	-€147,80	-€407,26
Interest Expenses	0	€26,23	€19,24
ITS	0	9,179336353	6,735091869
FCFet	€5,06	€110,15	€230,23

(II.c) (1.25 points) What is the present value of the interest tax shields of project *Armitage*? Show your calculations.

Ru	7,50%
PV(ITS)	€14,37
OR	
Vu	€818,23
VL-Vu	€14,37

(II.d) (1.25 points) Suppose that *GetOut Corp.*'s CFO, Mr. Chris Washington, considers that if project *Armitage* were unlevered, its free cash flows to the firm in years 1 and 2 would be 20% higher. What is your estimate of the present value of the costs of financial distress of this project under the scenario of financing considered for questions a), b) and c)? Explain by showing your computations.

Unlevered

t	0	1	2
FCFFt	-550	330	780
Ru	7,50417%		
NPV unlevered	431,8719645		
NPV unlevered - NPV a)	149,28		
PV(ITS)	€14,37		
PV(FDC)	€163,65		
OR			
t	0	1	2
FDC	0	55	130
PV(FDC) @ Ru	€163,65		

### GROUP III (3 points)

(III.a) (1.5 points) On December 22, 2017, U.S. President Trump signed the “Tax Cuts and Jobs Act” into law. The overall spirit of the law is to reduce tax rates on personal income (some of these cuts are temporary) and on corporate income. In what concerns corporations, the top income tax rate was cut from 35% to 21%, starting in 2018. Additionally, interest deductions for tax purposes at corporate level are now limited: they cannot exceed 30% of EBITDA. Based on the theories covered in the CIA course unit, what do you think will be the impact of these measures on the capital structure of U.S. firms? Explain your arguments.

Frame the answer in the context of the capital structure theory – for example the trade-off theory.

Explain the relevance of all taxes ( $T_c$   $T_e$   $T_i$ ) for the  $PV(ITS)$ .

Explain the impact of each of the measures mentioned in the question regarding the  $PV(ITS)$ , but also in terms of affecting  $V_u$  or other elements of the total value of the firm.

Ideally, present some graphical analysis of the trade-offs before and after the measures.

(III.b) (1.5 points) If you wanted to assess the viability of an investment project to launch a new flying car by *Fiat Chrysler Automobiles*, which steps would you follow and what sources of information would you resort to?

In essence describe the process followed in the group work assignment (or in project valuation of any kind), specifically for what you know about this company and its data. Explain all elements you need to collect and where from. Explain your choice of valuation method, rates. Explain how to make a final decision, and also how to perform robustness checks.

#### GROUP IV (4 points)

Firm *DisasterArt Inc.* is an unlevered company which currently has 8 million shares outstanding at a price of \$5.20 each. The firm announces a rights issue that entitles its current shareholders to acquire new shares of the company in 8 weeks' time. The conditions of the rights issue are such that the current owner of 2 shares is entitled to buy 1 new share for a price of \$5.00. The expected annual volatility of *DisasterArt Inc.*'s equity is 40%. Currently the risk-free interest rate is 2% (continuous compounding).

(IV.a) (1.5 point) What is the value of these rights according to the Black-Scholes valuation technique? Show all your computations, state clearly your assumptions, and comment your results.

n	8 000 000,00	
P	5,2	
Market cap	41 600 000,00	
m	8 000 000,00	
r	0,5	
K	5	
T	0,153846154	
Fee	800 000,00	
Sigma	40%	
Rf	2%	
lamda	0,33	
V	41 600 000,00	
nk	40 000 000,00	
PV(nk)	39 877 112,23	
d1	0,328430431	
d2	0,171537523	
N(d1)	0,628706881	
N(d2)	0,568099436	
Call	3 500 041,31	
Rights	1 166 680,44	
Right	0,15	comments...

(IV.b) (1.25 points) According to your previous answer what should happen to the share price of the company once the rights are traded? Show your computations and comment your results.

Shares	40 433 319,56	
P	5,054164945	goes down
with rights	5,20	remains the same for investor

(IV.c) (1.25 points) The firm is also studying a proposal for a firm commitment service from investment bankers *Wiseaux*, for a price of \$300,000. Would you recommend *DisasterArt Inc.* accept or reject the proposal made by investment bank *Wiseaux*? Show your computations and explain your answer.

Put 1 777 153,54

lamda\*Put 592384,5138

Looks like a good opportunity to subscribe this service for 300000  
(less than theoretical value).



**GROUP V (3 points)**

In the framework of Merton's model, consider the following data of company LADYBIRD: Equity has a market cap of 50 and an annual volatility of 40%. In 1 years' time, a loan of 100 reaches its maturity (ignore intermediate cash flows). Additionally, we know that the risk-free interest rate is 2% per year (continuous time), and that there are bankruptcy costs of 5 in case there is liquidation You are told that the value of LADYBIRD'S's Assets follows a binomial model, for which we have the following information:

TODAY	Semester 1	Semester 2
100.000	132.917093	176.669537
	75.2348681	100.000000
		56.6028538

(V.a) (2.0 points) Is it credible to you that the Tree for the Value of the Assets of company LADYBIRD is the one in the previous table? Show your computations and explain your answer.

S	15	dt	0,5
Sigma S	40%	u	1,329170935
		d	0,752348681
D	100	p	0,446760652
		1-p	0,553239348
Rf	2%		
K	5		
Assets	Sigma	40%	
Equity			
t	0	0,5	1
	14,99984545	33,91211011	76,6695374
		0	0
			0

Theoretical Stock value around 15 very different from market value of 50. Not credible.

(V.b) (1.0 points) Suppose that the tree for LADYBIRD's assets is the one given above for question a). Consider again that the firm has a loan of 100 to be repaid at the end of the year and no debt service is planned for the first semester. To simplify, consider that the cash flows of the firm each period coincide with the value of the assets ( $f_t = V_t$ ). If you adjusted your analysis to accommodate the possibility of strategic debt service (as in Anderson and Sundaresan, 1996), what would be the debt service chosen by firm LADYBIRD (in each scenario)? Explain and show your computations.

$S(t=1)_{++}$	100
$S(t=1)_{+-} = S(t=1)_{-+}$	95
$S(t=1)_{--}$	51,60285382