**LISBOA
SCHOOL OF
ECONOMICS &
MANAGEMENT**

SINCE 1911

CORPORATE INVESTMENT APPRAISAL

EXAM

5 JANUARY 2015

2 HOURS + 15minutes

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:

GROUP	GRADE	COMMENT
I		
II		
III		
IV		
V		
TOTAL		

GROUP I (4 points)

Firm SOUTHF is analyzing a new investment project, called OILY. The following table shows forecasts of **annual earnings** for the firm in two scenarios: the Current Scenario (without the project), and the Scenario with Project OILY:

Current Scenario (without Project OILY)	Years 1 to 3	Scenario with Project OILY	Years 1 to 3
Revenues	€ 900 000	Revenues	€ 1 750 000
Operating Costs	€ 500 000	Operating Costs	€ 600 000
Depreciation	€150 000	Depreciation	€ 650 000
Interest Expenses	€ 110 000	Interest Expenses	€ 110 000
Net Income	€ 98 000	Net Income	€ 273 000

Project OILY requires immediate investment of € 1 500 000 in capital expenditures, and there is no working capital. We also know that the appropriate discount rate to use is 12%.

(I.a) (1 point) Compute the free cash flow of project OILY. Show your computations.

EBT	140000		390000	
Taxes	42000		117000	
NI	98000		273000	
Tc	0,3			
t	0	1	2	3
Rev	0	850000	850000	850000
Op Costs	0	100000	100000	100000
Dep	0	500000	500000	500000
EBIT	0	250000	250000	250000
EBIT(1-TC)	0	175000	175000	175000
Dep	0	500000	500000	500000
CapEX	1500000	0	0	0
Chg NWC	0	0	0	0
FCF	-1500000	675000	675000	675000

(I.b)   (1 points) Compute the discounted payback period of project OILY. Explain and briefly comment.

t	0	1	2	3
FCFt	-1500000	675000	675000	675000
Disc	-1500000	602678,5714	538105,8673	480451,6673
Cum	-1500000	-897321,4286	-359215,5612	121236,106
DPP	2,747662222 years			

Using r=12%.

Should invest since NPV=121,236>0.

(I.c) (1 point) Read the statement: "OILY's IRR is certainly inferior to 12%, for which reason we should invest in this project". Do you agree with this statement? Explain your answer.

Since NPV>0 (question I.b) and cash flow structure allows interpretation of IRR, we know that IRR>12% (discount rate).

(I.d) (1 point) Would you prefer project OILY or an alternative project named STICKY, which requires investment in a machine with a useful life of 2 years, a cost of capital of 13%, and generates a net present value of € 80 000? Explain.

If only "one shot", without repetition over time, project STICKY wuld be preferable as it has a higher NPV.

Because of the different time frames, if repetition is possible over time, and if using constant cash flows over time is reasonable, then we could compute the equivalent annuities:

EA (OILY)	50476,52916
EA(STICKY)	47958,68545

OILY is better in terms of equivalent annuity. And it also has a lower discount rate than STICKY. Therefore, OILY is definitely better for any number of periods.

GROUP II (6 points)

Firm SOUTHF considers investing in new project RANCH (same industry as usual for the company), for which the free cash flows have already been estimated:

t	0	1	2
FCF_t	-1000	730	440

We know that SOUTHF is financed with a ratio D/E=0.5, the beta of its shares is 1.1, and the firm is subject to corporate taxation at rate 35%. The firm's debt has an annual cost of 3%, which is 2% points higher than the risk-free interest rate, and the market risk premium is 4.5%.

(II.a) (1.5 points) Assuming the project is financed with the same target capital structure as the firm, should the company invest in it? Show your computations and explain your answer.

WACC method
Re   5,95%
WACC   0,046166667

NPV   99,8086 €

Since NPV>0, should invest.

(II.b) (1.5 points) If the company decided to finance the project with a higher target ratio of leverage D/E = 1.0, the beta of debt would increase by 20%. What would happen to the NPV of the project? Explain and show your computations.

From the CAPM, and the initial cost of debt we get:

Rd	3%	Bd	0,444444444

With the new capital structure:

New Bd	0,533333333	
New Rd	3,40% via CAPM	
New Re	0,065333333 via MMII	
New WACC		0,043716667

NPV	103,34 €

NPV increases with debt, given higher ITS, as expected.

(II.c) (1.5 points) Assuming the company chooses to use the capital structure of question (II.a), what is the present value of the interest tax shield of the project? Explain.

Old capital Structure

D/E	0,5
Ru=Pre-Tax Wacc	0,049666667

NPV@Ru	94,81 €
PV(ITS)	5,0032 €

By difference of value computed in (II.a)

(II.d) (1.5 points) Considering the capital structure of question (II.a), apply the flow-to-equity method to confirm the valuation of the project. Explain.

With WACC method:

t	0	1	2
FCF	-1000	730	440
Vt	€1 099,81	€420,58	0
Dt=1/3Vt	€366,60	€140,19	€0,00

t	0	1	2
FCF	-1000	730	440
Interest	0	11,00 €	4,21 €
Annual ITS	0	3,85 €	1,47 €
Net Borrow	€366,60	- 226,4085012	- 140,1943604
FCFE	633,3971384	496,442743	297,0718496
NPV@Re	99,80858476		

GROUP III (3 points)

Read the following statement: "As firms get more and more debt, creditors share the risks with the equity-holders, and, therefore, equity-holders become less demanding". Do you agree with this statement? Explain your answer.

Must mention MM's perfect world, and with taxes, in which the increase in debt may lead to higher risk to creditors, but also to shareholders, who become more demanding in terms of Re.

On the other hand, an increase in debt brings along the relevance of all other factors (such as Financial Distress Costs, Agency Costs of Debt, etc), which may require additional analysis. For example, higher debt may lead to riskier choice of strategies by equityholders, because they are more demanding (in the sense that they have nothing to lose, etc), but also to worse quality projects being selected (and in that sense being less demanding).

Put your arguments forward, but be precise and follow a structured argument.

GROUP IV (4 points)

Company SOUTHF has just announced a warrants issue. 600 000 warrants are immediately placed in the market for a unit price of €0.33. Each warrant is convertible into one new share in 4 years time, when it is expected that company SOUTHF will raise € 1 200 000 with the exercise of the warrants. The current share price of SOUTHF is € 2.0, with a market cap of € 8 000 000. The company currently is unlevered. The volatility of its assets has been estimated as 20%, and the annual risk-free rate is 1% (in continuous time).

(IV.a) (2.5 points) Once they are issued, what is the fair price at which you think the warrants should be traded and what would happen to the stock price? Explain your estimates and comment your results.

m	600000
price warrant	0,33
r	1
mr	600000
T	4
mrK	1200000
K	2
share price_t0	2
Pn	8000000
n	4000000
sigma	20%
Rf	1%
lamda	0,130434783
V	8198000
PV(nK)	7686315,513
d1	0,361121701
d2	-0,038878299
N(d1)	0,640995764
N(d2)	0,484493709
Call	1530911,763
Warrants	199684,143
warrant	0,332806905
priceshare	1,999578964

The theoretical value of the warrants is very close to the one chosen by the company. The share price remains unchanged, therefore. All under the assumption of neutral expectations regarding NPV of what to do with the money generated with the warrants issue and exercise.

(IV.b) (1.5 points) If the firm were to hire an investment bank to guarantee firm commitment (i.e., exercise of the warrants even if out of the money at maturity) what would the fair price of such a service be? Explain.

Put   1019227,276
"Fair" Fee   132942,6882   With same comment as in previous question.

GROUP V (3 points)

In the framework of Merton's model, consider the following data for company SOUTHF: Equity has a market cap of 30 and a volatility of 40%. In 2 years' time, a loan of 250 reaches its maturity (ignore intermediate cash flows). Additionally we know that the risk-free interest rate is 1% per year (continuous time). You are told that the value of SOUTHF's Assets follows a binomial model.

(V.a)   (1 point) Suppose that the binomial tree of the value of the assets is the following one:

TODAY	Year 1	Year 2
275.0740	284.8578	294.9896
	265.6262	275.0740
		256.5029

What would the market value of SOUTHF's debt be? Explain your steps.

Tree for debt:

t=0	t=1	t=2
?	?	250,0000
	?	250,0000
		250,0000

Debt is riskless, so can simply
discount it at RF:
D(t=0)=245.0497.

(V.b)   (2 points) Is it credible to you that the Binomial Tree for the Value of the Assets of company SOUTHF is the one in the previous table? Show your computations and explain your answer.

From the assets' tree get implied parameters:
   u: 1,035567965
   d: 0,965653664
   p: 0,634295634

Now get recursively Tree for Equity:
   29,9970   37,3312   44,9896
               18,1006   25,0740
                            6,5029

Since 30 is the current market value, the tree of the Assets may be consistent. Check what happens in terms of implied stock volatility. From "u" the Assets Volatility would be approximately 3.5%. In which case:

dS/dV: 0,999950332
Implied Stock Vol: 32,05%
Which differs from 40% based on market information on the stocks.

ADDITIONAL SPACE TO ANSWER ANY QUESTION, IF REQUIRED

SCRAP PAPER

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