LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

CORPORATE INVESTMENT APPRAISAL

MASTERS IN FINANCE

EXAM

8 JANUARY 2016

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:

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

GROUP I (4 points)

Over the last couple of years firm GUD invested €220,000 in the development of a new product, called GREEF505. In order to launch the new product in the market, GUD is now considering investing in a new line of production, which would require an immediate investment of € 990,000 in equipment with a life of 3 years, which is the estimated lifespan of the project. The finance department has developed the following financial projections for the first year of production:

Project GREEF505	**Year 1**
Revenues	€ 1 280 000
Costs of Goods Sold	590 000
Depreciation	330 000
Interest Payments	20 000
Earnings Before Taxes	340 000
Net Income	€ 221 000

Revenues and Costs of Goods Sold are expected to grow 3% per year. Annual net working capital is going to be 8% of next year's revenues. Consider a discount rate of 14% for this project.

(I.a) (1 point) Compute the annual free cash flows of project GREEF505. Show your computations.

t	0	1	2	3
Revenues	0	1280000	1318400	1357952
COGS	0	590000	607700	625931
Depreciation	0	330000	330000	330000
EBIT	0	360000	380700	402021
EBIT(1-Tc)	0	234000	247455	261313,65
CapEx	990000	0	0	0
NWC	102400	105472	108636,16	0
Change in NWC	102400	3072	3164,16	-108636,16
FCF	-1092400	560928	574290,84	699949,81

(I.b) (1 points) Should GUD invest the € 990,000 in project GREEF505? Explain.

NPV	€313 986,44	>0, so invest.

(I.c) (1 point) Read the statement: “After answering the previous questions, I don’t need to make any computations in order to conclude that this project’s IRR is certainly inferior to 14%”. Do you agree with the statement? Explain your answer.

NPV>0 with r=14% and cash flow "nicely behaved", negative in the beginning and only changing sign once. So IRR>14%.

(I.d) (1 point) Would you prefer project GREEF505 or an alternative project named FAKE, which requires investment in a machine with a useful life of 4 years, a cost of capital of 9%, and generates a net present value of € 300,000? Explain.

If projects are just "0ne-off" then project GREEF505 is clearly better, with a higher NPV.

If projects are to be repeated over time and it's reasonable to belief that the same profile of cash flows would be repeated, then we could compare based on Equivalent Annuities:

EA GREEF 505	135243,8454	with	r=14%
EA FAKE	92600,59863	with	r=9%

Greef still seems better, but discount rates are different.
Compare in perpetuity:

Perp GREEF 505	966027,4675	
		in the long run,
Perp FAKE	1028895,54	FAKE would be better.

GROUP II (5 points)

Firm GUD is now considering investing in new project MOANIN (same industry as usual for the company), for which the free cash flows have already been estimated:

t	0	1	2	3
FCF_t	-1300	730	440	350

We know that GUD is financed with a ratio D/E=1.0, the beta of its shares is 0.9, and the firm is subject to corporate taxation at rate 35%. The firm's debt has an annual cost of 2.5%, which is 1 percentage point higher than the risk-free interest rate, and the market risk premium is 5%.

(II.a) (1.25 points) Assuming the project is financed with the same target capital structure ratio as the firm, should the company invest in it? Show your computations and explain your answer.

D/E	1	
Be	0,9	
Tc	35%	
Rd	2,50%	
Rf	1,50%	
Rm-Rf	5%	
a)		
Re	6,00%	CAPM
Rwacc	0,038125	
		>0, so
NPV	€124,30	invest

(II.b) (1.25 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.

With initial data:		
Ru	0,0425	
NPV"Ru	€114,01	
PV(ITS)	€10,29	difference NPV(a)-NPV(@Ru)

(II.c) (1.25 points) If the firm decides to finance the project with a higher target ratio of leverage D/E = 1.5, the cost of debt should increase to 2.75%. What would happen to the NPV of the project? Explain and show your computations.

D/E	1,5	
Rd	2,75%	
With initial data:		
Ru	0,0425	
With new data and Ru:		
Re	0,065	MMII
Rwacc	0,036725	
NPV	€127,63	increases due to higher PV(ITS)

(II.d) (1.25 points) Considering the capital structure choice of question (II.a), suppose that firm GUD decides to go ahead with project MOANIN. If the market value of equity of GUD goes up by 6.29, what is your best estimate of the present value of the costs of financial distress associated with this project? Explain.

Total value increase	NPV Unlevered + PV(ITS)-PV(FDC)	
PV(FDC)		€118,01
	6.29=124.3-PV(FDC)	

GROUP III (3 points)

Modigliani-Miller's Proposition I regarding the choice of capital structure by firms in the "perfect" world scenario (absence of taxes, etc.) could well be explained via put-call parity. Explain how.

Explain how both models rely on the same set of assumptions. Explain what MMI is. Explain what P-C Parity is. Make the analogy between levered equity and a call option on the (unlevered) assets of the firm, and also the analogy between debt as a risk-free loan and a put option on the assets. Explain intuitively, and graphically.

GROUP IV (5 points)

Company GUD has just announced a rights issue: 250,000 rights are issued immediately, each one convertible into two new shares, in 2 months time, at an exercise price of €2.50 per share. Before the announcement, the last price at which GUD's shares traded was €4.00, reaching a market capitalization of € 2,000,000. Investment bank HULP offers a firm commitment service for which it charges upfront a fee of €1,050. The firm currently has no debt. We have estimated an annual volatility of 40% for the assets of the company, and the annual risk free rate of interest (continuous compounding) is 3%.

(IV.a) (1.5 points) What is the value of the rights at the time they are issued? Explain.

lambda	0,5	
Rights=lambda*Call		
d1	2,990440952	
d2	2,827141636	
N(d1)	0,998607125	
N(d2)	0,997651722	
Call	756369,36	
Rights	378184,679	Assuming zero NPV for the cash raised with the rights issue. Ignoring the firm-commitment fee (or assuming it's fairly priced).
Each Right	1,512738716	

(IV.b) (1 point) Do you agree with the price of the firm commitment fee charged by the bank? Explain.

Could try to assess the value of the fee as dilution factor*Put, using put-call parity.

Keeping the same assumptions as in the previous question, using put-call parity:

Firm commitment fee=lambda*put

Put	134,96	
Firm commitment fee	67,47847115	lower than what the bank charged.

Notice additionally that this "mispricing" was disregarded when computing the value of the rights themselve

(IV.c) (1.5 points) What will happen to the stock price ("ex-rights") once the rights are issued? Explain and comment.

Ignoring the firm-comitment fee:

P	3,243630642

The drop is price is due to the value of the rights that now trade separately.

If we wanted to consider the fact that the company paid a fee of 1050 for a service worth 67.48, the estimate of the price would be slightly lower:

P	3,241665599

In this case we would be explicitly considering the extra loss in value due to an expensive extra service from the bank. Notice, of course, that there is still the "error" of not having included this value in the computation of the call option itself, as there is circularity in the process.

(IV.d) (1 point) To what extent do you think these equity offerings using rights issues might be related to the asymmetric information problem usually identified as the "lemons problem"? Explain.

Explain what the lemons problem is and how it arises due to excessive dilution of current shareholders' ownership when raising more equity from new shareholders, in a context of asymmetric information. A rights issue gives the opportunity to current shareholders of keeping their ownership percentage, avoiding the conflict between old and new shareholders, and potentially preventing underinvestment.

GROUP V (3 points)

Consider the following application of the debt valuation model of Anderson and Sundaresan (1996), with only two periods (consider two years, and a time step of 1 year). Firm GUD uses a technology such that the present value of its assets (at t=0) is Vo = 120, and this value evolves annually according to a binomial process with u=1.25 and d=1/u. The firm generates annual cash flows (ft) proportional to its present value, that is, ft = 0.2Vt. The annual risk-free interest rate (with "discrete" compounding) is 6% in the two years of our analysis (from t=0 to t=1, and from t=1 to t=2). There is a fixed liquidation cost for this firm, estimated as K=60.

Suppose that firm GUD obtains a loan at t=0, and this debt contract involves a debt service at t=1 and at t=2 of CS1=CS2=25. At t=1 and at t=2 the owner/manager decides the actual debt service that he will offer to the creditor. He cannot offer more than the cash flow the firm has; and if he offers less than the contracted value, the creditor might accept (and the "game" continues) or the creditor might liquidate the firm.

(V.a) (2 points) What is the debt service that the owner-manager of GUD should offer in each scenario at t=1 and at t=2? Explain, showing your calculations.

(V.b) (1 point) Present an estimate for the value of the loan that firm GUD obtained at t=0. Explain.

This is a "trickier" question that requires a clear description of the assumptions made by whoever is solving the problem.

Tree Value V

120	150	187,5
	96	120
		76,8

Tree Cash Flow

24	30	37,5
	19,2	24
		15,36

p 0,106666667

Debt Service

t=0	1	2	
0	25	25	assuming
	19,2	24	cannot offer more than the cash flow even in final period
		15,36	Forced Liquidation in red scenarios

Debt Value

t=0	1	2
35,22866975	48,58490566	25
	36	25
		16,8

assuming forced liquidation may imply higher recovery rate than the cash flow of that period, even at t=2.

Assuming also creditors cannot receive more than total value due CS1+CS2