Instituto Superior de Economia e Gestão
UNIVERSIDADE TÉCNICA DE LISBOA

CORPORATE INVESTMENT APPRAISAL

MASTERS IN FINANCE

EXAM

30 JANUARY 2013

2 HOURS

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		

Over the last couple of years firm MILAN has invested 250 000 in the development of a new prototype. In order to launch the new product in the market, MILAN is considering investing in a new line of production, for which it has developed the following financial projections:

New Project	Year 1
Revenues	€ 1 280 000
Costs of Goods Sold	590 000
Depreciation	300 000
Interest Payments	50 000
Earnings Before Taxes	340 000
Net Income	€ 221 000

The project requires an immediate capital expenditure of € 900 000 in equipment with a life of 3 years, which is the time period for which the project will last. Revenues and Costs of Goods Sold are expected to grow 2% per year. Annual net working capital is 10% of next year's revenues. Consider a discount rate of 15% for this project.

(I.a) (1.5 points) Compute the Free Cash Flows of the project. Show your computations.

Tc	0,35			
t	0	1	2	3
Revenues	0	1280000	1305600	1331712
Costs of Goods Sold	0	590000	601800	613836
Depreciation	0	300000	300000	300000
EBIT	0	390000	403800	417876
EBIT(1-Tc)	0	253500	262470	271619,4
Oper CF	0	553500	562470	571619,4
CapEx	900000	0	0	0
NWC	128000	130560	133171,2	0
Change in NWC	128000	2560	2611,2	-133171
FCF	-1028000	550940	559858,8	704790,6

(I.b) (1.5 points) Read the following statement made your partner, Ms. *K*: "Forget this project! A 3-year project with annual Net Income around 220000 will surely offer an internal rate of return well below the 15% required by investors for a 900000 Capital Expenditure".
Do you agree with the statement made by Ms. K? Explain why you do, or do not, agree.

Investment decisions are not based on net income versus capital expenditure. Instead, they are based on FCF (as computed in part I.a).
Based on these FCF one may compute the NPV (using the 15% required by investors). In this case:

NPV   €337.823,21

For this reason (NPV>0) MILAN should invest in the project.
Indeed, the IRR>15%, since NPV>0 and cash flow structure (negative first, and then only one change of sign).
If we wanted we could check that

IRR   33%

For all these reasons we must disagree with Ms. K's statement.

(I.c) (1 point) To make a final decision your boss Mr. WAKI asks you to compute the Modified Internal Rate of Return (instead of the "normal" IRR) in order to compare this project to others that the company has in its pipeline.
Compute the Modified IRR and explain why this could be a better criterion for decision-making.

Compounded CFt=2		728618,15	643837,6	704790,6
Final Value				2077246
MIRR	26,42%			

This can be a better criterion (especially when choosing from a portfolio of mutually exclusive projects) since "normal" IRR may overestimate the return of the project by assuming reinvestment of intermediate cash flows at the IRR itself. The Modified IRR considers reinvestment of cash flows of the project at the "normal" rate of return of 15%.

GROUP II (5 points)

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

t	0	1	2
FCF_t	-1000	530	725

We know that MILAN is financed with a ratio D/E=0.25, the beta of its shares is 1.5, and the firm is subject to corporate taxation at rate 30%. The firm's debt has an annual cost of 4%, which is 1% higher than the risk-free interest rate, and the market risk premium is 4.5%.

MILAN

D/E	0,25	D/(D+E)	0,2
Be	1,5		
Tc	30%		
Rd	4%		
Rm-Rf	5%		
Rf	3%		

(II.a) (1.75 points) Assuming that the project is financed exclusively with equity, how good is it? Show your computations and explain your answer.

APV method

Re	9,75%
Ru	8,60%

NPV	102,7509 €

(II.b) (1.75 points) If the company decides to finance the project with a target ratio of leverage D/E = 0.5, the cost of debt would remain the same. What would happen to the NPV of the project? Explain your answer showing your computations.

Old capital Structure

D/E	0,25	
Pre-Tax Wacc		8,60%

New Capital Structure

D/E	0,5	

New Rd	4,00%	same
New Re	0,109	
New WACC		0,082

NPV	109,11 €

(II.c) (1.5 points) Assume that the cost of debt remains equal to 4%, and that MILAN will get a loan for 2 years, with annual interest payments and full reimbursement in the end. What loan should MILAN get in order to see the present value of the project increase to 1115? Explain your answer showing all your steps.

Vu	€1.102,75	
Vu+PV(ITS)	1115	
PV(ITS)	€12,25	
EA(4%,2)	6,494424989	ITS
	21,6480833	Interest
	541,2020825	Loan

According to the trade-off theory, which are the main factors that explain the choice of capital structure made by a firm? Explain your arguments based on empirical evidence, numerical examples and/or graphs.

Explain main factors that influence choice of capital structure, and in what direction: different types of taxes, costs of financial distress, agency costs and benefits of debt.

$VL=Vu+....-...etc$

Should give examples (e.g., tax advantage of debt, what are financial distress costs, etc), can show a graph with "optimal capital structure" and the effects of different factors, can discuss empirical evidence on differences across industries, countries, etc.

GROUP IV (4 points)

Firm MILAN has just announced a new issue of convertible bonds. 5000 bonds will be placed in the market at their nominal value, which is € 1000. The bonds promise to pay an annual coupon of 7%. Each bond may be converted into shares at maturity for a price of €10 per share, which takes place in three years time. By then the company wishes to see its equity value increase by € 5,000,000 (if conversion takes place). The current stock price of MILAN is € 8, and its market capitalization is € 80,000,000. The firm currently has no debt. We have estimated an annual volatility of 15% for MILAN's assets. The risk-free interest rate is 3% (continuous compounding) and the yield-to-maturity (continuous time) of the straight bonds issued by companies similar to MILAN is 6%.

#convertibles				price	
m	5000	proceeds	5000000	convertible	1000
F	5000000	K	10		
T	3				
P	8				
Pn	80000000				
N	10000000	mrK=F			
		5000r10	5000000		
		r	100		
Sigma	15%				
Rf	3%				
Y	6%	coupon	7%		

(IV.a)   (2.5 points) What is the value of the convertible bonds issue at the time of its announcement? Comment briefly.

Straight Bond Component

t	1	2	3
Coupon	350000	350000	350000
Reimbursement	0	0	5000000
PV(Coup)	329617,59	310422,15	292344,57
PV(Princ)	0,00	0,00	4176351,06
	932.384,31		
Total(coup)	€		

5.108.735,37 €	Total Straight	
lambda	0,047619048	
Warrants=lambda*Call		
F/lambda	105000000	
d1	-0,37946895	
d2	-0,63927658	
N(d1)	0,352169827	
N(d2)	0,261321512	
Call	4528940,35	
Warrants	215663,8263	Assuming zero NPV investment of the proceeds.
Convertibles	5324399,20	Sold too cheaply.

(IV.b) (1.5 points) What is the expected price of the shares immediately after the convertibles are issued? Comment briefly.

Keeping the same assumptions
P   7,96756008
price goes down since the bonds are sold too cheaply.

GROUP V (4 points)

In the framework of Merton's model, consider the following data of company MILAN: Equity has a market cap of 15 and a volatility of 30%. In 2 years' time, a loan of 100 reaches its maturity (ignore intermediate cash flows). Additionally we know that the risk-free interest rate is 3% per year (continuous time), and that the bankruptcy costs are approximately 25% of the value of the assets at liquidation.

You are told that the value of MILAN's Assets follows a binomial model, for which we have the following information:

TODAY	Year 1	Year 2
104.2596	107.2925	110.4137
	101.3124	104.2596
		98.4485

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

Market Parameters

Stock Price:	15		r:	3%
			B/Ruptcy	
Stock Vol:	30%		Cost:	25%
Debt Par:	100			

Tree Parameters

Dt:	1
u:	1,02909
d:	0,971732
p:	1,023785

Stock Value Tree

11,3696	10,8817	10,4137
	4,4937	4,2596
		0,0000

11.37 different from the market cap of 15. Not consistent with market values.

(V.b)   (2 points) Consider the same tree for MILAN's assets, but adjust your analysis to accommodate Anderson and Sundaresan's 1996 model of strategic debt service. Consider again that the firm has a loan of 100 to be repaid at time 2 (CS2) and no debt service is planned for time 1. To simplify, consider that the cash flows of the firm each period coincide with the value of the assets (ft=Vt). Bankruptcy costs are 25% of the value of the firm at liquidation, and the risk-free rate (continuous time) is 3% per year.

What is the debt service that will be chosen by the shareholders in equilibrium at time 2 (in each scenario), and what is the present value of the loan at time 0? Explain.

CS1=0

CS2=100

ft=Vt

Beta=1

p: 1,023785

Asset Value Tree

104,2596	107,2925	110,4137
	101,3124	104,2596
		98,4485

Cash Fow Tree

104,2596	107,2925	110,4137
	101,3124	104,2596
		98,4485

Debt Service S2

S2++	82,8103
S2+-=S2-+	78,19469
S2--	73,83637

B(t=0)   78,19469

ADDITIONAL SPACE TO ANSWER ANY QUESTION, IF REQUIRED

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SCRAP PAPER

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