



CORPORATE INVESTMENT APPRAISAL

MASTERS IN FINANCE

EXAM

16 JANUARY 2013

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 FBI has two alternative investment opportunities, which are mutually exclusive: Project A and Project B. The Chief Financial Officer has prepared the following forecasted annual income statements for each project:

Project A	Years 1 to 4	Project B	Years 1 to 4
Revenues	€ 1 000 000	Revenues	€ 1 200 000
Costs of Goods Sold	300 000	Costs of Goods Sold	400 000
Depreciation	250 000	Depreciation	250 000
EBIT	450 000	EBIT	550 000
Interest Payments	20 000	Interest Payments	20 000
Earnings Before Taxes	430 000	Earnings Before Taxes	530 000
Net Income	€ 301 000	Net Income	€ 371 000

Both projects require initial capital expenditure of € 1 000 000, to be spent immediately. Annual net working capital is 10% of next year's revenues. We also know that the cost of capital (discount rate) associated with project A is 8%, and the cost of capital for project B is 13%.

(I.a) (1 point) Compute the discounted payback period of project A. Interpret the result. Show your computations.

Tc	0.30				
t	0	1	2	3	4
EBIT	0	450000	450000	450000	450000
EBIT(1-Tc)	0	315000	315000	315000	315000
Deprec.	0	250000	250000	250000	250000
NWC	100000	100000	100000	100000	0
Chg NWC	100000	0	0	0	-100000
CapEx	1000000	0	0	0	0
FCF	-1100000	565000	565000	565000	665000
cumulative	-1100000	-535000	30000		
		PP	1.9469026	yrs	
disc. FCF	-1100000	523148.1481	484396.43	448515.21	488794.85
cumulative	-1100000	-576851.8519	-92455.41	356059.79	844854.64
		DPP	2.2061366	yrs	

Interpret...

(I.b) (1.5 points) When comparing these two projects, what is the Incremental IRR?
Based on this method, in which project should you invest? Explain and briefly comment.

project B	t	0	1	2	3	4
EBIT		0	550000	550000	550000	550000
EBIT(1-Tc)		0	385000	385000	385000	385000
Deprec		0	250000	250000	250000	250000
NWC		120000	120000	120000	120000	0
Chg NWC		120000	0	0	0	-120000
CapEx		1000000	0	0	0	0
FCF		-1120000	635000	635000	635000	755000
project B-A		0	1	2	3	4
FCF		-20000	70000	70000	70000	90000
Incremental IRR						350%

Can't really use this because projects have a different risk profile (different discount rate

(I.c) (1.5 points) In which project should you invest? Explain.

For project B:

NPV 842387.54

A is better than B, because it has a larger NPV.

But it's quite marginal. Should perform sensitivity analysis, etc.

GROUP II (5 points)

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

t	0	1	2
FCF _t	-800	330	545

We know that FBI is financed with a ratio $D/E=1.25$, the beta of its shares is 1.2, and the firm is subject to corporate taxation at rate 35%. The firm's debt has an annual cost of 3%, which is 1% 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 as the firm, how good is this project? Show your computations and explain your answer.

FBI
 D/E 1.25 $D/(D+E)$ 0.555555556
 β_e 1.2
 T_c 35%
 R_d 3%
 $R_m - R_f$ 5%
 R_f 2%
WACC method
 R_e 8.00%
WACC 0.046388889

NPV 13.1192 €

(II.b) (1.25 points) If the company decided to finance the project with a lower target ratio of leverage $D/E = 1.0$, the cost of debt would be reduced to 2.75%. What would happen to the NPV of the project? Explain.

Old capital Structure
 D/E 1.25
Pre-Tax Wacc 0.052222222

New Capital Structure
0.5
 D/E 1
New
 R_d 2.75%
New
 R_e 0.076944444
New WACC 0.047409722

NPV 11.84 €

(II.c) (1.25 points) Assuming the company chooses to use the capital structure of question (II.a), what is the debt capacity of the project throughout its life? Explain.

t	0	1	2
FCF	-800	330	545
Vt	€813.12	€520.84	0
Dt	€451.73	€289.35	€0.00

(II.d) (1.25 points) Suppose that the company chooses to finance the project with a loan of 400, reimbursed at the end of 2 years, and with constant annual interest payments of 3% during 2 years. If the personal tax rate on equity income is 15% and the personal tax rate on interest income is 25%, how do you estimate the present value of the interest tax shield in this case? Explain.

t	0	1	2
Dt	400	400	0
Interest	0	12	12
Annual			
ITS	0	2.37	2.37
PV(ITS)	€4.58		

$$\text{Annual ITS} = ((1-T_i)-(1-T_c)(1-T_e))\text{Interest}$$

$$\text{PV (ITS) discounting annual ITS at } R_d(1-T_i)$$

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.

Should explain:

- what MM's proposition I is
- what Put-Call Parity is
- how the capital structure of the firm equity and debt can be viewed as options on the value of the assets of the firm (underlying assets), and explain...
- could use graphs, etc.

GROUP IV (4 points)

Company FBI has just announced a warrants issue. 250 000 warrants are immediately placed in the market for a unit price of €2.50. Each warrant is convertible into two new shares in 5 years time, when it is expected that the company will raise € 3 500 000 with the exercise of the warrants. The current share price of FBI is € 6, with a market cap of € 9 000 000. The company currently is unlevered. The volatility of its assets has been estimated as 15%, and the annual risk-free rate is 2% (in continuous time).

(IV.a) (1 point) What is the dilution factor of the warrants issue? Explain.

m	250000
price warrant	2.5
r	2
mr	500000
T	5
mrK	3500000
K	7
share	
price_t0	6
Pn	9000000
n	1500000
sigma	15%
Rf	2%
lamda	0.25

(IV.b) (2 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.

V	9625000	assuming zero NPV expectations about investment made by firm with this mc
PV(nK)	9500792.88	
d1	0.20642969	
d2	-0.12898050	
N(d1)	0.58177236	
N(d2)	0.44868653	
Call	1336681.10	
Warrants	334170.275	
warrant	1.33668110	<2.5 interpret warrants sold too expensive
stock		
price	6.19388648	interpret. due to warrants sold expensive.

(IV.c) (1 point) 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) what would the fair price of such a service be? Explain.

Via put-call parity:

Put 1212473.992

"Fair" Fee 303118.498 without expectations of positive/negative npv's.

GROUP V (4 points)

In the framework of Merton's model, consider the following data of company FBI: Equity has a market cap of 25 and a volatility of 35%. In 2 years' time, a loan of 240 reaches its maturity (ignore intermediate cash flows). Additionally we know that the risk-free interest rate is 2% per year (continuous time), and that the bankruptcy costs are approximately 20% of the value of the assets at liquidation.

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

TODAY	Year 1	Year 2
255.6016	264.6929	y
	x	255.6016
		z

(V.a) (1 point) Fill in the tree of the value of the assets. Explain your steps.

Dt:	1
u:	1.035567965
d:	0.965653664

Asset Value Tree

255.6016	264.6929	274.1075
	246.8227	255.6016
		238.3452

(V.b) (3 points) Is it credible to you that the Tree for the Value of the Assets of company FBI is the one in the previous table? Show your computations and explain your answer.

p:	0.777327888
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Stock Value Tree

25.0000	29.3988	34.1075
	11.8898	15.6016
		0.0000

Based on u,d:

Asset Vol:	3.50%
dS/dV:	0.979784765
Implied Stock Vol:	35.01%
Impl-Actual Vol:	0.01%

Both stock value and volatility of the model consistent with market values. So Asset Tree seems ok.