

LASTNAME :

STUDENT Id :

FIRSTNAME :

# Final Exam

## Form A

Friday 22 August 2008

### Indications

Please follow these indications:

1. The exam lasts 3 hours.
2. Please verify that your document contains exactly 4 pages.
3. Each question is worth one point (except if mentioned otherwise).
4. Please write your firstname and lastname on the first page.
5. Good work!!!

## Problems

### P1 Lease or buy

Your firm wants to buy a new fleet of electrical cars for its employees. The cost of the new cars will be \$ 300'000, those cars will be depreciated over 4 years using the straight line method.

The firm considers two financing solutions: borrowing and leasing.

- 1) **Loan:** As the cars are 'environment friendly', you are entitled a subsidized loan offered by the Region Bruxelles Capitale (RBC), the subsidized rate the RBC offers for an amount of \$ 300'000 is 3% (while the market rate for loans with the same risk is 6%) which means an annuity of \$ 80'708.
- 2) **Leasing:** If you choose the leasing solution, the manufacturer will ask leasing payments of \$ 85'000 per year for 4 years. The corporate tax rate is equal to 40%.

**Q1** How much is the NPV of the subsidy?

**Q2** Where is the NPV coming from?

- Q3** Compute the incremental cash flows of lease versus buy solutions. What is the best solution?

## **P2 The Merton model...**

You have just been hired in the risk management department of the (ex-) number 1 bank in the world. Your boss asks you to value loan granted to Freddy Mae (a mortgage lender company) last year. He tells you that the loan can be seen as a zero coupon of 300 million of face value (maturity 1 year), and that the unlevered value of this company is \$ 500 million. If the volatility of the wealth value is 60%, the risk free rate is equal to 6% the market premium is 7% and the beta of Freddy Mae is 1.7; use the Merton binomial model with step of 6 months to answer the following questions.

- Q4** Use a binomial tree to compute the value of the company and the value of its debt.  
**Q5** Compute the probability of default of the company.  
**Q6** Compute the cost of debt and the WACC of the company.

## **P3 Capital structure (basic)**

Five years ago, after finishing studying at the Solvay Business School, you decide, with some friends, to launch a new chain of restaurants selling only 'natural' food. During those five years, your company (named *Trèbon*) has grown steadily, and today, you and your associates are discussing opening a new restaurant in the university district. You are the Chief Financial Officer of the company and your associates ask you to evaluate this project.

The new restaurant's EBIT is € 600 000 per year (until infinity) and the initial investments in equipment and real estate is € 2 000 000. Since this investment is quite heavy, you decide (for the first time in the company history) to take some debt, setting a D/E (for this project only) of 0.5 (at the beginning; after that, the absolute amount of debt remains at the same level until infinity). The corporate tax rate is 40%; the risk free rate is 4% and the new restaurant's beta is equal to 0.9. You also remember that you performed an evaluation of the WACC and the beta of the company last week (when the company was all equity financed) and that you found a WACC of 12% for and a beta equal to 1.

You are the Chief Financial Officer of the company and your associates ask an answer for the following questions:

- Q7** What is the WACC of the new project?  
**Q8** What is the levered value of the restaurant?  
**Q9** What is the debt value?  
**Q10** In this set of hypothesis, how will the WACC evolve over time? Explain.  
**Q11** Why is the cost of equity higher when the company takes some debt? Explain using an example.

## **P4 Cost of capital**

You have just been appointed to the financial direction of a well known Belgian bank. As the economic situation could be better, the board of directors (before taking any decision concerning

the future of the bank) asks you a complete revaluation of the financial situation of the firm. Your assistant gathered the following data:

- EBIT of the company (perpetuity): \$ 10'000'000,
- the debt is fixed at \$ 1'000'000 (absolute value, until infinity),
- the cost of debt is 6% and the debt beta is 0.3,
- the risk free rate is 4%,
- the tax rate is equal to 40%,
- the cost of asset is 10%.

Here is the task the board of directors asks you to perform:

**Q12** Compute the value of the company.

If the bank sets a new debt policy, with debt rebalanced continuously (with a debt to value ratio equal to 20%, the cost of debt remains the same):

**Q13** Compute the cost of equity and the WACC of the firm.

**Q14** Compute the value of the firm with its new debt policy.

**Q15** How will the value of tax shield differs if instead of continuous rebalancing we use yearly rebalancing (hint: the lag in timing then becomes important)?

Here is some data about our Luxembourg's subsidiary:

	2009	2010	2011
Free Cash Flows (€)	100,000	200,000	300,000
Debt Level (€)	50,000	75,000	25,000

**Q16** Knowing that the situation of the Luxembourg's subsidiary is exactly the same than the parent company, compute the value of Luxembourg's subsidiary (be sure to use a method consistent with the evaluation performed in questions 13 and 14).

## P5 The decision to go public...

Please read the following table of Marco Pagano, Fabio Panetta, and Luigi Zingales (1998): "Why Do Companies Go Public? An Empirical Analysis".

**Q17** Comment the table and the results in line with what you can link to the theory covered in class. [4 points]

**Table III**  
**Determinants of the Decision to Go Public**

The effect of the variables listed on the probability to go public is estimated by a probit model. The estimation method is maximum likelihood. The dependent variable is 0 if the company is not listed and 1 on the year of listing (observations for public companies are dropped from the sample). The sample is restricted to all company-years that satisfy the listing requirement as of that year. Subsidiaries of foreign corporations are excluded from the sample. The independent-IPO sample excludes all subsidiaries of publicly traded companies from the sample; the carve-out sample is restricted to subsidiaries of publicly traded companies. Sales is the lagged value of the logarithm of revenues. CAPEX is the lagged value of capital expenditures over Property Plant and Equipment. Growth is the rate of growth of sales in that year. ROA is the lagged value of EBITDA over total assets. Leverage is the lagged value of the ratio of the book value of short plus long term debt divided by book value of short plus long term debt plus book value of equity the year before. Bank rate is the lagged value of the relative cost of borrowing for firm  $i$  relative to the average borrowing rate of all the firms in the sample. The concentration of borrowing is the lagged value of the Herfindahl index of the lines of credit granted by different banks. The industry MTB is the median market-to-book value of equity of firms in the same industry which traded on the Milan Stock Exchange. The regression also includes a constant term and calendar year dummies (not reported). Standard errors are in parentheses. The tax effect is the average value of the calendar year dummies in the three years when there was a tax incentive to go public. The  $p$ -value of an  $F$ -test for the hypothesis that the joint effect of these three variables equals zero is also reported.

Variable	Whole Sample	Independent IPOs	Carve-Outs
Sales	0.202 <sup>a</sup> (0.044)	0.230 <sup>a</sup> (0.055)	-0.070 (0.088)
CAPEX	0.167 (0.180)	0.343 <sup>b</sup> (0.169)	-0.770 (0.528)
Growth	0.234 <sup>c</sup> (0.131)	0.322 <sup>b</sup> (0.150)	-0.428 (0.415)
ROA	0.791 <sup>c</sup> (0.449)	1.170 <sup>b</sup> (0.485)	1.768 <sup>c</sup> (1.045)
Leverage	-0.032 (0.277)	0.183 (0.317)	-0.596 (0.492)
Bank rate	-4.093 (5.535)	5.070 (4.460)	-16.156 (12.424)
Concentration of borrowing	0.151 (0.575)	-0.668 (0.832)	-0.193 (0.731)
Industry MTB	0.241 <sup>a</sup> (0.065)	0.206 <sup>b</sup> (0.081)	0.333 <sup>b</sup> (0.174)
No. of observations	5,350	4,919	431
Pseudo- $R^2$	0.100	0.143	0.131
Tax effect	0.511	0.854	0.176
$F$ -test ( $p$ -value)	0.050	0.011	0.500

<sup>a</sup> Coefficient significantly different from 0 at the 1 percent level or less.

<sup>b</sup> Coefficient significantly different from 0 at the 5 percent level.

<sup>c</sup> Coefficient significantly different from 0 at the 10 percent level.