

LASTNAME :

STUDENT Id :

FIRSTNAME :

Final Exam

Form A

Tuesday 22 January 2013

Indications

Please follow these indications:

1. The exam lasts 3 hours.
2. Please verify that your document contains exactly 6 pages.
3. There are 20 questions. There are 26 points in total. The best 20 points will be considered for a total maximum grade of 20.
4. Please write your first name and last name on the first page.

Problems

P1 Company valuation

We are on the 31st December 2013. You just finished your studies at Solvay, and after being interviewed by the pair made by Matthew Mackenzie (“MattMack”) and Kevin Larsson (“KevLar”), the renowned managers of the worldwide known WishfulInvest financial holding company, you are hired to help them in analysing a brand new investment opportunity in a firm called DataCloud.

The EBIT generated by DataCloud should be equal to €20 million in 2014, €40 million in 2015 and €60 million in 2016. Afterwards the growth rate of the EBIT should be equal to 2%. The debt of the company is currently at a level of €150 million, but should be equal to 66% of the value of equity at the end of December 2016 (from 2016 on the debt level will be adjusted continuously). The cost of debt is equal to 5%, the interest paid on debt is equal to 5% too (all rates are annual in the present problem, unless otherwise stated). The investment cash flow is equal to depreciation and the tax rate is equal to 30%.

This information so far provides the necessary inputs for cash flows...the key question remains: what kind of cost of capital to use.

Fortunately, KevLar and MattMack have identified a company that has the same activity. This company (named Company A) has a value of €88 million and a net income of €10 million. The market value of the debt of this company is €50 million, its cost of debt is equal to 5% but the

interest paid on debt is 8%. Those values will stay at the same level in perpetuity (for Company A only, contrarily to DataCloud). The investment cash flow of this company will be equal to the depreciation and the tax rate is 30%.

- Q1** Compute the FCFs (unlevered) and the present value of tax shield of Company A.
- Q2** Compute the cost of asset of Company A.
- Q3** Compute the WACC of DataCloud for 2017 on.
- Q4** Compute the terminal value (the value of the cash flows from 2017 on) of DataCloud at the end of 2016.
- Q5** Find the value of the debt at the end of 2016 and the annual debt repayment (constant repayments for years 2011-2012-2013) necessary to obtain the good level in 2016 and the level of debt at the end of 2014 and 2015.
- Q6** Find the value of the company at the end of 2013, 2014 and 2015. Be sure to use a method which is coherent with what you did in **Q3 & Q4. (2 points)**

KevLar and MattMack are happy with what you did so far but would prefer you to use the WACC method also for years 2013-2014-2015.

- Q7** Compute the WACC of DataCloud for 2013, 2014 and 2015.
- Q8** Check the calculations you did in question **Q6** using the WACC method.

P2 Capital structure choices

In an ultimate round of interviews for DataCloud, Matthew Mackenzie from WishFullInvest tries to understand the choice made for the current capital structure as well as what would be the optimal target structure for that company. He has been reading some papers, in particular the one of Barclay & Smith (2005), "The Capital Structure Puzzle: The Evidence Revisited", and based on that, he asks you your opinion about some of the elements covered (even if you haven't read the paper, use what you know from the course...):

- Q9** The capital structure models we have reviewed one by one, individually, in the "Optimal Capital Structure" section of the course have some limitations in their applicability (or compared to what happens in the real World) one by one to decide what capital structure we must have. Can you cite three (3) of them?
- Q10** Cite three (3) benefits (absolute or relative) of debt.
- Q11** If WishFullInvest is a growing (or expected to grow) start-up, what kind of leverage and/or financing would you expect for this company? Explain carefully.

P3 Real options

We are at the end of 2013, you join a movie company. Your new boss is very excited. He just bought the rights to make the sequel of a very successful movie (at any end of year during the next 2 years, i.e.: until 2015). In 2013 and 2014, you must pay an amount of €1 million if you want to keep the rights alive for the next year. The production cost of the movie is €17 million (the cost is independent from the year of production). The outcome (in present value) of the film before production costs is estimated at a value of €20 million today with a volatility of 40%, the risk free rate is equal to 5% (annual rate).

- Q12** Use a binomial tree to determine if your company will decide to produce the film before 2015, and conclude on the value of the rights today. **(4 points)**

P4 Risky debt

Your company has issued zero-coupon bonds with face value of €600 million (represented by 600'000 zero-coupon bonds) 3 years ago; the maturity of this issuance is now exactly 2 years. The value of the assets of the company is estimated to be €500 million today with an annual volatility of its relative variations of 50%. The subjective probability of an “up” movement is equal to 46.39% and the equity is represented by 300'000 shares. The risk-free rate in the market today is estimated at 2%, and the market risk premium is 5% (we accept the working hypothesis of Merton's debt and use these in a binomial setting; all rates are annual in the present problem). To answer the following questions use a binomial tree with steps of 1 year.

- Q13** Use a two-period binomial tree to compute the value of the assets of the company.
- Q14** Find the value of this debt today.
- Q15** Decompose the value of debt in face value, risk free rate, loss-given-default and risk-neutral default probability.
- Q16** Find the asset's beta, the beta of debt (if you don't manage to get an answer for the assets' beta, use an assets' beta of 1.4) and the cost of debt.
- Q17** Compute the yield of debt and compare it to the cost of debt found in the previous question. Explain the difference between those numbers.
- Q18** If someone was to propose a protection against this debt's failure (consisting in simply reimbursing the difference between the face value and what you get into default), which price should he/she propose today?
- Q19** If this issue was convertible today, in exactly one year and in exactly 2 years, with a conversion ratio of 1 (which means that you can convert 1 bond into 1 share) what would be the price of this convertible bond? **(2 points)**
- Q20** What if this convertible bond was now callable by the shareholders in years 0 and 1 (the call price being equal to €950/bond). **(2 points)**

