CORPORATE FINANCE part

Multiple choice questions. (choose one answer)

Use the following problem description to answer multiple choice questions (3, 4, 5) and solve problem 3. Provide solutions to all answers (including answers multiple choice questions)

ABC company follows NO growth strategy. ABC company is financed with debt capital and equity capital. Equity consists of 2000 shares that are traded today at 400 rubles each. Debt is represented by riskless perpetual bonds which offer 6% coupon rate. In total there are 250 bonds and each has face value of 1000 rubles. ABC's management team is considering a "complex refinancing plan". Managers want to issue additional debt and use the proceeds to pay out dividends immediately. Management has decided to issue 100 risky straight coupon bonds with face value of 500 rubles with 10-year maturity. New bonds are expected to be sold at their face value and offer 7% coupon rate. Suppose you believe CAPM holds. Corporate income tax rate which is the only market imperfection equals 20%. The risk-free rate of return is 5% and yield curve is flat. ABC management plans to retire the new risky bonds when they mature at the end of 10 year period and will finance this repayment with an additional equity issue. ABC management team will disclose the description of the whole "complex refinancing plan" tomorrow morning. Analytics assume ABC's interest tax savings are of the same level of risk as its corresponding debt issues.
Unfortunately, you are not given the information regarding the systematic level of risk of ABC's equity and have to deal with comparable companies. XYZ company is a perfect candidate for that. XYZ's line of business is the same as ABC operates. However, XYZ company is 10 times greater in assets. Possibly, such a difference in size can be explained by XYZ's longer history of operations. XYZ management team continuously reinvests 25% of its earnings. XYZ uses two types of capital. One half is equity which has beta of 1,5. The other half is perpetual debt offering 6% yield. Analytics assume XYZ's interest tax savings are of the same level of risk as its operating assets. Expected return on the market portfolio is 15%.
Suppose, ABC's managers will firstly disclose all the details of their "complex refinancing plan" tomorrow morning. Afterwards they will issue debt and, finally, will use the proceedings to pay out cash dividends.

Answer the following questions:

3. (2 points) Determine the ABC firm value and the ABC stock price today before the announcement. Don't forget to provide explanations and calculations if needed. Choose the closest values.

1) Firm value 1110000 rubles, Stock price 405 rubles
2) Firm value 1100000 rubles, Stock price 400 rubles
3) Firm value 1104900 rubles, Stock price 403 rubles
4) Firm value 1054900 rubles, Stock price 378 rubles
5) Firm value 1054900 rubles, Stock price 428 rubles
6) Firm value 1050000 rubles, Stock price 400 rubles

Correct answer - 2
Many didn't pay attention that ABC debt trades with a premium. Riskfree rate is given. ABC has riskless debt at first. Coupon rate is higher that risk

4. (4 points) Determine the ABC firm value and the ABC stock price tomorrow morning after debt issue. Don't forget to provide explanations and calculations if needed. Choose the closest values.

1) Firm value 1110000 rubles, Stock price 405 rubles
2) Firm value 1100000 rubles, Stock price 400 rubles
3) Firm value 1104900 rubles, Stock price 403 rubles
4) Firm value 1054900 rubles, Stock price 378 rubles
5) Firm value 1054900 rubles, Stock price 428 rubles
6) Firm value 1050000 rubles, Stock price 400 rubles

Correct answer - 3

This question supposed you can calculate PVTS not only for a case of perpetual debt but also for debt with a fixed maturity.

5. (4 points) Determine the ABC firm value and the ABC stock price tomorrow after dividend payment. Don't forget to provide explanations and calculations if needed. Choose the closest values.

1) Firm value 1110000 rubles, Stock price 405 rubles
2) Firm value 1100000 rubles, Stock price 400 rubles
3) Firm value 1104900 rubles, Stock price 403 rubles
4) Firm value 1054900 rubles, Stock price 378 rubles
5) Firm value 1054900 rubles, Stock price 428 rubles
6) Firm value 1050000 rubles, Stock price 400 rubles

Correct answer - 4

The only imperfection was corporate income tax. Reasoning was based on MM reasoning. Stock price should decrease a result of dividend payment.

Problem solving section

Problem 3. (15 points) Continue to use the provided above problem description about ABC's "complex refinancing plan" and answer two questions. Don't forget to provide assumptions, explanations and calculations if needed.

3.1 (10 points) Determine the required return on ABC equity today and tomorrow after the announcement.

3.2 (5 points) Determine the change in ABC stock value as a result of capital structure change in 10 years when ABC is supposed to issue additional equity and repay risky debt. Present calculations if necessary.

Comments to solution to 3.1&3.2.

Most of participants understood the question in a correct way. However, many of you assumed riskless debt and possibility to use Hamada approach. This was not a correct approach. ABC's new debt is risky & comparable XYZ also uses riskless debt. So, you were supposed to use a portfolio approach to estimate corresponding betas and required returns.

A potential way to answer the question might look like this:

1. Use comparable XYZ to determine unlevered return under given info of XYZ risky debt. Beta of XYZ risky debt is not zero. So, you can't use Hamada approach to determine unlevered beta or return
2. Use unlevered beta or return to find ABC's current level of systematic risk and/or required return on equity. Hamada approach would fit in this case. ABC used riskless debt at the beginning
3. However new debt is risky and Hamada will not fit. It is not a big deal to weight assets and capital under given terms. So, the question is about unlevering&relevering under

given terms. Hamada is very popular but a few students cared about checking the assumptions. Many used Hamada and never thought about assumptions

Answer to Question 3.2 was pretty straightforward. All the information about future refinancing was available at zero moment. So, there was no reason to assume stock price would change. There is no surprise info to value. Besides that ABC company follows no growth strategy – No reason to change

Calculation itself was not an issue. Arithmetical mistakes were never penalized. However, logical mistakes were penalized heavily.

Problem 4 (25 points) You are asked to advise on an investment project. Company BCD plans to implement a project that will be financed with debt and equity. Shareholders have decided to implement the project with help of a separate new entity – company Z. Company Z will be created specifically to realize the project.
You are given the following info regarding the project:
Project has 3 years maturity. Sales are expected to be 300, 400 and 500 mln. rubles for the corresponding three years. COGS (excluding depreciation expense) will comprise 50% of Sales. Capital expenditures will reflect acquisition of equipment for 180 mln. rubles. It will be fully depreciated using straight-line approach. Net working capital management guidelines require current assets to be at 30% of expected EBITDA in a corresponding year. Current liabilities are planned to be at 10% of expected COGS in a corresponding year. Corporate income tax rate is 20%. Interest rate on debt capital is 10%. Required return on unlevered equity capital is 20%.
Project will be financed with debt and equity capital. It is agreed that debtholders will provide 90 mln. rubles with 10% required return. The rest will be financed with equity capital.
Managers agreed to a special debt repayment scheme. 90 mln. of debt will be retired in three equal installments of 30 mln. at the end of each of three years. All of three repayments will be financed with equity issues. Such a repayment scheme will result in changing capital structure. After the final debt repayment company Z will realize itself to be financed only with equity.
Answer the following questions:
4.1 (6 points) Assume the project is financed with equity only. Build up cash flows table and determine whether the project should be implemented.
4.2 (6 points) Calculate APV (Adjusted Present Value) of the project and advise whether the project should be implemented.
4.3 (6 points) Suppose APV measure from previous question follows normal distribution with estimated mean that you calculated in question 4.2 and standard deviation of APV equal to σ. You as a consultant got the following information from CEO of BCD company: company BCD managers will accept the project only in case the probability of firm value decrease is not higher than 2,3%. Estimate the maximum standard deviation σ of APV that will allow to accept the project.
4.4 (7 points) Suppose variance of APV calculated in question 4.3 depended only on sales fluctuations. Now you discover COGS being the second major source of uncertainty. Discuss characteristics of Sales and COGS that might increase probability of the project to be accepted (for example, those characteristics that might decrease standard deviation σ of APV that you got in question 4.3)

Solution and Mark Scheme:

4.1

Correct calculations of Investments and FCFFs give you 4 points.

Investments $_0$ = - CapEx - ΔNWC = -180 - 30 = -210

FCFF = EBIT*(1-t) + D,A – CapEx – ΔNWC

$FCFF_1$ = 90*0.8 + 60 – 0 – 10 = 122

$FCFF_2$ = 140*0.8 + 60 – 0 – 10 = 162

$FCFF_3$ = 190*0.8 + 60 – 0 + 50 = 262

Correct calculation of NPV gives you 2 points.

$NPV = -210 + \frac{122}{1.2} + \frac{162}{1.2^2} + \frac{262}{1.2^3} = 155.79$ Project should be accepted.

4.2

APV = NPV (base case) + PVTS

Tax $Shield_1$ = Debt*Interest rate*tax rate = 90*0.1*0.2 = 1.8

Tax $Shield_2$ = 60*0.1*0.2 = 1.2

Tax $Shield_3$ = 30*0.1*0.2 = 0.6

$$PVTS = \frac{1.8}{1.1} + \frac{1.2}{1.1^2} + \frac{0.6}{1.1^3} = 3.08$$

APV = 155.79 + 3.08 = 158.87 Project should be accepted.

Correct formula and answer, but mistakes in calculations, (not technical), gives you 2 points.

Most popular mistakes:

1. ΔNWC calculation: investments at zero moment were not taken into account

2. Tax Shield calculation: assumption of stable debt level while the capital structure is not stable (according to the problem).

3. APV calculation: for NPV (base case) calculation WACC was used

4. APV calculation: mistakes in APV formula

5. APV calculation: mistakes in TS calculation (not technical)

6. No discounting when calculating NPV and APV

Question 4.3&4.4.

Relevant discussions and estimation of the maximum standard deviation σ of APV that will allow to accept the project were accepted. Participants were supposed to show they can apply a bit of statistical skills to a corporate finance issue. Furthermore, discussion of means to decrease correlation between Sales and COGS were positively graded.