NOVA SCHOOL OF BUSINESS & ECONOMICS

Applied Corporate Finance

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Final Exam – Suggested Solutions

NAME (PRINT):_____.

Instructions for the exam

- Start by putting your name on the first page.
- The exam is worth 200 points.
- Credit will be given for providing the logic underlying your answer, rather than for just giving a number, so please clearly explain the reasoning behind your answer.
- If something is not clear, please make a reasonable assumption and continue. Please highlight your assumptions so that I can identify them when grading the exam.
- I can only give points for material that I can read, understand and interpret. So, it is to your advantage to express your ideas clearly and concisely, and to highlight key arguments and numbers that you would like me to focus on when reading the exam. Bullet points are preferred to paragraphs.
- Please put your answer in the space provided after each question. You have **two hours** to complete the exam.

Group 1
True/False/Uncertain

Indicate whether the statements below are true or false, and explain your answer in a maximum of three to four sentences.

1- When deciding on whether to use local or global CAPM in cross-border valuation, the important aspect to consider is the yield spread between the government bonds from the country where investment is going to take place and US Treasuries. **[10 points]**

False. The important aspect to consider in this situation is the ability of investors to invest on a global vs. local market as that is what determines their ability to diversify risk and the type of systematic risk they are exposed to.

2- The case Continental Cablevision shows that when valuing an international joint venture deal in the same industry as the home operations a firm should use the same WACC rate as it uses to evaluate investments in the home country. On the other hand in the case of an acquisition of a foreign company adjustments have to be made. **[10 points]**

False. Both in the case of joint venture and acquisition a cross border valuation typically involves risks that need to be considered and that add to the usual business risk we consider in a home project. Because of that many practitioners include ad-hoc adjustments to their discount rates.

3- A cross-border valuation exercise should only include adjustments for country risk if the project is associated with non-tradable goods/services, that is, goods/services that need to be consumed in the same country. **[10 points]**

False. Even if the firm is producing a good or service that will be consumed outside of the country there may still be country risks that one should take into account when deciding on an investment. The case of Petrozuata illustrates this point very clearly. Even though the oil produced in Venezuela was not going to be consumed in the country, there are still country risks associated with this project, e.g. risk of expropriation.

4- Since the current stock price is the sum of all discounted dividends, paying dividends now or keeping them inside the firm should have no impact whatsoever. **[10 points]**

False .Under the assumptions of Modigliani Miller dividends should have no impact whatsoever. But in reality, since these assumptions don't hold, dividends could impact stock prices in many ways. For example under asymmetric information dividends can transmit information regarding the insider's expectation of future cash flows. In this case an increasing dividend would have a positive impact on stock price.

5- When picking a comparable firm to estimate the asset beta of an incremental investment project, the key characteristic to match on is the leverage ratio of the comparable firm and how it compares to the leverage ratio of the firm undertaking the investment. **[10 points]**

False. The asset beta should reflect the risk of the underlying cash flows from the operations. In other words, the cash flow profile of the assets of comparable should be roughly of the same profile as the firm in question (in the CAPM sense the cash flows of the comparable and the firm in question should covary similarly with the market portfolio). Financial structure is irrelevant for asset betas.

Group 2
Acquisition of Publishing Company

At the end of 2014, you are considering acquiring the troubled publishing company Shakespeare Ltd. You believe that you can turn the company around by growing sales, improving distribution, reducing costs, and gradually reducing the inventory (all other current assets and current liabilities remain unchanged). This plan will take three years to implement, after which you expect cash flows to grow at the industry growth rate of 5% per year in perpetuity.

The corporate tax rate is 40%. To value the investment you scribble some projections on the back of an envelope. These three-year projections are given below (the bottom rows are left blank for notes). Note that the interest payments are based on Shakespeare's historical debt level of $160m and the risk-free rate of 5%.

Exhibit 1- Shakespeare's Financial Projections

Item / Year	2015	2016	2017
Sales	100	120	140
COGS	80	60	70
SG&A	10	10	10
Depreciation	10	10	10
CAPX	10	10	10
Inventory reduction	0	6	5
Interest Payment	8	8	8

Note: All values in $M.

1) Calculate free cash flow for the all-equity financed firm (excluding the terminal value) for the three years. **[10 points]**

Recall that: FCF = EBIAT + DEPR – INV

Item / Year	2015	2016	2017
Pre-tax Profits	0	40	50
Tax (40%)	0	16	20
Depreciation	10	10	10
CAPX	10	10	10
Inventory reduction	0	6	5
FCF	0	30	35

Currently Shakespeare is a privately held firm, so its equity and debt are not publicly traded. However, one publicly traded, Marvel Corp, is in a similar line of business, and has an equity beta of 1.6. Marvel has $300 million of debt on its balance sheet. This debt is risk-free, and historically Marvel has kept its D/D+E ratio constant at 25%. The market risk premium is 7%, and the risk-free interest rate is 5%.

2) What is the asset beta of Marvel? **[15 points]**

We can unlever Marvel's equity beta by using the usual unlevering formula:

$Beta_A = Beta_E\ E/D+E + Beta_D\ D/D+E = 1.6 \times 75\% + 0 \times 25\% = 1.2$

Shakespeare currently has $160 million of long-term risk-free debt on its balance sheet and it has maintained this amount historically. However, after the acquisition, you plan to change the capital structure to maintain a constant debt to value ratio of 1/3. (This means that D/D+E = 33%. You may use either 33% or 1/3, and don't worry about minor errors from this difference). The debt you issue is risk-free.

3) Which method do you think is the most appropriate and easier to implement to perform the valuation of Shakespeare? Why? **[10 points]**

For the WACC we know rD = 5%, tC = 40%, D/D+E = 33%, so we only need to calculate rE. We can find this by releveing the asset beta and use the CAPM.

(Alternatively, we can first use the CAPM to calculate rA and then relever the return).

$Beta_E = Beta_A + D/E\ (Beta_A - Beta_D) = 1.2 + ½ * 1.2 = 1.8$

$r_E = r_F + Beta_E$ *x (risk-premium) = 5% + 1.8 x 7% = 17.6%*

$WACC = r_E\ E/D+E + (1-tC)\ r_D\ D/D+E = 17.6\% \times 66\% + 60\% \times 5\% \times 33\% = 12.7\%$

4) What is the enterprise value of the company? **[10 points]**

Let's first calculate the terminal value for the valuation using the growing perpetuity formula and the last of the cash flows calculated above:
TV = FCF x (1+g) / (WACC – g) = $35 x (1+5%) / (13.95% - 5%) = $475.2

Now we can add this to the last cash flow and discount the total cash flows for each year.

Item / Year	2015	2016	2017
FCF	0	30	35
TV			475.2
Total FCF	0	30	510.2
Discounted FCF	0	26.6	401.5
PV	428.1		

5) Shakespeare has 100 million shares outstanding. What is the maximum price per share you would be willing to pay? What is the value of all the equity of Shakespeare? **[10 points]**

To calculate the value of the equity, we need to take the value of the operating assets and subtract the current value of the debt. (There are no non-operating assets or other liabilities here).
The value of the equity (to us) is then $428.1m - $160m = $268.1m
The price per share is: $268.1m/ 100m= $2.68

6) Do you have any concerns with the valuation you performed? How could you address them? **[15 points]**

Just like any other valuation we performed during the course the values we found depend crucially on the assumptions we made regarding risk free rate, market risk premium, growth rate of terminal value, etc. To address this I would recommend performing sensitivity analysis.
Another potential concern here is related to the fact that there is only one comparable firm that was used to calculate beta of our project, so we may be worried that idiosyncratic aspects of this firm will impact our valuation. To address this we may extend the set of comparable firms or do sensitivity analysis on our beta estimate.

Group 3
Market Expectations and Investment Policy

Genoma Inc. faces the need to raise external funds to undertake some new investment opportunities. By investing $100M Genoma will generate a gross return of $140M for sure and the market knows that. Unfortunately, Genoma has no internal funds and, because of the nature of the business, has to raise funds by issuing equity. The problem is that the market does not know whether the current value of Genoma assets is $100M or $20M, and regards both outcomes as equally likely. The managers of Genoma do know the true value, but they cannot reveal it, because this will jeopardize their success. Assume that investors are risk neutral and that the proper discount rate is zero. Suppose further that Genoma's managers are loyal agents of the existing shareholders.

1) If the market expects Genoma's managers to issue equity and undertake the investment independent of the true value of the company, what is the fraction of the final value of the company that the managers have to promise to investors to convince them to invest $100 in the company? **[5 points]**

*Inclusive of the project, the market thinks the company is worth either 240 or 160 with equal probability. Therefore, the market's expected value of the company after the project is undertaken is 0.5*240+0.5*160 = 200. To give investors a securities that they value at 100, Genoma therefore has to sell off 100/200 = 50% of the final value of the company.*

2) If Genoma's managers know that the true value of Genoma's existing assets is 100 would they want to issue equity? **[5 points]**

*The key question here is whether, after the issue of equity, the value of existing shareholders with the project is greater than or less than the original value of the shareholders without the project. If the true value of existing assets is 100, the value of firm after investing =100 + 140 = 240. From (a), the managers promised away 50% of the final value. Therefore, the value retained by existing shareholders is 0.5 * 240 = 120> 100 (original value of equity, value of equity if project is not undertaken). So Genoma will issue equity here.*

3) What if they know that the true value of Genoma's existing assets is 20? **[5 points]**

*Value of firm after investing = 20 + 140 = 160. The managers promised away 0.5 of the final value. Therefore, value retained by existing equityholders' stake = 0.5*160 = 80 > 20 (original value of stock). Again, Genoma will issue equity.*

4) Suppose instead that the market expects that Genoma's managers will issue equity and undertake the investment only when they know that the true value of the company is 20. What is the fraction of the final value of the company that the managers can promise to investors to convince them to invest $100 in the company? **[5 points]**

Since the market knows that the managers will only issue equity if the true value is 20, the market's valuation of the firm after investing = 20 + 140 = 160. The managers need to promise the investors 100 of the expected value. Fraction required = Required investment/ Total value = 100/160 = 0.625.

5) Under the assumption in 4), if Genoma's managers know that the true value of Genoma's existing assets is 100 would they want to issue equity? **[5 points]**

*If the true value is 100, suppose the managers issue stock and promise away 62.5% of the final value of the company. With a true value of 100, the final value is 240. Value retained by existing equityholders's stake = 37.5% of final value = 37.5%*240 = 90 < 100 (original value). Genoma will not issue equity since the existing shareholders lose 10. (The mispricing of the equity is now so large that they would rather forgo the profits of the than give away this much of the firm.)*

6) What if they know that the true value of Genoma's existing assets is 20? **[5 points]**

*If the true value is 20, suppose the managers issue stock and promise away 62.5% of the final value of the company. With a true value of 100, the final value is 160. Value retained by existing equityholders's stake = 37.5% of final value = [(160- 100)/160]*160 = 60 > 20 (original value). Genoma will issue equity since existing stockholders gain 40.*

7) What would be the market reaction if the firm announces the equity issuance under the beliefs of part 4)? **[5 points]**

Under such beliefs if the firm announces an equity issue investors immediately understand that the firm's existing assets must be worth only 20 and as such there would be a negative recation to the announcement.

8) Explain the effects of market expectations on the firm's investment policy in this example. **[10 points]**

This shows the importance of the market expectations. In situations where equity is rarely used to finance new investments, only overpriced firms will like to issue equity. By contrast, if all firms are expected to finance their investments through equity, then there is not a bad signal associated with it.

Scratch paper