ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

Principles of Finance

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Assignment 7

Instructions

- Assignments should be done in groups of 3 students.
- You should remain with the same group through the entire course.
- Submit on Moodle only one copy of solutions per group.
- For each assignment you can get a maximum of 100 points.
- All assignments turned in late will not be graded (zero points).

Due date

The due date is indicated on Moodle.

1. You are deciding between two mutually exclusive investment opportunities. Both require the same initial investment of \$17 million. Investment A will generate \$3 million per year (starting at the end of the first year) in perpetuity. Investment B will generate \$1.5 million at the end of the first year and its revenue will grow at 8% per year for every year after that. (15 points)
   (a) Which investment has the higher IRR?
   (b) Which investment has the higher NPV when the cost of capital is 9%?
   (c) Which investment will you decide to undertake? Why?

2. Assume that Rose Corporation's (RC) EBIT is not expected to grow in the future and that all earnings are paid out as dividends. RC is currently an all-equity firm. It expects to generate EBIT of $3 million over the next year. Currently RC has 8 million shares outstanding. RC is considering borrowing $1.5 million at a rate of 5% and using the proceeds to repurchase shares at the current share price of $2.5. (12 points)

   (a) What is RC's EPS prior to any borrowing?

   (b) What is RC's equity cost of capital prior to any borrowing?

   (c) What is the number of outstanding shares following the borrowing of $1.5 million and the subsequent share repurchase?

   (d) What is RC's EPS following the borrowing of $1.5 million and the subsequent share repurchase? What is RC's share price following the borrowing of $1.5 million and the subsequent share repurchase?

3. Big Blue Banana (BBB) is a clothing retailer with a current share price of $15 and with 18 million shares outstanding. Suppose BBB announces a plan to lower its corporate taxes by borrowing $55 million and using the proceeds to repurchase shares. (12 points)

   (a) What is the share price of BBB after this announcement, assuming perfect capital markets?

   (b) Suppose BBB pays corporate taxes of 33% and that shareholders expect the change in debt to be permanent. Assuming that capital markets are perfect except for the existence of corporate taxes, what is the share price of BBB after this announcement?

   (c) Suppose BBB pays corporate taxes of 33% and that shareholders expect the change in debt to be permanent. Assume that capital markets are perfect except for the existence of corporate taxes and financial distress costs. What is the present value of BBB's financial distress costs if the price of BBB stays at $15 per share following the announcements?

4. Blue Ltd. is going to pay an unlevered free cash flow of $450 every year forever, starting at the end of this year. Suppose the company borrows today risk-free debt worth $3,000 and keeps it permanently (the firm is targeting the level of debt instead of the leverage ratio). The risk-free rate is 3%. The expected market return is 9%. The firm is in the 33% tax bracket. Consider also the following information about Blue Ltd. comparable firms, which do target a specific leverage ratio. (22 points)

	Red Ltd.	Black Ltd.	Yellow Ltd.
β_E	1.1	1.5	0.9
β_D	0	0	0
$\frac{D}{D+E}$	0.3	0.2	0.5
Market cap.	350	200	100

   a) Determine the unlevered cost of capital of Blue Ltd.*Hint: Use the respective firm values of comparable companies to weight the industry asset beta.*

b) Compute the firm value and the equity value by means of the APV approach.

c) Show that using the weighted average cost of capital, r_{WACC}, you reach the same firm value as with the APV approach, assuming that the firm leverage is the one implied by the value of equity computed in question b). *Hint: The unlevered cost of capital with a fixed debt schedule is*

$$r_A = \frac{E}{E + D_s} r_E + \frac{D_s}{E + D_s} r_D,$$

where $D_s \equiv D(1 - \tau_C)$ *is the value of debt net of the present value of tax shields.*

5. XYZ Inc. has a debt to equity ratio of 0.4, \$45,000 of debt with an interest rate of 4%, 4,000 shares outstanding, a 11% expected return on assets, and a 35% tax rate. Assuming a constant amount of debt: (27 points)

   (a) Compute the value of the firm and its share price.

   (b) Compute the expected return of equity.

   (c) Compute the weighted average cost of capital of the company.

   (d) What are the expected amounts distributed annually to share- and debt-holders?

   (e) What are the expected earnings before taxes? What are the expected earnings before interests and taxes?

   Assume now that the company decides to increase its debt by \$22,500 to repurchase stocks. Assume that the interest rate on debt remains unchanged:

   (f) Compute the total value of the firm when the repurchase plan is announced. What is the value of equity and debt?

   (g) What is the share price upon this announcement? How many shares can the company buy-back with the proceeds of the debt issuance?

   (h) Compute the net earnings of the company after the share-repurchase.

   (i) Compute the debt to equity ratio and the weighted average cost of capital after the share-repurchase. Compare the $\frac{D}{E}$ and WACC after and before the share repurchase. Did the company make the right decision to modify its capital structure?

6. A levered company has a total value of 250. Its debt-to-equity ratio is $\frac{1}{4}$, and is assumed to maintain a constant dollar amount of debt in the future. The company faces bankruptcy costs in the form of $K(D) = \frac{D}{10} + \frac{D^2}{500}$, and has a tax rate of 35%. (12 points)

   (a) Compute the value of equity and debt.

   (b) What would have been the value of this company if it was not levered?

   (c) What is the optimal capital structure of the company?

   (d) What will be the total firm value if the company decides to restructure to its optimal capital structure? What will be its debt to equity ratio?