



EXAM

Course code:	BE 410
Course name:	Corporate Finance
Date:	16 May, 2019
Duration:	09.00 – 13.00
Pages:	8 pages in total, including a 3 page attachment with useful formulas.
Allowed aid:	Calculators with empty memory, dictionary
Note:	You can answer in English or Norwegian



Exercise 1 (30%)

15 questions in total. Correct answer is 1 point, wrong answer is 0 point. Also 0 points if you pick more than one answer. If you do not like any of the alternatives, give a brief explanation why this is so. Make a two-column table with the question number in the left column, and the answer in the right. You can present calculations/comments below the table if this is preferred (but not necessary).

1) Which of the following statements is FALSE?

- A) The firm's weighted average cost of capital (WACC) denoted r_{wacc} is the cost of capital that reflects the risk of the overall business, which is the combined risk of the firm's equity and debt.
- B) Intuitively, the difference between the discounted free cash flow model and the dividend-discount model is that in the dividend-discount model the firm's cash and debt are included indirectly through the effect of interest income and expenses on earnings in the dividend-discount model.
- C) We interpret r_{wacc} as the expected return the firm must pay to investors to compensate them for the risk of holding the firm's debt and equity together.
- D) When using the discounted free cash flow model we should use the firm's equity cost of capital.

2) Consider a zero-coupon bond with a \$1000 face value and 10 years left until maturity. If the bond is currently trading for \$459, then the yield to maturity on this bond is closest to:

- A) 7.5%
- B) 10.4%
- C) 9.7%
- D) 8.1%

3) When discounting dividends you should use:

- A) the weighted average cost of capital.
- B) the after tax weighted average cost of capital.
- C) the equity cost of capital.
- D) the before tax cost of debt.

4) You expect Whirlpool Corporation (WHR) to have earnings per share of \$6.10 over the coming year. If the average P/E ratio for the appliance industry sector is 17.0, the value of a share of WHR stock based upon the comparables approach is closest to:

- A) \$103.70
- B) \$27.90
- C) \$35.90
- D) \$23.10

5) Luther Industries is currently trading for \$27 per share. The stock pays no dividends. A one-year European put option on Luther with a strike price of \$30 is currently trading for \$2.60. If the risk-free interest rate is 6% per year, then the price of a one-year European call option on Luther with a strike price of \$30 will be closest to:

- A) \$1.30
- B) \$7.10
- C) \$2.60
- D) \$1.95

6) If a firm's excess cash holdings are greater than its debt, using net debt as the measure of leverage will result in:

- A) its unlevered beta and cost of capital equaling zero.
- B) its unlevered beta and cost of capital being greater than its equity beta and cost of capital.
- C) the risk of the firm's equity being increased by its cash holdings in excess of its operating needs.
- D) the risk of the firm's debt being increased by its cash holdings in excess of its operating needs.



7) Consider a firm with debt. In a world with taxes, which of the following is the rate we should use to evaluate an all-equity financed project with the same risk as the firm?

- A) The weighted-average cost of capital
- B) The unlevered cost of capital (pre-tax WACC)
- C) The cost of equity
- D) The cost of debt

8) Your firm is financed with equity only and is planning to invest in a new electrostatic power generation system. Electrostat Inc is a firm that specializes in this business. Electrostat has a stock price of \$25 per share with 16 million shares outstanding. Electrostat's equity beta is 1.18. It also has \$220 million in debt outstanding with a debt beta of 0.08. If the risk-free rate is 3%, and the market risk premium is 6%, then your estimate of your cost of capital for electrostatic power generators is closest to:

- A) 7.50%
- B) 7.75%
- C) 9.50%
- D) 10.10%

Use the following information to answer the questions 9 and 10 below:

Wyatt Oil issued \$100 million in perpetual debt (at par) with an annual coupon of 7%. Wyatt will pay interest only on this debt. Wyatt's corporate tax rate is expected to be 40% for the foreseeable future.

9) Wyatt's annual interest tax shield is closest to:

- A) \$2.8 million
- B) \$4.2 million
- C) \$7.0 million
- D) \$40 million

10) The present value of Wyatt's perpetual interest tax shield is closest to:

- A) \$4.2 million
- B) \$7.0 million
- C) \$40 million
- D) \$60 million

Use the following information to answer the questions 11 and 12 below:

Rockwood Industries has 100 million shares outstanding, a current share price of \$25, and no debt. Rockwood's management believes that the shares are underpriced, and that the true value is currently \$30 per share. Rockwood plans to use \$250 million in cash to repurchasing shares. Management expects that very soon new information will come out that will cause investors to revise their opinion of the firm and agree with Rockwood's assessment of the firm's true value.

11) If Rockwood is able to repurchase shares prior to the market becoming aware of the new information regarding Rockwood's true value, then the number of shares outstanding following the repurchase is closest to:

- A) 92 million
- B) 10 million
- C) 75 million
- D) 90 million

12) Assume that Rockwood is able to repurchase shares prior to the market becoming aware of the new information regarding Rockwood's true value. After the repurchase, and following the release of the new information regarding the true value of Rockwood, the firm's share price is closest to:

- A) \$30.00
- B) \$31.50
- C) \$28.75
- D) \$30.60



13) Which of the following statements is FALSE?

- A) Calculating the precise present value of financial distress costs is a relatively straightforward process.
- B) Two key qualitative factors determine the present value of financial distress costs: (1) the probability of financial distress and (2) the magnitude of the costs after a firm is in distress.
- C) Technology firms are likely to incur high costs when they are in financial distress, due to the potential for loss of customers and key personnel, as well as a lack of tangible assets that can be easily liquidated.
- D) The magnitude of the financial distress costs will depend on the relative importance of the sources of these costs and is likely to vary by industry.

14) Taggart Transcontinental shares are currently trading at \$200 per share. The split ratio need to bring the stock price down to \$80 is:

- A) 2:1
- B) 3:1
- C) 1:5
- D) 5:2

15) You founded your own firm three years ago. You initially contributed \$200,000 of your own money and in return you received 2 million shares of stock. Since then, you have sold an additional 1 million shares of stock to angel investors. You are now considering raising capital from a venture capital firm. This venture capital firm would invest \$5 million and would receive 2 million newly issued shares in return. Your firm has no debt. Assuming that this is the venture capitalist's first investment in your firm, the post-money valuation of your shares is closest to:

- A) \$5.0 million
- B) \$12.5 million
- C) \$4.0 million
- D) \$2.5 million

Exercise 2 (15%)

You are a consultant who was hired to evaluate a new product line for Markum Enterprises. The upfront investment required to launch the product line is \$10 million. The product will generate free cash flow of \$750,000 the first year, and this free cash flow is expected to grow at a rate of 4% per year in perpetuity. Markum has an equity cost of capital of 11.3%, a debt cost of capital of 5%, and a tax rate of 35%. Markum maintains a debt-equity ratio of 0.40.

- a) What is the NPV of the new product line (including any tax shields from leverage)?
- b) How much of the product line's value is attributable to the present value of interest tax shields?

Exercise 3 (15%)

In a hostile takeover process, briefly describe different defense strategies the target board can employ to avoid a takeover.

Exercise 4 (20%)

Wyatt Oil has 8 million shares outstanding and is about to issue 10 million *new* shares in an initial public offering (IPO). The IPO price has been set at \$15 per share, and the underwriting spread is 6%. The IPO is a big success with investors, and the share price rises to \$35 the first day of trading.

- How much capital did Wyatt Oil raise from the IPO?
- Wyatt Oil has no debt. What is the market value of the firm after the IPO?
- Now suppose that the post-IPO value of Wyatt is its fair market value. Suppose Wyatt could have issued shares directly to investors at their fair market value in a perfect market with no underwriting spread and no underpricing. What would the share price have been in this case, if Wyatt Oil raise the same amount as in part a)?
- What is the total cost to Wyatt Oil's *original* investors due to market imperfections?

Exercise 5 (20%)

Gladstone Corporation is about to launch a new product. Depending on the success of the new product, the total value of Gladstone's assets may have one of four values next year: \$140 million, \$120 million, \$90 million, or \$70 million. These outcomes are all equally likely, and this risk is diversifiable, which means that both debt and equity cost of capital is equal to the risk-free rate of return of 5%. In the event of default, 25% of the value of Gladstone's assets will be lost to bankruptcy costs. (Ignore all other market imperfections, such as taxes.)

- What is the initial value of Gladstone's equity without leverage?

Now suppose Gladstone has zero-coupon debt with a \$100 million face value due next year.

- What is the initial value of Gladstone's debt? What is the yield-to-maturity of the debt? What is its expected return?
- What is the initial value of Gladstone's equity now? What is Gladstone's total value (both equity and debt) with leverage?

Now, suppose Gladstone has 10 million shares outstanding and *no debt* at the start of the year.

- If Gladstone does not issue debt, what is its share price?
- If Gladstone issues debt of \$100 million due next year and uses the proceeds to repurchase shares, what will its share price be? Explain differences in your answer, if any, from that in part (d)?

BE-410 Exam enclosure: Formula sheet

The Time Value of Money.

$$PV(C_n) = \frac{C_n}{(1+r)^n} \quad FV_n(C) = C \times (1+r)^n$$

$$PV(\text{Stream of Cash Flow}) = C_0 + \frac{C_1}{(1+r)^1} + \frac{C_2}{(1+r)^2} + \dots + \frac{C_N}{(1+r)^N} = \sum_{n=0}^N \frac{C_n}{(1+r)^n}$$

$$PV(\text{perpetuity}) = \frac{C}{r} \quad PV(\text{growing perpetuity}) = \frac{C}{r-g}$$

$$PV(\text{annuity}) = C \times \frac{1}{r} \left(1 - \frac{1}{(1+r)^N} \right) \quad FV(\text{annuity}) = C \times \frac{1}{r} \left((1+r)^N - 1 \right)$$

$$PV(\text{growing annuity}) = C \times \frac{1}{r-g} \left(1 - \left(\frac{1+g}{1+r} \right)^N \right)$$

$$IRR \text{ with two cash flows} = \left(\frac{FV}{P} \right)^{\frac{1}{N}} - 1 \quad IRR \text{ of growing perpetuity} = \frac{C}{P} + g$$

Interest Rates.

$$1 + EAR = \left(1 + \frac{APR}{k} \right)^k \quad r_r = \frac{r-i}{1+i} \approx r-i$$

Valuing Bonds.

$$CPN = \frac{\text{Coupon Rate} \times \text{Face Value}}{\text{Number of Coupon Payments per Year}}$$

$$\text{Yield to maturity for zero coupon bonds: } y_n = \left(\frac{FV}{P} \right)^{\frac{1}{n}} - 1$$

$$P = \frac{CPN}{1+y} + \frac{CPN}{(1+y)^2} + \dots + \frac{CPN + FV}{(1+y)^N} = CPN \times \frac{1}{y} \left(1 - \frac{1}{(1+y)^N} \right) + \frac{FV}{(1+y)^N}$$

Valuing Stocks.

$$r_E = \frac{Div_1 + P_1}{P_0} - 1 = \underbrace{\frac{Div_1}{P_0}}_{\text{Dividend yield}} + \underbrace{\frac{P_1 - P_0}{P_0}}_{\text{Capital Gain Rate}}$$

$$\text{Stock Price: } P_0 = \frac{Div_1}{1+r_E} + \frac{Div_2}{(1+r_E)^2} + \dots + \frac{Div_N}{(1+r_E)^N} + \frac{P_N}{(1+r_E)^N} \quad P_0 = \frac{Div_1}{r_E - g}$$

$$Div_t = \underbrace{\frac{\text{Earnings}_t}{\text{Shares Outstanding}_t}}_{EPS_t} \times \text{Dividend Payout Rate}_t$$

$$g = \text{Retention Rate} \times \text{Return on New Investment}$$

$$P_0 = \frac{PV(\text{Future Total Dividends and Repurchases})}{\text{Shares Outstanding}_0}$$

Free Cash Flow = $EBIT \times (1 - \tau_c) - \text{Capital Expenditures} + \text{Depreciation} - \text{Increases in Net Working Capital}$

$$\text{Enterprise Value: } V_0 = PV(\text{Future Free Cash Flow of Firm}) \quad P_0 = \frac{V_0 + \text{Cash}_0 - \text{Debt}_0}{\text{Shares Outstanding}_0}$$

Financial Options.

$$C = \max(S - K, 0) \quad P = \max(K - S, 0)$$

$$C = P + S - PV(K) - PV(Div)$$

$$C = \underbrace{S - K}_{\text{Intrinsic value}} + \underbrace{dis(K) + P - PV(Div)}_{\text{Time value}} \quad P = \underbrace{K - S}_{\text{Intrinsic value}} + \underbrace{C - dis(K) + PV(Div)}_{\text{Time value}}$$

Capital Markets and the Pricing of Risk.

$$E[R] = \sum_R p_R \times R$$

$$Var(R) = E[(R - E[R])^2] = \sum_R p_R \times (R - E[R])^2 \quad SD(R) = \sqrt{Var(R)}$$

$$SD(\text{Average of Independent, Identical Risks}) = \frac{SD(\text{Individual Risk})}{\sqrt{\text{Number of Observations}}}$$

$$\text{Market Risk Premium} = E[R_{Mkt}] - r_f$$

$$\text{CAPM: } r_i = r_f + \beta_i \times (E[R_{Mkt}] - r_f)$$

Estimating the Cost of Capital.

$$r_d = \text{Yield to Maturity} - \text{Prob}(\text{default}) \times \text{Expected Loss Rate}$$

$$r_U = \frac{E}{E + D} r_E + \frac{D}{E + D} r_D \quad \beta_U = \frac{E}{E + D} \beta_E + \frac{D}{E + D} \beta_D$$

Capital Structure in a Perfect Market.

$$r_E = r_U + \frac{D}{E} (r_U - r_D) \quad \beta_E = \beta_U + \frac{D}{E} (\beta_U - \beta_D)$$

$$r_{wacc} = r_A = r_U = \frac{E}{E + D} r_E + \frac{D}{E + D} r_D \quad \beta_U = \frac{E}{E + D} \beta_E + \frac{D}{E + D} \beta_D$$

Debt and Taxes.

$$V^L = V^U + PV(\text{Interest Tax Shield})$$

$$PV(\text{Interest Tax Shield for perpetual debt}) = \tau_c \times D$$

$$r_{wacc} = \frac{E}{E+D}r_E + \frac{D}{E+D}r_D(1-\tau_c) = \underbrace{\frac{E}{E+D}r_E + \frac{D}{E+D}r_D}_{\text{Pretax WACC}} - \underbrace{\frac{D}{E+D}r_D\tau_c}_{\text{Reduction due to Tax Shield}}$$

Capital Budgeting and Valuation with Leverage.

$$r_{wacc} = \frac{E}{E+D}r_E + \frac{D}{E+D}r_D(1-\tau_c)$$

$$\text{Debt capacity } D_t = \frac{D}{E+D}V_t^L = d \times V_t^L \quad V^L = APV = V^U + PV(\text{Interest Tax Shield})$$

$$r_U = \frac{E}{E+D}r_E + \frac{D}{E+D}r_D = \text{Pretax WACC}$$

$$FCFE = FCF - (1 - \tau_c) \times (\text{Interest Payments}) + (\text{Net Borrowing})$$

$$r_E = r_U + \frac{D}{E}(r_U - r_D) \quad r_{wacc} = r_U - \frac{D}{E+D}\tau_c r_D = r_U - d\tau_c r_D$$

Exchange Rate Risk.

$$\text{Forward Exchange Rate: } F_T = S \times \frac{(1 + r_{\$})^T}{(1 + r_{\pounds})^T}$$

$$\text{Foreign-Denominated Cost of Capital: } r_{\pounds}^* = \frac{1 + r_{\pounds}}{1 + r_{\$}} (1 + r_{\$}^*) - 1 \approx r_{\pounds} + (r_{\$}^* - r_{\$})$$