

FM 2555A
Assignment No. 3
Due Date: 12:30, 01 December 2016
BGS 165

NOTE: Only solutions to 5 problems marked with ♣ (see pages 7-8) are required for submission. The other problems are practice exercises.

GUIDELINES ON SUBMITTING ASSIGNMENTS

- **Your assignment paper must include the Marking Scheme as a cover page.** This marking scheme can be downloaded from the course website. *Failure to follow this instruction can result to a 2-point deduction on your assignment mark.*
- Do not submit your rough work! Do the problem set and then re-write it at least once - neatly, with adequate amount of clear explanation. The rewriting stage is the most important one for finding errors in one's work, and it will also deepen your understanding of the subject matter. Assignments are marked for both technical correctness and elegance of presentation.
- Bear in mind to include a sufficient amount of explanation about your work so that any marker does not have to guess what you mean. The grader of your work will determine if you understand what you are writing, not merely that you reach the particular correct answer.
- On questions where a computer output is required, include the output in the text of your answer at the appropriate locations - do not put it all in a bunch at the end of your assignment. Unless, you are instructed to submit your work in a CD or disc, you are expected to hand in a PRINTED COPY. *Assignments sent via e-mail will not be accepted.*
- YOU MUST WRITE YOUR OWN WORK IN YOUR OWN WORDS, using full sentences and proper English grammar. It is your responsibility to familiarise yourself with the provisions of the University Regulation concerning academic integrity and honesty. *Any behaviour that can potentially lead to plagiarism and cheating (including copying from/sharing with another student answers in assignments and exams) is a serious offence and carries with it severe penalty.*

Problems below, unless indicated otherwise, were taken from Brealey, R. (2017), *Principles of Corporate Finance*, 12th edition, McGraw-Hill Education, New York. *N.B.: For problems not required for submission, you will learn and benefit more if you attempt solving them first before looking at their solutions.*

NOTE: Problem number format: [x/y], where x is the number of the problem and y is the page number in the 12th ed of the Brealey et al. textbook.

Problem [2/242]

A company is 40% financed by risk-free debt. The interest rate is 10%, the expected market risk premium is 8%, and the beta of the company's common stock is 0.5. What is the company cost of capital? What is the after-tax WACC, assuming that the company pays tax at a 35% rate?

Problem [3/242]

Refer to Chapter -9 slide presentation (slide #9-9). What proportion of Dow Chemical's returns was explained by market movements? What proportion of risk was diversifiable? How does the diversifiable risk show up in the plot? What is the range of possible errors in the estimated betas?

Problem [4/242]

Define the following terms:

- a. Cost of debt
- b. Cost of equity
- c. After-tax WACC
- d. Equity beta
- e. Asset beta
- f. Pure-play comparable
- g. Certainty equivalent

Problem [5/242]

EZCUBE Corp. is 50% financed with long-term bonds and 50% with common stock. The debt securities have a beta of 1.5. The company's equity beta is 1.25. What is EZCUBE's asset beta?

Problem [6/242]

Many investment projects are exposed to diversifiable risks. What does “diversifiable” mean in this context? How should diversifiable risks be accounted for in project valuation? Should they be ignored completely?

Problem [8/243]

Which of these projects is likely to have the higher asset beta, other things equal? Why?

- a. The sales force for project A is paid a fixed annual salary. Project B’s sales force is paid by commissions only.
- b. Project C is a first-class-only airline. Project D is a well-established line of breakfast cereals.

Problem [10/243]

A project has a forecasted cash flow of \$110 in year 1 and \$121 in year 2. The interest rate is 5%, the estimated risk premium on the market is 10%, and the project has a beta of 0.5. If you use a constant risk-adjusted discount rate, what is

- a. The PV of the project?
- b. The certainty-equivalent cash flow in year 1 and year 2?
- c. The ratio of the certainty-equivalent cash flows to the expected cash flows in years 1 and 2?

Problem [11/243]

The total market value of the common stock of the Okefenokee Real Estate Company is \$6 million, and the total value of its debt is \$4 million. The treasurer estimates that the beta of the stock is currently 1.5 and the expected risk premium in the market is 6%. The Treasury bill rate is 4%. Assume for simplicity that Okefenokee debt is risk-free and the company does not pay tax.

- a. What is the required return on Okefenokee stock?
- b. Estimate the company cost of capital.
- c. What is the discount rate for an expansion of the company’s present business?
- d. Suppose the company wants to diversify into the manufacture of rose-coloured spectacles. The beta of unlevered optical manufacturers is 1.2. Estimate the required return on Okefenokee’s new venture.

Problem [12/243]

Nero Violins has the following capital structure:

Security	Beta	Total Market Value (\$ millions)
Debt	0	\$100
2	0.20	40
3	1.20	299

- What is the firm's asset beta? (*Hint*: What is the beta of a portfolio of all the firm's securities?)
- Assume that the CAPM is correct. What discount rate should Nero set for investments that expand the scale of its operations without changing its asset beta? Assume a risk-free interest rate of 5% and a market risk premium of 6%.

Problem [13/244]

The following table shows estimates of the risk of two well-known Canadian stocks:

	Standard Deviation (%)	R ²	Beta	Standard Error of Beta
TD Bank	13	0.49	0.83	0.11
Loblaw	21	0.01	0.21	0.25

- What proportion of each stock's risk was market risk, and what proportion was specific risk?
- What is the variance of TD? What is the specific variance?
- What is the confidence interval on Loblaw's beta?
- If the CAPM is correct, what is the expected return on TD? Assume a risk-free interest rate of 5% and an expected market return of 12%.
- Suppose the next year the market provides a zero return. Knowing this, what return would you expect from TD?

Problem [14/244]

You are given the following information for Golden Fleece Financial:

Long-term debt outstanding	\$300,000
Current yield to maturity (r_{debt})	8%
Number of shares of common stock	10,000
Price per share	\$50
Book value per share	\$25
Expected rate of return on stock (r_{equity})	15%

Calculate Golden Fleece's company cost of capital. Ignore taxes.

Problem [17/244]

Binomial Tree Farm's financing includes \$5 million of bank loans. Its common equity is shown in Binomial's Annual Report at \$6.67 million. It has 500,000 shares of common stock outstanding, which trade on the Wichita Stock Exchange at \$18 per share. What debt ratio should Binomial use to calculate its WACC or asset beta? Explain.

Problem [17/244]

You run a perpetual encabulator machine, which generates revenues averaging \$20 million per year. Raw materials costs are 50% of revenues. These costs are variable – they are always proportional to revenues. There are no other operating costs. The cost of capital is 9%. Your firm's long-term borrowing rate is 6%.

Now you are approached by Studebaker Capital Corp, which proposes a fixed-price contract to supply raw materials at \$10 million per year for 10 years.

- What happens to the operating leverage and business risk of the encabulator machine if you agree to this fixed-price contract?
- Calculate the present value of the encabulator machine with and without the fixed-price contract.

Problem [21/245]

A project has the following forecasted cash flows:

Cash flows (\$ 000's)			
C_0	C_1	C_2	C_3
-100	+40	+60	+50

The estimated project beta is 1.5. The market return r_m is 16%, and the risk-free rate r_f is 7%.

- Estimate the opportunity cost of capital and the project's PV (using the same rate to discount each cash flow).
- What are the certainty-equivalent cash flows in each year?
- What is the ratio of the certainty-equivalent cash flow to the expected cash flow in each year?
- Explain why this ratio declines.

Problem [22/245]

The McGregor Whisky Company is proposing to market diet scotch. The product will first be test-marketed for two years in southern California at an initial cost of \$500,000. This test launch is not expected to produce any profits but should reveal consumer

preferences. There is a 60% chance that demand will be satisfactory. In this case McGregor will spend \$5 million to launch the scotch nationwide and will receive an expected annual profit of \$700,000 in perpetuity. If demand is not satisfactory, diet scotch will be withdrawn.

Once consumer preferences are known, the product will be subject to an average degree of risk, and therefore, McGregor requires a return of 12% on its investment. However, the initial test-market phase is viewed as much riskier, and McGregor demands a return of 20% on this initial expenditure.

What is the NPV of the diet scotch project?

Problem [7/352]

Geothermal Corporation has just received good news: Its earnings increased by 20% from last year's value. Most investors are anticipating an increase of 25%. Will Goethermal's stock price increase or decrease when the announcement is made?

Problem [10/352]

How would you respond to the following comments?

- "Efficient market, my eye! I know lots of investors who do crazy things."
- "Efficient market? Balderdash! I know at least a dozen people who have made a bundle in the stock market."
- "The trouble with efficient-market theory is that it ignores investor's psychology."
- "Despite all the limitations, the best guide to a company's value is its written-down book value. It is much more stable than market value, which depends on temporary fashions."

Problem [13/353]

Here are alphas and betas for Intel and ConAgra for the 60 months ending February 2012. Alpha is expressed as a percent per month.

	Alpha	Beta
Intel	0.97	1.08
ConAgra	0.51	0.67

Explain how these estimates would be used to calculate an abnormal return.

Problem [16/353]

What does efficient-market hypothesis have to say about these two statements?

- a. "I notice that short-term interest rates are about 1% below long-term rates. We should borrow short-term."
- b. I notice that interest rates in Japan are lower than rates in the United States. We would do better to borrow Japanese yen rather than US dollars.

♣ Required Assignment Question 1 (Problem [22/246]) [10 points]

An oil company executive is considering investing \$10 million in one or both of two wells: well 1 is expected to produce oil worth \$3 million a year for 10 years; well 2 is expected to produce \$2 million for 15 years. These are *real* (inflation-adjusted) cash flows.

The beta for *producing wells* is 0.9. The market risk premium is 8%, the nominal risk-free interest rate is 6%, and expected inflation is 4%.

The two wells are intended to develop a previously discovered oil field. Unfortunately, there is still a 20% chance of a dry hole in each case. A dry hole means zero cash flows and a complete loss of the \$10 million investment. Ignore taxes.

- a. What is the correct real discount rate for cash flows from developed wells? [3 pts]
- b. The oil company executive proposes to add 20 percentage points to the real discount rate to offset the risk of a dry hole. Calculate the NPV of each well with this adjusted rate? [3 pts]
- c. What do you say the NPVs of the two wells are? [2 pts]
- d. Is there a single fudge factor that could be added to the discount rate for developed wells that would yield the correct NPV for both wells? [2 pts]

♣ Required Assignment Question 2 (Problem [18/353]) [6 points]

The Table below (Column 2) shows the monthly return on the British FTSE 100 index from June 2013 through January 2015. Columns 3 and 4 show returns on the stocks of two firms – Executive Cheese and Paddington Beer. Both firms announced their earnings in January 2015. Calculate the average abnormal return of the two stocks during the month of the earnings announcement.

Month	Market Return	Executive Cheese Return	Paddington Beer Return
Jun – 13	-5.6	-3.2	-9.2
Jul	6.5	6.1	7.3
Aug	-3.1	2.0	-6.7
Sep	0.8	0.4	0.5
Oct	4.2	2.7	7.3
Nov	-1.2	-2.3	-4.9
Dec	1.5	1.4	1.8
Jan – 14	-3.5	-3.8	-5.0
Feb	4.6	4.0	5.6
Mar	-3.1	-4.2	-5.7
Apr	2.8	1.3	4.5
May	1.0	0.9	0.5
Jun	-1.5	-1.4	-0.7
Jul	-0.2	-0.3	-0.8
Aug	1.3	1.6	2.2
Sep	-2.9	-2.4	-6.4
Oct	-1.2	-0.9	-0.8
Nov	2.7	2.3	3.4
Dec	-2.3	-1.7	-2.3
Jan – 15	4.0	5.7	4.1

♣ Required Assignment Question 3 (not in the textbook) [4 points]

A project has an expected cash flow of \$300 in year 3. The risk-free rate is 5 percent, the market risk premium is 8 percent, and the project's beta is 1.25. Calculate the certainty equivalent cash flow for year 3, CEQ₃.