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1.

The Cost of Capital: Introduction

Companies issue bonds, preferred stock, and common equity to raise capital to invest in capital budgeting projects. Capital is a necessary factor of production, and like any other factor, it has a cost. This cost is equal to the _____ required return on the applicable security. The rates of return that investors require on bonds, preferred stocks, and common equity represent the costs of those securities to the firm. Companies estimate the required returns on their securities, calculate a weighted average of the costs of their different types of capital, and use this average cost for capital budgeting purposes.

The firm's primary financial objective is to _____ shareholder value. To do this, companies invest in projects that earn _____ their cost of capital. So, the cost of capital is often referred to as the _____ rate: When calculating the weighted average cost of capital (WACC), our concern is with capital that must be provided by _____ —interest-bearing debt, preferred stock, and common equity. _____ and accruals, which arise spontaneously from operations when capital budgeting projects are undertaken, are not included as part of total invested capital because they do not come directly from investors.

Which of the following would be included in the calculation of total invested capital? Choose the response that is most correct.

- a. Notes payable
- b. Taxes payable
- c. Retained earnings
- d. Responses a and c would be included in the calculation of total invested capital.
- e. None of the above would be included in the calculation of total invested capital.

The correct response is _____

2.

The Cost of Capital: Cost of Debt

A firm's before-tax cost of debt, r_d , is the interest rate that the firm must pay on _____ debt. Because interest is tax deductible, the relevant cost of _____ debt used to calculate a firm's WACC is the _____ cost of debt, $r_d(1 - T)$. The _____ cost of debt is used in calculating the WACC because we are interested in maximizing the value of the firm's stock, and the stock price depends on _____ cash flows. It is important to emphasize that the cost of debt is the interest rate on _____ debt, not _____ debt because our primary concern with the cost of capital is its use in capital budgeting decisions. The rate at which the firm has borrowed in the past is _____ because we need to know the cost of _____ capital. For these reasons, the _____ on outstanding debt (which reflects current market conditions) is a better measure of the cost of debt than the _____. The _____ on the company's _____ -term debt is generally used to calculate the cost of debt because more often than not, the capital is being raised to fund _____ -term projects.

Quantitative Problem: 5 years ago, Barton Industries issued 25-year noncallable, semiannual bonds with a \$900 face value and a 12% coupon, semiannual payment (\$54 payment every 6 months). The bonds currently sell for \$845.87. If the firm's marginal tax rate is 40%, what is the firm's after-tax cost of debt? Round your answer to 2 decimal places. Do not round intermediate calculations.

_____ %

3.

The Cost of Capital: Cost of Preferred Stock

The cost of preferred stock, r_p , used in the weighted average cost of capital equation is calculated as the preferred dividend, D_p , divided by the current price of the preferred stock, P_p . _____ tax adjustment is made when calculating r_p because preferred dividends _____ tax deductible; so _____ tax savings are associated with preferred stock.

Quantitative Problem: Barton Industries can issue perpetual preferred stock at a price of \$56 per share. The stock would pay a constant annual dividend of \$3.00 per share. If the firm's marginal tax rate is 40%, what is the company's cost of preferred stock? Round your answer to 2 decimal places.

_____ %

4.

The Cost of Capital: Cost of New Common Stock

If a firm plans to issue new stock, flotation costs (investment bankers' fees) should not be ignored. There are two approaches to use to account for flotation costs. The first approach is to add the sum of flotation costs for the debt, preferred, and common stock and add them to the initial investment cost. Because the investment cost is increased, the project's expected return is reduced so it may not meet the firm's hurdle rate for acceptance of the project. The second approach involves adjusting the cost of common equity as follows:

$$\text{Cost of equity from new stock} = r_e = \frac{D_1}{P_0(1-F)} + g$$

The difference between the flotation-adjusted cost of equity and the cost of equity calculated without the flotation adjustment represents the flotation cost adjustment.

Quantitative Problem: Barton Industries expects next year's annual dividend, D_1 , to be \$2.10 and it expects dividends to grow at a constant rate $g = 5\%$. The firm's current common stock price, P_0 , is \$20.80. If it needs to issue new common stock, the firm will encounter a 5.1% flotation cost, F . Assume that the cost of equity calculated without the flotation adjustment is 12% and the cost of old common equity is 11.5%. What is the flotation cost adjustment that must be added to its cost of retained earnings? Round your answer to 2 decimal places. Do not round intermediate calculations.

_____ %

What is the cost of new common equity considering the estimate made from the three estimation methodologies? Round your answer to 2 decimal places. Do not round intermediate calculations.

_____ %

5.

The Cost of Capital: Weighted Average Cost of Capital

The firm's target capital structure is the mix of debt, preferred stock, and common equity the firm plans to raise funds for its future projects. The target proportions of debt, preferred stock, and common equity, along with the cost of these components, are used to calculate the firm's weighted average cost of capital (WACC). If the firm will not have to issue new common stock, then the cost of retained earnings is used in the firm's WACC calculation. However, if the firm will have to issue new common stock, the cost of new common stock should be used in the firm's WACC calculation.

Quantitative Problem: Barton Industries expects that its target capital structure for raising funds in the future for its capital budget will consist of 40% debt, 5% preferred stock, and 55% common equity. Note that the firm's marginal tax rate is 40%. Assume that the firm's cost of debt, r_d , is 7.9%, the firm's cost of preferred stock, r_p , is 7.4% and the firm's cost of equity is 11.9% for old equity, r_s , and 12.58% for new equity, r_e . What is the firm's weighted average cost of capital (WACC₁) if it uses retained earnings as its source of common equity? Round your answer to 3 decimal places. Do not round intermediate calculations.

_____ %

What is the firm's weighted average cost of capital (WACC₂) if it has to issue new common stock? Round your answer to 3 decimal places. Do not round intermediate calculations.

_____ %

6.

AFTER-TAX COST OF DEBT

The Holmes Company's currently outstanding bonds have a 9% coupon and a 12% yield to maturity. Holmes believes it could issue new bonds at par that would provide a similar yield to maturity. If its marginal tax rate is 40%, what is Holmes's after-tax cost of debt? Round your answer to two decimal places.

_____ %

7.

COST OF PREFERRED STOCK

Torch Industries can issue perpetual preferred stock at a price of \$61.00 a share. The stock would pay a constant annual dividend of \$6.50 a share. What is the company's cost of preferred stock, r_p ? Round your answer to two decimal places.

_____ %

8.

COST OF COMMON EQUITY

Pearson Motors has a target capital structure of 30% debt and 70% common equity, with no preferred stock. The yield to maturity on the company's outstanding bonds is 10%, and its tax rate is 40%. Pearson's CFO estimates that the company's WACC is 13.50%. What is Pearson's cost of common equity? Do not round intermediate calculations. Round your answer to two decimal places.

_____ %

10.

PROJECT SELECTION

Midwest Water Works estimates that its WACC is 10.40%. The company is considering the following capital budgeting projects.

Assume that each of these projects is just as risky as the firm's existing assets and that the firm may accept all the projects or only some of them. Which set of projects should be accepted?

Project	Size	Rate of Return	
A	\$1 million	12.0%	_____
B	2 million	11.5	_____
C	2 million	11.2	_____
D	2 million	11.0	_____
E	1 million	10.7	_____
F	1 million	10.3	_____
G	1 million	10.2	_____

d. If you have equal confidence in the inputs used for the three approaches, what is your estimate of Callahan's cost of common equity? Round your answer to two decimal places. Do not round your intermediate calculations.

_____ %

12.

COST OF COMMON EQUITY AND WACC

Palencia Paints Corporation has a target capital structure of 40% debt and 60% common equity, with no preferred stock. Its before-tax cost of debt is 10%, and its marginal tax rate is 40%. The current stock price is $P_0 = \$20.50$. The last dividend was $D_0 = \$3.50$, and it is expected to grow at a 7% constant rate. What is its cost of common equity and its WACC? Round your answers to two decimal places. Do not round your intermediate calculations.

a. $r_S =$ _____ %

b. WACC = _____ %

13.

WACC

The Pawlson Company's year-end balance sheet is shown below. Its cost of common equity is 15%, its before-tax cost of debt is 11%, and its marginal tax rate is 40%. Assume that the firm's long-term debt sells at par value. The firm's total debt, which is the sum of the company's short-term debt and long-term debt, equals \$1137. The firm has 576 shares of common stock outstanding that sell for \$4.00 per share.

<u>Assets</u>		<u>Liabilities And Equity</u>	
Cash	\$ 120	Accounts payable and accruals	\$ 10
Accounts receivable	240	Short-term debt	57
Inventories	360	Long-term debt	1080
Plant and equipment, net	2160	Common equity	1733
Total assets	<u>\$2880</u>	Total liabilities and equity	<u>\$2880</u>

Calculate Pawlson's WACC using market-value weights. Round your answer to two decimal places. Do not round your intermediate calculations.

_____ %

14.

WACC

Olsen Outfitters Inc. believes that its optimal capital structure consists of 70% common equity and 30% debt, and its tax rate is 40%. Olsen must raise additional capital to fund its upcoming expansion. The firm will have \$5 million of retained earnings with a cost of $r_S = 15\%$. New common stock in an amount up to \$7 million would have a cost of $r_E = 19\%$. Furthermore, Olsen can raise up to \$3 million of debt at an interest rate of $r_D = 11\%$ and an additional \$3 million of debt at $r_D = 13\%$. The CFO estimates that a proposed expansion would require an investment of \$7.8 million. What is the WACC for the last dollar raised to complete the expansion? Round your answer to two decimal places.

_____ %

15.

WACC AND PERCENTAGE OF DEBT FINANCING

Hook Industries's capital structure consists solely of debt and common equity. It can issue debt at $r_d = 10\%$, and its common stock currently pays a \$3.25 dividend per share ($D_0 = \$3.25$). The stock's price is currently \$23.25, its dividend is expected to grow at a constant rate of 7% per year, its tax rate is 40%, and its WACC is 13.80%. What percentage of the company's capital structure consists of debt? Do not round intermediate calculations. Round your answer to two decimal places.

_____ %

16.

WACC

Empire Electric Company (EEC) uses only debt and common equity. It can borrow unlimited amounts at an interest rate of $r_d = 9\%$ as long as it finances at its target capital structure, which calls for 35% debt and 65% common equity. Its last dividend (D_0) was \$2.40, its expected constant growth rate is 5%, and its common stock sells for \$25. EEC's tax rate is 40%. Two projects are available: Project A has a rate of return of 12%, and Project B's return is 10%. These two projects are equally risky and about as risky as the firm's existing assets.

a. What is its cost of common equity? Round your answer to two decimal places. Do not round your intermediate calculations.

_____ %

b. What is the WACC? Round your answer to two decimal places. Do not round your intermediate calculations.

_____ %

c. Which projects should Empire accept?

17.

COST OF COMMON EQUITY WITH FLOTATION

Banyan Co.'s common stock currently sells for \$35.50 per share. The growth rate is a constant 9.8%, and the company has an expected dividend yield of 3%. The expected long-run dividend payout ratio is 30%, and the expected return on equity (ROE) is 14%. New stock can be sold to the public at the current price, but a flotation cost of 10% would be incurred. What would be the cost of new equity? Round your answer to two decimal places. Do not round your intermediate calculations.

_____ %

18.

WACC AND COST OF COMMON EQUITY

Kahn Inc. has a target capital structure of 45% common equity and 55% debt to fund its \$9 billion in operating assets. Furthermore, Kahn Inc. has a WACC of 16%, a before-tax cost of debt of 10%, and a tax rate of 40%. The company's retained earnings are adequate to provide the common equity portion of its capital budget. Its expected dividend next year (D_1) is \$4, and the current stock price is \$29.

- a. What is the company's expected growth rate? Round your answer to two decimal places at the end of the calculations. Do not round your intermediate calculations.

_____ %

- b. If the firm's net income is expected to be \$1.9 billion, what portion of its net income is the firm expected to pay out as dividends? (*Hint*: Refer to Equation below.)

$$\text{Growth rate} = (1 - \text{Payout ratio})\text{ROE}$$

Round your answer to two decimal places at the end of the calculations. Do not round your intermediate calculations.

_____ %

19.

COST OF COMMON EQUITY

The Bouchard Company's EPS was \$5.92 in 2016, up from \$3.52 in 2011. The company pays out 40% of its earnings as dividends, and its common stock sells for \$33.

- a. Calculate the past growth rate in earnings. (*Hint*: This is a 5-year growth period.) Round your answer to two decimal places.

_____ %

- b. The last dividend was $D_0 = 0.40(\$5.92) = \2.37 . Calculate the *next* expected dividend, D_1 , assuming that the past growth rate continues. Do not round off intermediate calculations. Round your answer to the nearest cent.

\$ _____

- c. What is Bouchard's cost of retained earnings, r_s ? Round your answer to two decimal places. Do not round your intermediate calculations.

_____ %

20.

CALCULATION OF g AND EPS

Sidman Products's common stock currently sells for \$47 a share. The firm is expected to earn \$4.70 per share this year and to pay a year-end dividend of \$2.90, and it finances only with common equity.

- a. If investors require a 10% return, what is the expected growth rate? Round your answer to two decimal places. Do not round your intermediate calculations.

_____ %

- b. If Sidman reinvests retained earnings in projects whose average return is equal to the stock's expected rate of return, what will be next year's EPS? (*Hint: $g = (1 - \text{Payout ratio})\text{ROE}$*). Round your answer to the nearest cent. Do not round your intermediate calculations.

\$ _____ per share

The company estimates that it can issue debt at a rate of $r_D = 11\%$, and its tax rate is 35%. It can issue preferred stock that pays a constant dividend of \$4 per year at \$41 per share. Also, its common stock currently sells for \$40 per share; the next expected dividend, D_1 , is \$4.25; and the dividend is expected to grow at a constant rate of 6% per year. The target capital structure consists of 75% common stock, 15% debt, and 10% preferred stock.

a. What is the cost of each of the capital components? Round your answers to two decimal places. Do not round your intermediate calculations.

Cost of debt _____ %

Cost of preferred stock _____ %

Cost of retained earnings _____ %

b. What is Adamson's WACC? Round your answer to two decimal places. Do not round your intermediate calculations.

_____ %

c. Only projects with expected returns that exceed WACC will be accepted. Which projects should Adamson accept?

Project 1 _____

Project 2 _____

Project 3 _____

Project 4 _____

22.

ADJUSTING COST OF CAPITAL FOR RISK

Ziege Systems is considering the following independent projects for the coming year:

Project	Required Investment	Rate of Return	Risk
A	\$4 million	13%	High
B	5 million	10.5	High
C	3 million	8.5	Low
D	2 million	8.25	Average
E	6 million	11.5	High
F	5 million	11.5	Average
G	6 million	6.25	Low
H	3 million	10.5	Low

Ziege's WACC is 9.00%, but it adjusts for risk by adding 2% to the WACC for high-risk projects and subtracting 2% for low-risk projects.

a. Which projects should Ziege accept if it faces no capital constraints?

- Project A _____
- Project B _____
- Project C _____
- Project D _____
- Project E _____
- Project F _____
- Project G _____
- Project H _____

b. If Ziege can only invest a total of \$13 million, which projects should it accept?

Project A _____

Project B _____

Project C _____

Project D _____

Project E _____

Project F _____

Project G _____

Project H _____

If Ziege can only invest a total of \$13 million, what would be the dollar size of its capital budget? Round your answer to two decimal places. Enter your answer in millions. For example, an answer of \$10,550,000 should be entered as 10.55.

\$ _____ million

- c. Suppose Ziege can raise additional funds beyond the \$13 million, but each new increment (or partial increment) of \$5 million of new capital will cause the WACC to increase by 1%. Assuming that Ziege uses the same method of risk adjustment, which projects should it now accept?

Project A _____

Project B _____

Project C _____

Project D _____

Project E _____

Project F _____

Project G _____

Project H _____

What would be the dollar size of its capital budget? Round your answer to two decimal places. Enter your answer in millions. For example, an answer of \$10,550,000 should be entered as 10.55.

\$ _____ million

23.

WACC

The following table gives Foust Company's earnings per share for the last 10 years. The common stock, 8.5 million shares outstanding, is now (1/1/17) selling for \$72 per share. The expected dividend at the end of the current year (12/31/17) is 55% of the 2016 EPS. Because investors expect past trends to continue, g may be based on the historical earnings growth rate. (Note that 9 years of growth are reflected in the 10 years of data.)

Year	EPS	Year	EPS
2007	\$3.90	2012	\$5.73
2008	4.21	2013	6.19
2009	4.55	2014	6.68
2010	4.91	2015	7.22
2011	5.31	2016	7.80

The current interest rate on new debt is 10%; Foust's marginal tax rate is 40%; and its target capital structure is 40% debt and 60% equity.

a. Calculate Foust's after-tax cost of debt. Round your answer to two decimal places.

_____ %

Calculate Foust's cost of common equity. Calculate the cost of equity as $r_s = D_1/P_0 + g$. Round your answer to two decimal places. Do not round your intermediate calculations.

_____ %

b. Find Foust's WACC. Round your answer to two decimal places. Do not round your intermediate calculations.

_____ %

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ANSWER KEY

Copy of Copy (2) of Module 5 Homework

1 marginal investor's

maximize

more than

hurdle

investors

Accounts payable

Statement a

2 new

new

after-tax

after-tax

after-tax

new

outstanding

irrelevant

new

yield to maturity

coupon rate

yield to maturity

long

long

7.71; 7.72; 7.7

3 No

aren't

no

5.36

4 **3.64**

15.14

5 **8.811**

9,185

6 **7.20; 7.19; 7.21**

7 **10.66; 10.65; 10.67**

8 **16.71; 16.70; 16.72**

9 **13.76; 13.75; 13.77**

15.70; 15.69; 15.71

10 Accept

Accept

Accept

Accept

Accept

Don't accept

Don't accept

11 **14.20; 14.21; 14.19**

17.00; 17.01; 16.99

16.00; 16.01; 15.99

15.73; 15.74; 15.72

12 25.27; 25.28; 25.26

17.56; 17.57; 17.55

13 12.22; 12.23; 12.21

14 15.28; 15.27; 15.29; 12.72; 12.71; 12.73

15 51.12; 51.11; 51.13; 51.10; 51.14; 51.09; 51.15; 51.08; 51.16; 51.07; 51.17

16 15.08; 15.07; 15.09

11.69; 11.68; 11.70

Project A

17 13.13; 13.14; 13.12

18 14.43; 14.42; 14.44

69.24; 69.23; 69.25

19 10.96; 10.95; 10.97

2.63

18.92; 18.91; 18.93

20 3.83; 3.82; 3.84

4.88

21 7.15; 7.14; 7.16

9.76; 9.75; 9.77

16.63; 16.62; 16.64

14.52; 14.51; 14.53

Accept

Accept

Reject

Reject

22 accept

reject

accept

reject

accept

accept

reject

accept

accept

reject

Reject

Reject

Reject

Accept

Reject

Accept

12

accept

reject

Accept

Reject

Reject

Accept
Reject
Accept

15

23 6.00; 5.99; 6.01

13.96; 13.95; 13.97

10.78; 10.77; 10.79

ANSWER KEY - Page 1