

Homework Assignment

Ch. 10 Cost of Capital, Brigham & Houston

Self Test ST-2

Problems 10-1, 10-2, 10-3, 10-4, 10-6, 10-8, 10-9, 10-11

SELF TEST

ST-2

WACC. Lancaster Engineering Inc. (LEI) has the following capital structure, which it considers to be optimal:

Debt	25%
Preferred stock	15
Common equity	<u>60</u>
	<u>100%</u>

LEI's expected net income this year is \$34,285.72; its established dividend payout ratio is 30%; its federal-plus-state tax rate is 40%; and investors expect future earnings and dividends to grow at a constant rate of 9%. LEI paid a dividend of \$3.60 per share last year, and its stock currently sells for \$54.00 per share.

LEI can obtain new capital in the following ways:

- Preferred: New preferred stock with a dividend of \$11.00 can be sold to the public at a price of \$95.00 per share.
- Debt: Debt can be sold at an interest rate of 12%.

- Determine the cost of each capital component.
- Calculate the WACC.
- LEI has the following investment opportunities that are average-risk projects:

Project	Cost at $t = 0$	Rate of Return
A	\$10,000	17.4%
B	20,000	16.0
C	10,000	14.2
D	20,000	13.7
E	10,000	12.0

Which projects should LEI accept? Why?

- $0.09 + (0.13 - 0.09)(1.40) = 0.1540$ (15.40%)
- $(0.4)(0.12)(1 - 0.4) + (0.6)(0.1651)$
- Projects A, C, E because the rate of return is high higher.

PROBLEMS

10-1

AFTER-TAX COST OF DEBT. The Heuser Company's currently outstanding bonds have a 10% coupon and a 12% yield to maturity. Heuser believes it could issue new bonds at par that would provide a similar yield to maturity. If its marginal tax rate is 35%, what is Heuser's after-tax cost of debt?

Answer: The new bonds would have a coupon rate of 12% to be issued at par.

The after tax cost of debt = Before tax cost x (1-tax rate)

After tax cost = 12% X (1-0.35) = 7.8%

10-2

COST OF PREFERRED STOCK. Tunney Industries can issue perpetual preferred stock at a price of \$47.50 a share. The stock would pay a constant annual dividend of \$3.80 a share. What is the company's cost of preferred stock, r_p ?

Answer: Cost of preferred stock r_p = Dividend/ current price of share

= 3.80/47.50

= 0.08 or 8%

10-3

COST OF COMMON EQUITY. Percy Motors has a target capital structure of 40% debt and 60% common equity, with no preferred stock. The yield to maturity on the company's outstanding bonds is 9%, and its tax rate is 40%. Percy's CFO estimates that the company's WACC is 9.96%. What is Percy's cost of common equity?

Answer: 40% Debt; 60% Common equity; r_d = 9%; T = 40%; WACC = 9.96%;

$WACC = (w_d)(r_d)(1 - T) + (w_c)(r_s)$

$0.0996 = (0.4)(0.09)(1 - 0.4) + (0.6)r_s$

$0.0996 = 0.0216 + 0.6r_s$

$0.078 = 0.6r_s$

$r_s = 13\%$.

10-4

COST OF EQUITY WITH AND WITHOUT FLOTATION. Javits & Sons' common stock currently trades at \$30.00 a share. It is expected to pay an annual dividend of \$3.00 a share at the end of the year ($D_1 = \$3.00$), and the constant growth rate is 5% a year.

- What is the company's cost of common equity if all of its equity comes from retained earnings?
- If the company issued new stock, it would incur a 10% flotation cost. What would be the cost of equity from new stock?

Answer: a.) $R_s = (D_1/P_0) + g = (3/30) + 5\% = 15\%$

b.) $R_e = D_1/[P_0(1-F)] + g = 3/[30(1-10\%)] + 5\% = 16.11\%$

10-6

COST OF COMMON EQUITY. The future earnings, dividends, and common stock price of Carpetto Technologies Inc. are expected to grow 7% per year. Carpetto's common stock currently sells for \$23.00 per share; its last dividend was \$2.00; and it will pay a \$2.14 dividend at the end of the current year.

- What is the company's cost of common equity if all of its equity comes from retained earnings?
- Using the DCF approach, what is its cost of common equity?
- If the firm's beta is 1.6, the risk-free rate is 9%, and the average return on the market is 13%, what will be the firm's cost of common equity using the CAPM approach?
- If the firm's bonds earn a return of 12%, based on the bond-yield-plus-risk-premium approach, what will be r_s ? Use the midpoint of the risk premium range discussed in Section 10-5 in your calculations.

If you have equal confidence in the inputs used for the three approaches, what is your estimate of Carpetto's cost of common equity?

- a.) Cost of common equity (r_S) = $\$2.14 / \$23.00 + 0.07 = 0.1630$ (16.30%)
 b.) Cost of common equity (r_S) = $\$2.14 / \$23.00 + 0.07 = 0.1630$ (16.30%)
 c.) Cost of common equity (r_S) = $0.09 + (0.13 - 0.09)(1.60) = 0.1540$ (15.40%)
 d.) Cost of common equity (r_S) = $0.12 + 0.04 = 0.16$ (16.00%)

$$\text{Cost of common equity } (r_S) = (0.1630 + 0.1540 + 0.1600) / 3 = 0.1590 (15.90\%)$$

10-8

COST OF COMMON EQUITY AND WACC. Patton 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 12%, and its marginal tax rate is 40%. The current stock price is $P_0 = \$22.50$. The last dividend was $D_0 = \$2.00$, and it is expected to grow at a 7% constant rate. What is its cost of common equity and its WACC?

Answer: Debt = 40%, Common equity = 60%.

$$P_0 = \$22.50, D_0 = \$2.00, D_1 = \$2.00(1.07) = \$2.14, g = 7\%.$$

$$r_S = D_1 / P_0 + g = \$2.14 / \$22.50 + 7\% = 16.51\%.$$

$$\text{WACC} = (0.4)(0.12)(1 - 0.4) + (0.6)(0.1651)$$

$$\text{WACC} = 0.0288 + 0.0991 = 12.79\%.$$

10-9

WACC. The Paulson Company's cost of common equity is 14%, its before-tax cost of debt is 10%, 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 \$1,167. The firm has 576 shares of common stock outstanding that sell for \$4.00 per share. Calculate Paulson's WACC using market-value weights.

Assets		Liabilities and Equity	
Cash	\$ 120	Accounts Payable	\$10
Accounts receivable	240	Short-term Debt	47
Inventories	360	Long-term debt	1,120
Plant and equipment, net	<u>2,160</u>	Common equity	<u>1,703</u>
Total assets	<u>\$2,880</u>	Total liabilities and equity	<u>\$2,880</u>

Answer: $\text{WACC} = (D/V) \text{ Cost of debt} \times (1 - \text{Taxes}) + (E/V) \text{ Cost of equity}$. V Is value of the firm = Market value of debt + Market value of equity.

$$\text{WACC} = 0.4 \times 13\% \times (1 - 40\%) + 0.6 \times 13\% = 3.12\% + 9.6\% = 12.72\%.$$

10-11

WACC AND PERCENTAGE OF DEBT FINANCING. Hook Industries' capital structure consists solely of debt and common equity. It can issue debt at $r_d = 11\%$, and its common stock currently pays a \$2.00 dividend per share ($D_0 = \$2.00$). The stock's price is currently \$24.75, its dividend is expected to grow at a constant rate of 7% per year, its tax rate is 35%, and its WACC is 13.95%. What percentage of the company's capital structure consists of debt?

Answer: $r_S = D_1 / P_0 + g = \$2(1.07) / \$24.75 + 7\% = 8.65\% + 7\% = 15.65\%.$

$$\text{WACC} = w_d(r_d)(1 - T) + w_c(r_S); w_c = 1 - w_d.$$

$$\begin{aligned}
 13.95\% &= wd(11\%)(1 - 0.35) + (1 - wd)(15.65\%) \\
 0.1395 &= 0.0715wd + 0.1565 - 0.1565wd \\
 -0.017 &= -0.085wd \quad wd = 0.20 = 20\%.
 \end{aligned}$$