Cost of Capital

Learning Problems

Answer Keys

**WACC at Winnipeg Electric**

1. WACC = 1(.555) 2(.079) + 1(.09) 3(.05) + 1(.355) 4(.0432) = .0637 or 6.37%

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|  | **Calculation** | **Market Value** | **% of Total** |
| Debt | (1,500) (1.0532) (1,000) | 1,579,800 | 35.5% |
| Preferred shares | (5,000) (80) | 400,000 | 9.0% |
| Common shares | (65,000) (38) | 2,470,000 | 55.5% |
| Total | 4,449,800 | 100.0% |

2 kc = .04 + (.78) (.05) = .079

3 kp = 4 / 80 = .05

4 1,579,800 = 551,000 ($\frac{1-(1+kd)^{-20}}{kd}$) + $\frac{1,500,000}{(1+kd)^{20}}$

kd = .0304

(1 + .0304)2 - 1 = .0617

(.0617) (1 - .30) = .0432

5 (1,500) (1,000) (.068/2)

**WACC at Balmer**

1. WACC = 1(.3451) 2(.095) + 1(.0785) 3(.0694) + 1(.5764) 4(.0456) = .0645 or 6.45%

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|  | **Calculation** | **Market Value** | **% of Total** |
| Common shares | (4,500,000) (38) | 171,000,000 | 34.51% |
| Preferred shares | (540,000) (72) | 38,880,000 | 7.85% |
| Debt | (300,000) (.952) (1,000) | 285,600,000 | 57.64% |
| Total | 495,480,000 | 100.00% |

2 kc = .03 + 1.3 (.05) = .095

3 kp = 5 / 72 = .0694

4 285,600,000 = 59,000,000 ($\frac{1-(1+kd)^{-40}}{kd}$) + $\frac{300,000,000}{(1+kd)^{40}}$

kd = .0321

(1 + .0321)2 - 1 = .0652

(.0652) (1 - .30) = .0456

5 (300,000) (1,000) (.06/2)

**WACC at Jackson**

1. WACC = (.3) 1(.1378) + (.2) 2(.0844) + (.5) 3(.0636) = .0900 or 9.00%

1 kc = (7 / 90) + .06 = .1378

2 kp = (95) (.08) / 90 = .0844

3 4970 = 540 ($\frac{1-(1+kd)^{-40}}{kd}$) + $\frac{1,000}{(1+kd)^{40}}$

kd = .04155

(1 + .04155)2 - 1 = .0848

(.0848) (1 - .25) = .0636

4 1,000 - 30

5 (1,000) (.08) (6 / 12)

**WACC at Anderson**

1. WACC = 1(.4134) 2(.0905) + 1(.0709) 3(.075) + 1(.5157) 4(.0728) = .0803 or 8.03

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|  | **Calculation** | **Market Value** | **% of Total** |
| Common shares | (35,000) (10) | 350,000 | 41.34% |
| Preferred shares | (15,000) (4) | 60,000 | 7.09% |
| Bonds | (450) (1,000) (.97) | 436,500 | 51.57% |
| Total | 846,500 | 100.00% |

2 kc = .03 + 1.21 (.05) = .0905

3 kp = .30 / 4.00 = .075

4 97 = 54.5 ($\frac{1-(1+kd)^{-20}}{kd}$) + $\frac{100}{(1+kd)^{20}}$

kd = .0474

(1 + .0474)2 -1 = .0970

(.0970) (1 - .25) = .0728

5 (100) (.09) (6 / 12)

**Issuance Costs at Wilson**

1. Issuance costs should be shown as a negative cash flow at the beginning of the project’s life. These costs are tax-deductible.

Issuance costs should not be included in the cost of capital which should only reflect the risk of the project. By including issuance costs in the cost of capital, the negative cash flows from the issuance costs are being spread over the project’s life instead of being recognized at the beginning of the project’s life when they are incurred.

Weighted average issuance costs = (.35) (.03) + (.20) (.05) + (.45) (.10) = .0655 or 6.55%

(Total capital to raise) (1 – Issuance costs) = (Total capital needed)

(Total capital to raise) (1 – .0655) = 5,000,000

Total capital to raise = 5,350,454.79

Issuance costs = (5,350,454.79 – 5,000,000) = 350,454.79

After-tax issuance costs = (350,454.79) (1 – .25) = 262,841.09

262,841.09 should be shown as a negative cash flow at T=0 in the capital budgeting analysis

1. The process would be the same except the cost of common equity would be 0% resulting in weighted average issuance costs of:

= (.35) (.03) + (.20) (.05) + (.45) (0) = .0205 or 2.05%

Most companies do not issue equity because of high issuance costs and control issues that may arise from selling new shares. Using this lower weighted average issuance costs would be common in practice.

**WMCC at Greyhound**

1. No. A new cost of capital or WMCC should be calculated since the airline and bus industries have very different risk levels.
2. WMCC = (.30) 1(.0848) + (.10) 2(.09) + (.60) 3(.139) = .1178 or 11.78%

1 kd = (.1130) (1 - .25) = .0848

2 kp = 9 / 100 = .09

3 kc = .04 + 1.65 (.06) = .139

Point-to-Point was selected as a comparable company because it had a very similar capital structure to Greyhound. A firm’s borrowing level affects its beta.

# WMCC at Predator

1. WMCC = (.5) 1(.125) + (.1) 2(.085) + (.4) 3(.0690) = .0986 or 9.9%

1 kc = .04 + 1.7 (.05) = .125

2 kp = .085

3 kd = ((1 + .09/2)2-1) (1 - .25) = .0690

# WMCC at Allison with Project Risk

1. Common share beta: (1.21 + 1.15 + 1.11 +1.32) / 4 = 1.20

Treasury spread: (4.10 + 3.85 + 3.50 + 3.95) / 4 = 3.85

WMCC = (.4) 1(.10) + (.6) 2(.0589) = .0753 or 7.53%

7.53% + 2.00% = 9.53%

1 kc = .04 + 1.2 (.05) = .10

2 kd = .04 + .0385 = .0785

(.0785) (1 - .25) = .0589

# WMCC at Harrison with Project Risk

1. Common share beta: (1.45 + 1.56 + 1.39 + 1.48) / 4 = 1.47

Preferred share yield: (.054 + .061 + .049 + .055) / 4 = .055

Treasury spread: (2.45 +2.58 + 2.10 + 2.49) / 4 = 2.41

WMCC = (.5) 1(.1035) + (.1) 2(.055) + (.4) 3(.0406) = .0735 or 7.35%

7.37% + 3.00% = 10.37%

1 kc = .03 + 1.47 (.05) = .1035

2 kp = .055

3 kd = .03 + .0241 = .0541

(.0541) (1 - .25) = .0406

# Adjusting Beta for Leverage

1. 1.23 = Bu (1 + (1 - .25) (.24)) Bu = 1.04

BL = 1.04 (1 + (1 - .25) (.43)) BL =1.38

Conversion of Dempsey’s debt ratio to debt-to-equity ratio

Debt ratio = $\frac{.3}{1}$ = .3

Debt-to-equity ratio = $\frac{.3}{1- .3}$ = .43

**WMCC at Baxter**

1. WACC = (.40) 1(4.64%) + (.60) 2(10.90%) = 8.40%

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| **Company** | **Beta** | **Debt-to-Equity** |
| Wilson | .97 | 40% |
| Jacobs and Sons | 1.34 | 50% |
| Mathew Jenkins | 1.53 | 65% |
| Average | 1.28 | 52% |

(X) (.5) + (1.45) (.5) = 1.21 X = .97

1.28 = Bu (1 + (1 -.25) (.52)) Bu = .92

BL = .92 (1 + (1 -.25) (.67)) BL = 1.38

$\frac{D}{E}$ = $\frac{.4}{.6}$ = .67

kc = .04 + 1.38 (.05) = .1090 or 10.90%

2 990 = 30 $(\frac{1-\left(1+i\right)^{-30}}{i})$ + $\frac{1,000}{(1+i)^{30}}$

i = .0305

(1 + .0305)2 – 1 = .0619

(.0619) (1 - .25) = .0464 or 4.64%