**COST OF CAPITAL**

The Marietta Corporation, a large manufacturer of mufflers, tailpipes, and shock absorbers, is currently carrying out its financial planning for next year. In about two weeks, at the next meeting of the firm's board of directors, Frank Bosworth, vice president of finance, is scheduled to present his recommendations for next year's overall financial plan. He has asked Donna Botello, manager of financial planning, to gather the necessary information and perform the calculations for the financial plan.

The company’s divisional staffs, together with corporate finance department personnel, have analyzed several proposed capital expenditure projects. The following is a summary schedule of acceptable projects (defined by the company as projects having internal rates of return greater than 8 percent):

**Project Investment Amount Internal Rate of Return**

**(in Millions of Dollars)**

|  |  |  |
| --- | --- | --- |
| A | $10.0 | 25% |
| B | $20.0 | 21% |
| C | $30.0 | 18% |
| D | $35.0 | 15% |
| E | $40.0 | 12.4% |
| F | $40.0 | 11.3% |
| G | $40.0 | 10% |
| H | $20.0 | 9% |

All projects are expected to have one year of negative cash flow followed by positive cash flows over the remaining years. In additions, next year’s projects involve modifications and expansion of the company’s existing facilities and products. As a result, these projects are considered to have approximately the same degree of risk as the company’s existing assets.

Botello feels that this summary schedule and detailed supporting documents provide her with the necessary information concerning the possible capital expenditure projects for next year. She can now direct her attention to obtaining the data necessary to determine the cost of the capital required to finance next year’s proposed projects.

The company’s investment bankers indicated to Bosworth in a recent meeting that they feel the company could issue up to $50 million of 9 percent first-mortgage bonds at par next year. The investment bankers also feel that any additional debt would have to be subordinated debentures with a coupon of 10 percent, also to be sold at par. The investment bankers rendered this opinion after Bosworth gave an approximate estimate of the size of next year’s capital budget, and after he estimated that approximately $100 million of retained earnings would e available for next year.

Both the company’s financial managers and its investment bankers consider the present capital structure of the company, shown in the following table, to be optimal (assume that book and market values are equal):

|  |  |
| --- | --- |
| Debt | $400,000,000 |
| Stockholder’s equity: |  |
| Common Stock | $150,000,000 |
| Retained Earnings | $450,000,000 |
|  | **$1,000,000,000** |

Botello has assembled additional information, as follows:

* Marietta common stock is currently selling at $21 per share.
* The investment bankers have also indicated that an additional $75 million in new common stock could be issued t net the company $19 per share.
* The company’s present annual dividend is $1.32 per share. However, Bosworth feels fairly certain that the board will increase it to $1.415 per share next year.
* The company’s earnings and dividends have doubled over the past 10 years. Growth has been fairly steady, and this rate is expected to continue for the foreseeable future. The company’s marginal tax rate is 40 percent.

Using the information provided, answer the following questions. (note: Disregard discrepancies in this case.)

**1. Calculate the after tax cost of each component source of capital.**

**2. Calculate the marginal cost of capital for the various intervals, or “packages,” of capital the company can raise next year.**

**3. Using the marginal cost of capital curve from question 2, determine the company’s optimal capital budget for next year.**

**4. Should Project G be accepted or rejected? Why?**

**5. What factors do you feel might cause Bosworth to recommend a different capital budget than the one obtained in question 3?**

**QUESTION 6**

arrow technology, inc. (ATI) has total assets of $10,000,000 and expected operation income (EBIT) of $2,500,000. If ATI uses debt in its capital structure, the cost of this debt will be 12 percent per anum.

a. Complete the following table:

**Leverage Ratio (Debt/Total Assets)**

**0% 25% 50%**

|  |  |  |  |
| --- | --- | --- | --- |
| Total assets |  |  |  |
| Debt (at 12% interest) |  |  |  |
| Equity |  |  |  |
| Total Liabilities and equity |  |  |  |
| Expected operating income (EBIT) |  |  |  |
| Less: Interest (at 12%) |  |  |  |
| Earnings before tax |  |  |  |
| Less: Income tax at 40% |  |  |  |
| Earnings after tax |  |  |  |
| Return on equity |  |  |  |

**Effect of a 20% Decrease in EBIT to $2,000,000**

|  |  |  |  |
| --- | --- | --- | --- |
| Expected operating income (EBIT) |  |  |  |
| Less: Interest (at 12%) |  |  |  |
| Earnings before tax |  |  |  |
| Less: Income tax at 40% |  |  |  |
| Earnings after tax |  |  |  |
| Return on equity |  |  |  |

**Effect of a 20% Increase in EBIT to $3,000,000**

|  |  |  |  |
| --- | --- | --- | --- |
| Expected operating income (EBIT) |  |  |  |
| Less: Interest (at 12%) |  |  |  |
| Earnings before tax |  |  |  |
| Less: Income tax at 40% |  |  |  |
| Earnings after tax |  |  |  |
| Return on equity |  |  |  |

b. Determine the percentage change in return on equity of a 20 percent decrease in expected EBIT from a base level of $2,500,000 with a debt /total assets ratio of

i: 0%

ii: 25%

iii: 50%

c. Determine the percentage change in return on equity of a 20 percent increase decrease in expected EBIT from a base level of $2,500,000 with a debt /total assets ratio of

i: 0%

ii: 25%

iii: 50%

d. Which leverage ratio yields the highest expected return on equity?

e. Which leverage ratio yields the highest variability (risk) in expected return on equity?

f. What assumption was made about the cost of debt (i.e., interest rate) under the various capital structures (i.e., leverage ratio)? How realistic is this assumption?

**Question 7**

Colorado Coal Company has estimated the costs of debt and equity capital (with bankruptcy and agency costs) for various proportions of debt in its capital structure.

Debt Ratio Pretax Cost of Debt Cost of Equity Weighted Average Cost

[B/(B + E)] Kd Ke Of Capital Ka

|  |  |  |  |
| --- | --- | --- | --- |
| 0.00 |  |  | 12.0% |
| 0.15 |  | 13.0 | 11.68% |
| 0.30 | 8.0 | 14.5 |  |
| 0.45 |  | 16.5 | 11.775% |
|  | 14.0 | 19.0 | 12.64% |

The company’s income tax rate is 40 percent.

**a. Fill in the missing entries in the table.**

**b. Determine the capital structure (i.e., debt ratio) that minimizes the firm’s weighted average cost of capital.**