Sample Problems for WACC

Question 1:
Suppose a company uses only debt and internal equity to finance its capital budget and uses CAPM to compute its cost of equity. Company estimates that its WACC is 12%. The capital structure is 75% debt and 25% internal equity. Before tax cost of debt is 12.5% and tax rate is 20%. Risk free rate is $r_{RF} = 6\%$ and market risk premium $(r_m - r_{RF}) = 8\%$. What is the beta of the company?

Answer:

\[
WACC = w_d r_d (1 - T) + w_e r_e
\]
\[
0.12 = 0.75(0.125)(1 - 0.20) + 0.25r_e
\]
\[
r_e = 18\%
\]

\[
r_e = 18\% = r_{RF} + \beta(r_m - r_{RF})
\]
\[
18\% = 6\% + \beta(8\%)
\]
\[
\beta = 1.5
\]

Question 2
A company finances its operations with 50 percent debt and 50 percent equity. Its net income is $I = $30 million and it has a dividend payout ratio of $x = 20\%$. Its capital budget is $B = $40 million this year.

The interest rate on company’s debt is $r_d = 10\%$ and the company’s tax rate is $T = 40\%$.

The company’s common stock trades at $P_0 = $66 per share, and its current dividend of $D_0 = $4 per share is expected to grow at a constant rate of $g = 10\%$ a year.

The flotation cost of external equity, if issued, is $F = 5\%$ of the dollar amount issued.

a) Will the company have to issue external equity?

\[
w_e B = 0.50(40M) = 20M
\]
\[
I(1 - x) = $30(1 - 0.2) = 24M
\]

Since $I(1 - x) > w_e B \implies \text{Internal Equity}$
b) What is the company’s WACC?

\[ r_{e\text{internal}} = \frac{D_0(1 + g)}{P_0} + g = \frac{4(1 + 0.10)}{66} + 0.10 = 16.66\% \]

\[
WACC = w_d r_d (1 - T) + w_{e\text{internal}} \\
= 0.50(0.10)(1 - 0.40) + 0.50(0.166) \\
= 11.3\%
\]

**Question 3:** A company finances its operations with 40 percent debt and 60 percent equity. Its net income is \( I = \$16 \) million and it has a dividend payout ratio of \( x = 25\% \). Its capital budget is \( B = \$15 \) million this year. The annual yield on the company’s debt is \( r_d = 10\% \) and the company’s tax rate is \( T = 30\% \).

The company’s common stock trades at \( P_0 = \$55 \) per share, and its current dividend of \( D_0 = \$5 \) per share is expected to grow at a constant rate of \( g = 10\% \) a year. The flotation cost of external equity, if it is issued, is \( F = 5\% \) of the dollar amount issued. What is the company’s WACC?

\[
w_e B = 0.60(15M) = 9M \\
I(1 - x) = \$16(1 - 0.25) = 12M
\]

Since \( I(1 - x) > w_e B \implies \text{Internal Equity} \)

b) What is the company’s WACC?

\[
r_{e\text{internal}} = \frac{D_0(1 + g)}{P_0} + g = \frac{5(1 + 0.10)}{55} + 0.10 = 20\% \\
WACC = w_d r_d (1 - T) + w_{e\text{internal}} \\
= 0.40(0.10)(1 - 0.30) + 0.60(0.20) \\
= 14.8\%
\]