

# BUSN3049 Corporate Finance

## Tutorial 8

1. Bird Enterprises has no debt. Its current total value is \$47 million. Ignoring taxes, what will the company's value be if it sells \$18.4 million in debt? Suppose now that the company's tax rate is 23 percent. What will its overall value be if it sells \$18.4 million in debt? Assume debt proceeds are used to repurchase equity.

### Answer

M-M Proposition I with no taxes states the value of the levered firm is equal to the value of the unlevered firm. So, with no taxes, the value of the firm if it issues debt is:

$$V_U = V_L = 47,000,000$$

With corporate taxes, we need to use M-M Proposition I with taxes, so the value of the firm is:

$$\begin{aligned} V_L &= V_U + T_C D \\ &= 47,000,000 + 0.23(18,400,000) \\ &= 51,232,000 \end{aligned}$$

2. In Question 1, what is the debt-equity ratio in both cases?

### Answer

The value of the firm is the value of the debt plus the value of the equity. We can use this relationship to find the value of equity in each case. So, the debt-equity ratio with no taxes is

$$\begin{aligned} V &= E + D \\ 47,000,000 &= E + 18,400,000 \\ E &= 28,600,000 \end{aligned}$$

Hence, the debt-equity ratio is

$$D/E = \frac{18,400,000}{28,600,000} = 0.6433$$

With taxes, the debt-equity ratio becomes

$$\begin{aligned} V &= E + D \\ 52,520,000 &= E + 18,400,000 \\ E &= 34,120,000 \end{aligned}$$

Hence, the debt–equity ratio is

$$D/E = \frac{18,400,000}{34,120,000} = 0.5393$$

3. What is the cost of capital for a firm that is 100 percent debt financed? What is the value of the firm?

**Answer**

With a debt–value ratio of 1, the WACC is  $R_A(1 - T_C)$ . This result makes intuitive sense. It says that the cost of capital is the same as it would be for an all equity firm, but with the tax benefit of debt.

To find the value of the firm, M-M Proposition I with taxes states that

$$V_L = V_U + T_C D$$

The value of the firm is equal to its all-equity value grossed up by the tax benefit of debt. With 100% debt, it is the value of debt grossed up with the value of tax benefit of debt.

4. (*To be worked out by students in the tutorial class.*) Horford Co. has no debt. Its cost of capital is 8.9 percent. Suppose the company converts to a debt–equity ratio of 1.0. The interest rate on the debt is 5.7 percent. Ignoring taxes, what is the company’s new cost of equity? What is its WACC?

**Answer**

When the company is all-equity financed, the cost of equity is

$$WACC = R_E = 0.0890 = 8.9\%$$

Using M-M Proposition I with no taxes, the cost of equity will be

$$\begin{aligned} R_E &= R_A + (R_A - R_D)(D/E) \\ &= 0.089 + (0.089 - 0.057)(1) \\ &= 0.1210 = 12.10\% \end{aligned}$$

And the new WACC will be

$$\begin{aligned} WACC &= (E/V)R_e + (D/V)R_D \\ &= 0.050(0.1210 + 0.50(0.0570)) \\ &= 0.0890 = 8.9\% \end{aligned}$$