

AFIN2053 Tutorial 6, Week 8 Solutions

16.20 M&M Proposition 1: A company financed completely with equity currently has a cost of capital equal to 18 per cent. If Modigliani and Miller's Proposition 1 holds and the company is thinking about changing its capital structure to 50 per cent debt and 50 per cent equity, what will be the cost of equity after the change if the cost of debt is 8 per cent?

It is easy to see that the current cost of capital (also the cost of equity in this case) is 18 per cent. Given the proposition, we know that the cost of capital (or WACC) for the company must be constant at 18 per cent. If we know that the company can borrow at a 8 per cent cost of capital, with a 50 per cent–50 per cent debt-equity mix, then we can use the WACC formula to solve for the new cost of equity capital as follows:

$$\begin{aligned} \text{WACC} &= x_{\text{Debt}}k_{\text{Debt}} + x_{\text{os}}k_{\text{os}} \\ 0.18 &= 0.5(0.08) + 0.5(k_{\text{os}}) \\ K_{\text{os}} &= 0.28, \text{ or } 28\% \end{aligned}$$

16.23 Interest tax shield benefit: White Ltd has \$550 million of debt outstanding at an interest rate of 10 per cent. What is the amount of the tax shield on that debt, just for this year, if White Ltd is subject to a 34 per cent company tax rate?

White Ltd will pay \$55,000,000 ($\$550,000,000 \times 0.10$) in interest this year, which will shield White Ltd from paying a tax amount equal to:

$$V_{\text{Tax-savings debt}} = D \times t = (\$55,000,000 \times 0.34) = \$18,700,000$$

Therefore, the amount of this year's tax shield, due to debt issuance, for White Ltd is \$18,700,000.

16.24 Interest tax shield benefit: Munich Ltd has \$507 million of debt outstanding at an interest rate of 7 per cent. What is the present value of the tax shield on that debt if it has no maturity and if Munich Ltd is subject to a 34 per cent company tax rate?

The present value of Munich Ltd's tax shield is:

$$t_c \times D = 0.34 \times \$507,000,000 = \$172,380,000$$

An alternative calculation would be:

$$(t_c \times D \times k_{\text{Debt}}) / k_{\text{Debt}} = (0.34 \times \$507,000,000 \times 0.07) / 0.07 = \$172,380,000$$

16.32 M&M Proposition 2: Organic Foods is currently valued at \$589 million. Organic Foods will be repurchasing \$159 million of its equity by issuing a non-maturing debt issue at a 10 per cent annual interest rate. Organic Foods is subject to a 33 per cent company tax rate. Given all of the Modigliani and Miller assumptions, except the assumption that there is no tax, what value will Organic Foods have after the recapitalisation?

Organic Foods will be worth \$589,000,000 plus the present value of the tax shield.

The present value of the tax shield is \$159,000,000 x 0.33 = \$52,470,000.

Therefore, Organic Foods will be worth \$641,470,000 after the recapitalisation.

16.37 Two theories of capital structure: Use the following table to make a suggestion for the recommended proportion of debt that the company should utilise for its capital structure.

Benefit or (cost)	<u>No debt</u>	<u>25% debt</u>	<u>50% debt</u>	<u>75% debt</u>
Tax shield	\$ 0	\$10	\$20	\$30
Agency cost	-\$10	-\$ 5	-\$ 5	-\$20
Financial distress cost	-\$ 1	-\$ 3	-\$10	-\$10

By totalling the cost and benefits for each proportion of debt we find:

Benefit or (Cost)	<u>No debt</u>	<u>25% debt</u>	<u>50% debt</u>	<u>75% debt</u>
Total cost/benefit	-\$11	\$2	\$5	\$0

Therefore, this company can maximise company value by choosing a 50 per cent debt capital structure.

16.43 Delhi Ltd has \$350 million of debt outstanding at an interest rate of 10 per cent. What is the present value of the debt tax shield if the debt will mature in 5 years (and no new debt will replace the old debt), assuming that Delhi is subject to a 30 per cent company tax rate?

Delhi will pay \$35,000,000 (\$350,000,000 x 0.10) in interest each year, which will shield Delhi from paying a tax amount equal to \$10,500,000 (\$35,000,000 x 0.3). The tax shield will last for five years, so the present value of receiving this amount for the next five years is:

$$\frac{10,500,000}{0.10} \left(1 - \frac{1}{1.10^5}\right) = \$39,803,261$$

16.44 Phoenix Ltd is currently valued at \$800 million, but management wants to completely pay off its perpetual debt of \$400 million. Phoenix is subject to a 30 per cent corporate tax rate. If Phoenix pays off its debt, what will be the total value of its equity?

Phoenix will be worth \$800 million less the present value of the tax shield on its current debt. The present value of the tax shield is:

$$\$400,000,000 \times .3 = \$120,000,000$$

Therefore, Phoenix will be worth \$680 million (\$800 million - \$120 million) after the recapitalisation, and since it will be an all-equity company, that will be the value of the equity.

16.46 Holmes Ltd has an abundant cash flow. It is so high that the managers take Fridays off for a weekly luncheon in Coolangatta using the corporate jet. Describe how altering the company's capital structure might make the management of this company stay in the office on Fridays in order to work on new positive NPV projects.

The root of the problem is that the company's management is too comfortable, because their weekly trip to Coolangatta is not costly enough to the managers of the company. Holmes could drastically increase the proportion of debt in the company's capital structure. This would decrease the amount of "free" cash that Holmes's management could spend on their weekly outings. If enough debt is placed on this company, then a cash shortage, or lack of a large cash surplus, would necessitate that the managers of the company work on new positive-NPV projects rather than spend their Fridays in Coolangatta.

16.48 According to the pecking order theory:

- a. new debt is preferable to new equity.**
- b. new equity is preferable to internally generated funds.**
- c. new debt is preferable to internally generated funds.**
- d. new equity is always preferable to other sources of capital.**

A is correct. According to pecking order theory, internally generated funds are preferable to both new equity and new debt.

16.49 According to the static trade-off theory,

- a. the amount of debt a company has is irrelevant.**
- b. debt should be used only as a last resort.**
- c. debt will not be used if a company's tax rate is high.**
- d. companies have an optimal level of debt.**

D is correct. The static trade-off theory indicates that there is a trade-off between the tax shield from interest on debt and the costs of financial distress, leading to an optimal range of debt for a company.