

The Benefit of Debt: Interest Tax Shields

Interest expense is looked upon by the tax office as a cost of doing business, so it is tax-deductible. That's why it is subtracted from Net Income (NI) before tax is paid:

$$NI = (Rev - COGS - FC - Depr - \textbf{IntExp}) \cdot (1 - t_c)$$

However, we know that interest expense is an accountants' attempt to quantify the income payable to debt holders, just as dividends are income to equity holders (note that interest expense is not a cash flow). In a perfect world with no taxes or transaction costs we wouldn't care if we financed our project with debt or equity. But since interest expense is tax-deductible and dividends aren't, debt is tax-advantaged.

Advantage of Debt versus Equity Funding

$$NI = (\text{Rev} - \text{COGS} - \text{FC} - \text{Depr} - \text{IntExp}) \cdot (1 - t_c)$$


Pretax profit

The effect of more debt funding (D as in $V=D+E$):

↑D, ↑IntExp, ↓Pretax profit, ↓Tax.

The effect of more equity funding (E):

↑E, ↑Dividends, Same Pretax profit, Same Tax.

Debt is tax advantaged over equity because **interest expense** is tax deductible but **dividends** are not. This is the ‘interest tax shield’ benefit of funding your assets with debt.

Quantifying the Interest Tax Shield

$$NI = (Rev - COGS - FC - Depr - \mathbf{IntExp}). (1 - t_c)$$

$$FFCF = NI + Depr - CapEx - \Delta NOWC + \mathbf{IntExp}$$

After substituting the NI equation into FFCF, and then expanding and collecting like terms, the following can be shown:

$$FFCF = (Rev - COGS - FC - Depr). (1 - t_c) + Depr \\ - CapEx - \Delta NOWC + \mathbf{IntExp. t_c}$$

That last term, $\mathbf{IntExp. t_c}$, is the tax shield per year. It is the tax saving from paying interest on debt. Note that:

$$\mathbf{IntExp} = \mathbf{D. r_d}$$
, where D is the value of the firm's debt.

Calculation Example: Interest Tax Shield

Just Jeans Group Income Statement for period ending 26 July 2008	
Net sales	822
COGS	717
Depreciation	24
EBIT	81
Interest expense	11
Taxable income	70
Taxes	21
Net income	49

Just Jeans Group Balance Sheet as at 26 July		
	2008	2007
Current A	92	105
Non-current A	195	178
Total A	287	259
Current L	208	72
Non-current L	22	134
Owners Equity	57	53
Total L and OE	287	259

Note: all figures are given in millions of dollars (\$m).

Question: Find the yearly interest tax shield assuming a corporate tax rate (t_c) of 30%.

Answer: The easy way is to use the formula:

$$\begin{aligned}\text{Interest tax shield per year} &= \text{IntExp. } t_c \\ &= 11m \times 0.3 = \$3.3m\end{aligned}$$

So \$3.3m is the annual tax saving from paying interest on debt. If the firm didn't have this debt then it would have a lower FFCF and the value of the firm's assets is less.

Question: Find the present value of the interest tax shields (V_{ITS}). Assume that the interest tax shield will be constant forever and that the discount rate of the interest tax shield (r_{ITS}) is 10%.

Answer: Since the tax shield cash flow will be the same forever, we can value it using the perpetuity formula $V_0 = \frac{C_1}{r}$:

$$V_{ITS} = \frac{r_D \cdot D \cdot t_c}{r_{ITS}} = \frac{\text{IntExp} \cdot t_c}{r_{ITS}} = \frac{11m \times 0.3}{0.1} = 33m$$

This is the increase in the value of the firm from having debt, incurring interest expense and therefore paying less tax.