

Answer on Question #83945 - Economics - Finance

Question:

1) If a firm borrows £20 million for one year at an interest rate of 4%, approximately what is the present value of the interest tax shield? Assume a 20% marginal corporate tax rate.

Answer

Annual interest tax shield can be calculated by following:

Interest rate payment: £20,000,000*0.04=£800,000

Annual tax shield: 0.2*£800,000=£160,000

Present value of the interest tax shield:

$$PV(Tax\ Shield) = \frac{DR_D T_C}{R_D} = D * T_C$$

where

D – debt;

T_C – tax rate.

$$PV = £20,000,000 * 0.2 = £4,000,000$$

Assume perpetual debt:

$$PV = \frac{£160,000}{0.04} = £4,000,000$$

Question:

2) What is the standard deviation of the portfolio that consists of A and B shares?

	Firm Expected Return	Standard Deviation	Percentage of portfolio	Correlation
A	20%	40%	60%	0.2
B	10%	20%	40%	0.2

Answer

$$\sigma_{portfolio} = \sqrt{w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2w_1 w_2 \rho_{1,2} \sigma_1 \sigma_2}$$

where

w_{1,2}- proportion of portfolio invested in shares 1,2;

σ_{1,2}- shares 1,2 standard deviation of returns

ρ_{1,2}- correlation coefficient

$$\begin{aligned}\sigma_{portfolio} &= \sqrt{(0.6)^2(0.4 - 0.2)^2 + (0.4)^2(0.2 - 0.1)^2 + 2 * 0.6 * 0.4 * 0.2 * (0.4 - 0.2) * (0.2 - 0.1)} \\ &= 0.133 = 13.3\%\end{aligned}$$

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