M339W: December 4th, 2020.

Equity vs. Debt Financing

Capital Structure: relative proportions of debt, equity, and other securities that a company has outstanding

Financing a firm w/ Equity:

... equity in the firm w/ no debt is called **unlevered equity**

Financing a firm w/ Debt & Equity:

... equity in a firm which also has debt outstanding is called **levered equity**

* Promised payments to debt holders are to be made before the pmts to equity holder.

Perfect Capital Markets (PCM)

1. Investors and firms can trade in the same set of securities @ competitive market prices equal to the present value of their future cashflows.
2. There are no taxes, transaction costs, or issuance costs associated w/ security trading.
   ↖ when a firm takes out a loan or when it raises capital by issuing securities, the banks that provide the loan or underwrite the sale of the securities charge fees.

3. A firm's financing decisions do not change the cashflows generated by its investments, nor do they reveal new information about them.

Modigliani • Miller Proposition I.

In a perfect capital market, the total value of a firm's securities is equal to the market value of the total cashflows generated by its assets and is not affected by its choice of capital structure.

Course 2, Spring 2003, Problem #7.

A firm has the following capital structure:

	Market Value
Debt	5,000
Equity	10,000
Total	15,000

Current share price: 50.
Expected earnings per share: 6
Cost of New Debt: 5%

The firm would like to issue new debt and use the proceeds to repurchase equity.
Using the assumptions of Modigliani and Miller's proposition I, determine the amount of new debt the firm must issue to achieve an expected return on equity (ROE) of 15%.

→:

We want the new ROE = 0.15

$$\text{new ROE} = \frac{\text{expected earnings} - \text{interest on the new debt}}{\text{MV of equity} - \text{new debt}}$$

Let D be the amount of new debt:

Then,

$$\text{new ROE} = \frac{\text{expected earnings} - 0.05 \cdot D}{10000 - D} = 0.15$$

$$\text{expected earnings} = (\#\text{ of shares outstanding}) \times (\text{expected earnings per share})$$

$$= \frac{\text{MV of Equity}}{\text{price per share}} \times (\text{expected earnings per share})$$

$$= \frac{10{,}000}{50} \times 6 = 200 \times 6 = 1200$$

$$\Rightarrow \quad \frac{1200 - 0.05D}{10000 - D} = 0.15$$

$$\Rightarrow \quad 1200 - 0.05D = 1500 - 0.15D$$

$$\Rightarrow \quad 0.10D = 300$$

$$\Rightarrow \quad D = 3000$$

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Modigliani-Miller Proposition II.

	Return
E... market value of equity	R_E
D... market value of debt	R_D
U... market value of equity if the company is unlevered	R_U

$$R_U = \frac{E}{E+D} R_E + \frac{D}{E+D} \cdot R_D \quad / \cdot (E+D)$$

$$E \cdot R_E + D \cdot R_D = (E+D) \cdot R_U$$

$$E \cdot R_E = E \cdot R_U + D(R_U - R_D) \quad / : E$$

(MM) $$R_E = R_U + \frac{D}{E}(R_U - R_D)$$

R_U: return w/out leveraging

$(R_U - R_D)$: additional "risk" due to leveraging

1st Attack (MM) w/ E:

$$r_E = r_U + \frac{D}{E}(r_U - r_D)$$

The cost of capital of levered equity increases w/ the firm's market value debt-to-equity ratio.

2nd Attack (MM) w/ $Cov[\cdot, R_{Mkt}]$:

$$\beta_E = \beta_U + \frac{D}{E}(\beta_U - \beta_D)$$

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