M339W: November 22nd, 2021.

Miller-Modigliani Proposition II.

Return

R_E

R_D

R_U

E ... market value of equity

D ... market value of debt

U ... market value of equity if the company were unlevered

$$\Rightarrow \quad R_U = \frac{E}{E+D} R_E + \frac{D}{E+D} R_D$$

$\frac{D}{E+D}$: debt-to-value ratio

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

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

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

$$\Rightarrow \quad R_E = R_U + \frac{D}{E}(R_U - R_D) \qquad (II)$$

R_U: return w/out leveraging

$\frac{D}{E}$: debt-to-equity ratio

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

1st Attack (II) w/ the expectation:

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

The cost of capital of levered equity increases w/ the debt-to-equity ratio.

$$\longrightarrow \quad r_U = \frac{E}{E+D} r_E + \frac{D}{E+D} r_D$$

... the pretax weighted-average cost of capital

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

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

$$\beta_U = \frac{E}{E+D} \beta_E + \frac{D}{E+D} \cdot \beta_D$$

40. Company X has a current stock price of 55 and a book equity per share of 18. Investors expect earnings per share of 2.0 for the year and a 1.2 cash dividend per share at the end of the year. Assume the company's payout ratio and return on equity are constant.

What is the market capitalization rate for Company X?

A. 4.6%
B. 5.6%
C. 6.6%
D. 7.6%
E. 8.6%

Sample Course 2.

41. Company X and Company Y each has the same cost of capital and identical asset portfolios with a market value of 1000.

$r_X = r_Y$

Company X has zero debt. The expected return on equity for Company X is 15%.

$D_X = 0$ $\quad r_{EX} = r_X = 0.15 \Rightarrow r_Y = 0.15$

The firm value of Company Y is made up of 50% debt and 50% equity. The expected return on debt for Company Y is 9%.

$E_Y = D_Y$ $\quad r_{YD} = 0.09$

Assuming no taxes, what is the expected return on equity in Company Y? $r_{EY} = ?$

A. 9%
B. 15%
C. 21%
D. 27%
E. 33%

$$r_{EY} = r_Y + \frac{D_Y}{E_Y}(r_Y - r_{DY}) = 0.15 + 1 \cdot (0.15 - 0.09)$$

$r_{EY} = 0.21$

42. Which of the following are valid reasons for a stock split, assuming the efficient market theory is correct?

I. To give shareholders a hedge against inflation.

II. To allow shareholders to participate in the increase in book value.

III. To keep the share price in a desirable trading price range.

A. I only
B. III only
C. I and II only
D. I and III only
E. II and III only

43. The market value of a company's liabilities consists of 40 of debt and 80 of equity, for total liabilities of 120. $D=40,\ E=80$

The β for the company's debt and equity are 0.3 and 1.65, respectively. $\beta_D=0.3,\ \beta_E=1.65$ The expected return on the company's debt is 9%. $r_D=0.09$ The company has a weighted average cost of capital of 14%. $r_U=0.14$

Which of the following statements are true, ignoring the effect of taxes?

X I. If the proceeds from issuing additional equity of 10 are used to retire 10 of debt, the company's cost of capital will increase to 14.6%. False, because of Miller-Modigliani.

X II. If a proposed new project has a β of 1.05, the project is riskier than the company's existing business.

$\beta_U=\frac{80}{120}\beta_E+\frac{40}{120}\beta_D=\frac{2}{3}\cdot 1.65+\frac{1}{3}\cdot 0.03=1.20$

☺ III. If the risk-free rate is 8%, then the expected risk premium on the market is 5%.

CAPM: $r_U=0.14=r_f+\beta_U\left(\mathbb{E}[R_{Mkt}]-r_f\right)$

$\Rightarrow \mathbb{E}[R_{Mkt}]-r_f=\frac{0.14-0.08}{1.2}=\frac{0.06}{1.2}=0.05$

(A) I only

(B) II only

(C) III only

(D) I and II only

(E) I and III only

39. A firm has a debt ratio of 0.4. The firm also has a debt beta of 0.75 and an equity beta of 1.50. The expected return on the market is currently 11% and the risk-free interest rate is 5%.

What is the required return on an investment project that expands the firm's existing operations while maintaining the current target capital structure?

(A) 10%

(B) 11%

(C) 12%

(D) 14%

(E) 15%