Short-Answer

Use the following information to answer questions 1 and 2 below.

Sirius Black XM Radio is unlevered and its stock has a market value of $100 million. The beta of Sirius' stock is 1.4 and the expected return and cost of capital on its stock is 12.4%. The risk-free rate is 4%.

1. According to Modigliani and Miller, what would Sirius Black XM's stock be worth if Sirius Black XM's assets were unchanged but if the firm were funded with equity and $20 million of risk-free debt rather than entirely with equity?

   100 - 20

2. What would Sirius Black's cost of equity capital be in number 1?

$$.124 + \left(\frac{20}{100 - 20}\right)(.124 - .04)$$

Use the following information to answer questions 3 and 4 below.

Sirius Black XM Radio has outstanding stock with a market value of $60 million and outstanding risk-free debt with a market value of $40 million. The beta of Sirius' stock is 1.2 and the expected return and cost of capital on its stock is 11.2%. The risk-free rate is 4%.

3. According to Modigliani and Miller, what would Sirius Black XM's stock be worth if Sirius Black XM were funded entirely with equity?

   60 + 40

4. What would Sirius Black's cost of equity capital be in number 3?

$$r_U = \left(\frac{60}{60 + 40}\right)(.112) + \left(\frac{40}{60 + 40}\right)(.04)$$

Use the following information to answer questions 5 and 6 below.

Sirius Black XM Radio has outstanding stock with a market value of $80 million and outstanding risk-free debt with a market value of $20 million. The beta of Sirius' stock is 1.4 and the expected return and cost of capital on its stock is 12.4%. The risk-free rate is 4%.

5. According to Modigliani and Miller, what would Sirius Black XM's stock be worth if Sirius Black XM were funded entirely with equity?

   80 + 20

6. What would Sirius Black's equity beta be in number 5?

$$\beta_U = \left(\frac{80}{80 + 20}\right)(1.4) + \left(\frac{20}{80 + 20}\right)(0)$$

7. Assume perfect capital markets. Assume also that Generally Eclectic (GE) has outstanding equity with a market value of $700 billion and outstanding bonds with a market value of $500 billion. How can an investor with $100,000 create an unlevered position in GE? Be specific.

   Invest $100{,}000\left(\frac{700}{700+500}\right)$ in GE stock and $100{,}000\left(\frac{500}{700+500}\right)$ in GE bonds

8. Assume perfect markets. When a firm issues debt and uses the proceeds to repurchase shares of stock, the expected return for the firm's stockholders rises. Why doesn't this make stockholders better off?

   The increase in risk exactly offsets the increase in the expected return

9. With perfect capital markets, financial transactions neither create nor destroy value, but simply repackage risk and return. As a result, what are the two basic possibilities if a financial transaction appears to create value? How do you tell a difference between the two?

   1) market imperfection, and 2) too good to be true => must identify the market imperfection that is the source of value

10. Briefly explain why in perfect capital markets the expected return on a firm's stock increases as the firm's leverage increases.

    Firm will be able to borrow at a rate that is less than the expected return on the firm's assets

11. In a perfect market, how does the firm's weighted average cost of capital change as the firm increases its leverage?

    No change

12. NewsyCorp currently funds its assets worth (market value) $1 million with equity that has a beta of 0.75. Calculate the beta of NewsyCorp's stock if it were to issue $250,000 of risk-free debt and use the proceeds to repurchase stock. Assume perfect capital markets.

    $\beta_E = 0.75 + \left(\frac{250{,}000}{1{,}000{,}000 - 250{,}000}\right) \times 0.75$

13. In a perfect capital market, how does an increase in the amount of debt in a firm's capital structure impact the beta of the firm's stock?

    Rises.

Problems

1. Assume that the market value of Universal Gaming's stock is $600 million and that the market value of its debt is $400 million. Assume also that investors expect a 12% return on Universal's stock and a 4% return on Universal's bonds. Finally, assume perfect capital markets.
   a. Assume that Universal issues $400 million of stock and will use the proceeds to retire their debt. What will be the expected return on Universal's stock?
   b. Assume instead that Universal issues $250 million of additional debt and will use the proceeds to repurchase stock. If the risk of the debt does not change, what will the expected return on Universal's stock after the change?
   c. Are stockholders better off in "a" or "b"?

   a. $r_U = \left(\frac{600}{600+400}\right)(.12) + \left(\frac{400}{600+400}\right)(.04)$

   b. $r_E = r_u + \frac{650}{350}(r_U - .04)$

   c. Neither one. Stockholders are unaffected.

2. Assume that markets are perfect and that Best Purchase and Circuit Town have identical assets that will generate identical cash flows a year from today (at which point both firms will pay out all cash and cease operations). The market value of Best Purchase's outstanding stock is $100,000. Circuit Town's debt matures for $30,000 a year from today and promises a 4% return. The market value of Circuit Town's stock is $60,000. Note: in answering all parts, use a "+" for inflows and a "-" for outflows.
   a. Given this information, what set of transactions today will generate an arbitrage profit? What is your profit today from this transaction?
   b. Show that the conditions of arbitrage are met if Best Purchase and Circuit Town's assets generate net cash flow of $110,000 a year from today. Be sure to identify the source of all cash flows.
   c. Show that the conditions of arbitrage are met if Best Purchase and Circuit Town's assets generate net cash flow of $25,000 a year from today. Be sure to identify the source of all cash flows.

   a. Mkt value of debt $= \frac{30{,}000}{1.04}$;

   Buy Circuit Town's debt and stock, short sell Best Purchase's stock

   Arbitrage profit = $+100{,}000 - 60{,}000 - \frac{30{,}000}{1.04}$

   b. $CF_1 = 0 = 30{,}000$ (CT debt) + (110,000 – 30,000) (CT stock) – 110,000 (short BP stock).
   c. $CF_1 = 0 = 25{,}000$ (CT debt) + 0 (CT stock) – 25,000 (short BP stock).

3. Assume that the market value of Universal Gaming's stock is $600 million and that the market value of its debt is $400 million. Assume also that the beta of on Universal's stock is 1.2 and that the beta of Universal's bonds is 0.3. Finally, assume perfect capital markets and that the debt beta does not change with the firm's leverage.
   a. Assume that Universal issues $400 million of stock and will use the proceeds to retire their debt. What will be the beta of Universal's stock?
   b. Assume instead that Universal issues $250 million of additional debt and will use the proceeds to repurchase stock. If the beta of Universal's debt rises to 0.4, what will the beta of Universal's stock after the change?
   c. Are stockholders better off in "a" or "b"?

   a. $\beta_U = \left(\frac{600}{600+400}\right)1.2 + \left(\frac{400}{600+400}\right)0.3$

   b. $\beta_E = \beta_U + \frac{650}{350}(\beta_U - 0.4)$

   c. Neither one. Stockholders are unaffected.

Multiple-Choice

1. J&J Inc. currently has no debt and the market value of its assets equal $1,000,000. The firm's assets have a beta of 0.7 and a cost of capital of 6.9%. Assume that J&J is considering issuing $300,000 of debt and using the proceeds to repurchase shares. The debt would have a beta of 0.1 and a return of 2.7%. Assuming perfect capital markets, which of the following calculates the beta of the J&J's equity after the debt issue and share repurchase?

A. $0.7+\left(\frac{300{,}000}{700{,}000}\right)\times(0.7-0.1)$

b. $0.7+\left(\frac{300{,}000}{1{,}000{,}000}\right)\times(0.7-0.1)$

c. $0.7+\left(\frac{300{,}000}{1{,}000{,}000}\right)\times(0.7)$

d. $0.7+\left(\frac{300{,}000}{700{,}000}\right)\times(0.7)$

e. none of the above

2. Assuming perfect capital markets, which of the following contribute to the firm's weighted average cost of capital remaining unchanged if the firm issues additional shares of stock and uses the proceeds to pay off most its debt?

a. the weight of equity falls
b. the firm's weighted average cost of capital does not remain unchanged, it falls
c. bondholders demand a higher rate of return to compensate them for the increased risk they are taking
d. the firm's weighted average cost of capital does not remain unchanged, it rises
E. stockholders demand a lower rate of return since they now have more of a claim to the firm's least risky cash flows

3. Assume that two firms have identical projects that will generate either $100,000 or $300,000 of free cash flow each year. For each firm there is a 70% chance that free cash flows will equal $300,000. No Debt Inc. (ND) has no debt while Lots of Debt Corp. (LOD) has borrowed $1,000,000 at an 8% interest rate. The value of ND's equity is $2,000,000 and of LOD's equity is $1,100,000. Assuming perfect capital markets, which of the following will allow you to generate a positive arbitrage profit?

A. buy 5% of ND's equity, short-sell 5% of LOD's equity, borrow $50,000
b. buy 5% of ND's equity, short-sell 5% of LOD's equity, lend $50,000
c. short-sell 5% of ND's equity, buy 5% of LOD's equity, borrow $50,000
d. short-sell 5% of ND's equity, buy 5% of LOD's equity, lend $50,000
e. no arbitrage profit is possible

4. Burlington Northern currently has outstanding debt with a market value of $500,000 and outstanding equity with a market value of $1,000,000. The beta of Burlington Northern's debt is 0.2 and of its equity is 1.1. The cost of capital on Burlington Northern's debt is 4% and on Burlington Northern's equity is 11%. If Burlington Northern issues enough equity to retire all of its debt, which of the following calculate the cost of capital on Burlington Northern's stock if markets are perfect?

a. $\left(\frac{1{,}000{,}000}{500{,}000}\right)\times 11+\left(\frac{500{,}000}{1{,}000{,}000}\right)\times 4$

B. $\left(\frac{1{,}000{,}000}{1{,}500{,}000}\right)\times 11+\left(\frac{500{,}000}{1{,}500{,}000}\right)\times 4$

c. $11+\left(\frac{500{,}000}{1{,}000{,}000}\right)\times(11-4)$

d. $11-\left(\frac{500{,}000}{1{,}000{,}000}\right)\times(11-4)$

e. $4+\left(\frac{500{,}000}{1{,}000{,}000}\right)\times(11-4)$

5. When we assume perfect capital markets we assume

a. there are no taxes
b. there are no transaction costs
c. all securities are fairly priced
d. the total cash flows generated by the firm's project is unaffected by how the firm raises the money to invest in the projects
E. all of the above

6. Assuming perfect capital markets, which of the following occurs if a firm issues debt and uses the proceeds to repurchase shares?

a. the combined value of the firm's outstanding stock and bonds rise
B. the expected return on equity rises
c. risk-averse stockholders are worse off
d. the price per share of the firm's stock rises
e. the equity cost of capital falls