GESTÃO FINANCEIRA II

PROBLEM SET 4 - SOLUTIONS

(FROM BERK AND DEMARZO'S "CORPORATE FINANCE")

LICENCIATURA – UNDERGRADUATE COURSE

1ST SEMESTER 2010-2011

Chapter 12
Estimating the Cost of Capital

12-1. Suppose Pepsico's stock has a beta of 0.57. If the risk-free rate is 3% and the expected return of the market portfolio is 8%, what is Pepsico's equity cost of capital?

$3\% + 0.57 \times (8\%\text{-}3\%) = 5.85\%$

12-14. In mid-2009, Ralston Purina had AA-rated, 6-year bonds outstanding with a yield to maturity of 3.75%.

    a. What is the highest expected return these bonds could have?

    b. At the time, similar maturity Treasuries has a yield of 3%. Could these bonds actually have an expected return equal to your answer in part (a)?

    c. If you believe Ralston Purina's bonds have 1% chance of default per year, and that expected loss rate in the event of default is 40%, what is your estimate of the expected return for these bonds?

    a. Risk-free => y = 3.75%

    b. no

    c. y-d × l= 3.75% – 1%(.40) = 3.35%

12-15. In mid-2009, Rite Aid had CCC-rated, 6-year bonds outstanding with a yield to maturity of 17.3%. At the time, similar maturity Treasuries had a yield of 3%. Suppose the market risk premium is 5% and you believe Rite Aid's bonds have a beta of 0.31. If the expected loss rate of these bonds in the event of default is 60%, what annual probability of default would be consistent with the yield to maturity of these bonds?

Rd = 3% + .31(5%) = 4.55%
= y – pL = 17.3% – p(.60)
p = (17.3% – 4.55%)/.60 = 21.25%

Chapter 14
Capital Structure in a Perfect Market

14-5. Suppose there are no taxes. Firm ABC has no debt, and firm XYZ has debt of $5000 on which it pays interest of 10% each year. Both companies have identical projects that generate free cash flows of $800 or $1000 each year. After paying any interest on debt, both companies use all remaining free cash flows to pay dividends each year.

a. **Fill in the table below showing the payments debt and equity holders of each firm will receive given each of the two possible levels of free cash flows.**

	ABC		XYZ	
FCF	Debt Payments	Equity Dividends	Debt Payments	Equity Dividends
$ 800				
$1000				

b. **Suppose you hold 10% of the equity of ABC. What is another portfolio you could hold that would provide the same cash flows?**

c. **Suppose you hold 10% of the equity of XYZ. If you can borrow at 10%, what is an alternative strategy that would provide the same cash flows?**

a.

	ABC		XYZ	
FCF	Debt Payments	Equity Dividends	Debt Payments	Equity Dividends
$800	0	800	500	300
$1,000	0	1000	500	500

b. Unlevered Equity = Debt + Levered Equity. Buy 10% of XYZ debt and 10% of XYZ Equity, get 50 + (30,50) = (80,100)

c. Levered Equity = Unlevered Equity + Borrowing. Borrow $500, buy 10% of ABC, receive (80,100) − 50 = (30, 50)

14-6. **Suppose Alpha Industries and Omega Technology have identical assets that generate identical cash flows. Alpha Industries is an all-equity firm, with 10 million shares outstanding that trade for a price of $22 per share. Omega Technology has 20 million shares outstanding as well as debt of $60 million.**

a. **According to MM Proposition I, what is the stock price for Omega Technology?**

b. **Suppose Omega Technology stock currently trades for $11 per share. What arbitrage opportunity is available? What assumptions are necessary to exploit this opportunity?**

a. V(alpha) = $10 \times 22 = 220$m = V(omega) = D + E $\Rightarrow$ E = 220 − 60 = 160m $\Rightarrow$ p = $8 per share.

b. Omega is overpriced. Sell 20 Omega, buy 10 alpha, and borrow 60. Initial = 220 − 220 + 60 = 60. Assumes we can trade shares at current prices and that we can borrow at the same terms as Omega (or own Omega debt and can sell at same price).

14-8. **Schwartz Industry is an industrial company with 100 million shares outstanding and a market capitalization (equity value) of $4 billion. It has $2 billion of debt outstanding. Management have decided to delever the firm by issuing new equity to repay all outstanding debt.**

a. **How many new shares must the firm issue?**

b. **Suppose you are a shareholder holding 100 shares, and you disagree with this decision. Assuming a perfect capital market, describe what you can do to undo the effect of this decision.**

    a.   Share price = 4b/100m = $40, Issue 2b/40 = 50 million shares

    b.   You can undo the effect of the decision by borrowing to buy additional shares, in the same proportion as the firm's actions, thus relevering your own portfolio. In this case you should buy 50 new shares and borrow $2000.

14-12. **Hardmon Enterprises is currently an all-equity firm with an expected return of 12%. It is considering a leveraged recapitalization in which it would borrow and repurchase existing shares.**

    a.   **Suppose Hardmon borrows to the point that its debt-equity ratio is 0.50. With this amount of debt, the debt cost of capital is 6%. What will the expected return of equity be after this transaction?**

    b.   **Suppose instead Hardmon borrows to the point that its debt-equity ratio is 1.50. With this amount of debt, Hardmon's debt will be much riskier. As a result, the debt cost of capital will be 8%. What will the expected return of equity be in this case?**

    c.   **A senior manager argues that it is in the best interest of the shareholders to choose the capital structure that leads to the highest expected return for the stock. How would you respond to this argument?**

    a. $r_e = r_u + d/e(r_u - r_d) = 12\% + 0.50(12\% - 6\%) = 15\%$

    b. $r_e = 12\% + 1.50(12\% - 8\%) = 18\%$

    c.   Returns are higher because risk is higher—the return fairly compensates for the risk. There is no free lunch.

14-13. **Suppose Microsoft has no debt and an equity cost of capital of 9.2%. The average debt-to-value ratio for the software industry is 13%. What would its cost of equity be if it took on the average amount of debt for its industry at a cost of debt of 6%?**

At a cost of debt of 6%:

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

$$r_E = 0.092 + \frac{0.13}{0.87}(0.092 - 0.06)$$

$$= 0.0968$$

$$= 9.68\%.$$

14-17. **Mercer Corp. is an all equity firm with 10 million shares outstanding and $100 million worth of debt outstanding. Its current share price is $75. Mercer's equity cost of capital is 8.5%. Mercer has just announced that it will issue $350 million worth of debt. It will use the proceeds from this debt to pay off its existing debt, and use the remaining $250 million to pay an immediate dividend. Assume perfect capital markets.**

    a.   **Estimate Mercer's share price just after the recapitalization is announced, but before the transaction occurs.**

    b.   **Estimate Mercer's share price at the conclusion of the transaction. (*Hint*: use the market value balance sheet.)**

c. Suppose Mercer's existing debt was risk-free with a 4.25% expected return, and its new debt is risky with a 5% expected return. Estimate Mercer's equity cost of capital after the transaction.

a. MM => no change, $75

b. Initial enterprise value = 75 × 10 + 100 = 850 million

New debt = 350 million

E = 850 – 350 = 500

Share price = 500/10 = $50

c. Ru = (750/850) × 8.5% + (100/850) × 4.25% = 8%

Re = 8% + 350/500(8% – 5%) = 10.1%

14-18. In June 2009, Apple Computer had no debt, total equity capitalization of $128 billion, and a (equity) beta of 1.7 (as reported on Google Finance). Included in Apple's assets was $25 billion in cash and risk-free securities. Assume that the risk-free rate of interest is 5% and the market risk premium is 4%.

a. What is Apple's enterprise value?

b. What is the beta of Apple's business assets?

c. What is Apple's WACC?

a. 128-25=103 billion

b. Because the debt is risk free, $\beta_U = \dfrac{E}{E+D}\beta_E$

$$= \frac{128}{103}(1.7)$$
$$= 2.11$$

c. $r_{WACC} = r_f + \beta\left(E[R_{Mkt}] - r_f\right) = 5 + 2.11 \times 4 = 13.4\%$

alternatively

$r_E = r_f + \beta_E\left(E[R_{Mkt}] - r_f\right) = 5 + 1.7 \times 4 = 11.8\%$

$$r_{wacc} = \frac{E}{E+D}r_E + \frac{D}{E+D}r_D = \frac{\$128}{\$103}(11.8\%) - \frac{\$25}{\$103}(5\%) = 13.4\%$$

Chapter 15
Debt and Taxes

15-5. Your firm currently has $100 million in debt outstanding with a 10% interest rate. The terms of the loan require the firm to repay $25 million of the balance each year. Suppose that the marginal corporate tax rate is 40%, and that the interest tax shields have the

same risk as the loan. What is the present value of the interest tax shields from this debt?

Year	0	1	2	3	4	5
Debt	100	75	50	25	0	0
Interest		10	7.5	5	2.5	0
Tax Shield		4	3	2	1	0
PV	$8.30 million					

15-10. **Rogot Instruments makes fine Violins and Cellos. It has $1 million in debt outstanding, equity valued at $2 million, and pays corporate income tax at rate 35%. Its cost of equity is 12% and its cost of debt is 7%.**

   a. **What is Rogot's pretax WACC?**

   b. **What is Rogot's (effective after-tax) WACC?**

   a. $$\text{Pre} - \text{Tax Wacc} = \frac{E}{E+D}r_E + \frac{D}{E+D}r_D = \frac{2}{3}12\% + \frac{1}{3}7\% = 10.33\%$$

   b. $$r_{\text{wacc}} = \frac{E}{E+D}r_E + \frac{D}{E+D}r_D(1-\tau_c) = \frac{2}{3}12 + \frac{1}{3}7(.65) = 9.52\%$$

15-16. **Milton Industries expects free cash flow of $5 million each year. Milton's corporate tax rate is 35%, and its unlevered cost of capital is 15%. The firm also has outstanding debt of $19.05 million, and it expects to maintain this level of debt permanently.**

   a. **What is the value of Milton Industries without leverage?**

   b. **What is the value of Milton Industries with leverage?**

   a. $$V^U = \frac{5}{0.15} = \$33.33 \text{ million}$$

   b. $$V^L = V^U + \tau_C D = 33.33 + 0.35 \times 19.05 = \$40 \text{ million}$$

15-18. **Kurz Manufacturing is currently an all-equity firm with 20 million shares outstanding and a stock price of $7.50 per share. Although investors currently expect Kurz to remain an all-equity firm, Kurz plans to announce that it will borrow $50 million and use the funds to repurchase shares. Kurz will pay interest only on this debt, and it has no further plans to increase or decrease the amount of debt. Kurz is subject to a 40% corporate tax rate.**

   a. **What is the market value of Kurz's existing assets before the announcement?**

   b. **What is the market value of Kurz's assets (including any tax shields) just after the debt is issued, but before the shares are repurchased?**

   c. **What is Kurz's share price just before the share repurchase? How many shares will Kurz repurchase?**

   d. **What are Kurz's market value balance sheet and share price after the share repurchase?**

a. Assets = Equity = $7.50 \times 20 = \$150$ million

b. Assets = 150 (existing) + 50 (cash) + 40% × 50 (tax shield) = $220 million

c. E = Assets – Debt = 220 – 50 = $170 million. Share price $= \dfrac{\$170 \text{ million}}{20} = \$8.50$.

   Kurz will repurchase $\dfrac{50}{8.50} = 5.882$ million shares.

d. Assets = 150 (existing) + 40% × 50 (tax shield) = $170 million

   Debt = $50 million

   E = A – D = 170 – 50 = $120 million

   Share price $= \dfrac{\$120}{20 - 5.882} = \$8.50 / \text{share}$.