PROBLEM 1 (12 points; 3 points for each part)

An unlevered (all-quity) firm has 300,000 common shares trading at $60 per share. With its investment plan fixed, it is expected to generate a perpetual EBIT stream of $3 million per year. The corporate tax rate is 40%. The firm is contemplating issuing a $9 million face value perpetual bond carrying 5% coupon interest per year and using the proceeds to retire some of its stock outstanding. Ignoring personal taxes,

a) What will be the market value of the firm's equity after the change in its capital structure?

b) What will be the share price after the change in its capital structure?

c) What will be the firm's cost of equity after the change in its capital structure?

d) What will be the firm's WACC after the change in its capital structure?

a) $V_u = 300{,}000 \times \$60 = 18$ million

$V_L = V_u + t_c D = 18 + 0.4 \times 9$

$= 21.6$ million

$E_L = V_L - D = 21.6 - 9 = 12.6$ million

b) $\frac{9{,}000{,}000}{60} = 150{,}000$

Shares left : $300{,}000 - 150{,}000 = 150{,}000$

New Sp : $\frac{E_L}{CS} = \frac{12.6 \text{ million}}{150{,}000} = \$84$/share.

c) $k_e^L = \frac{(1-t_c)(EBIT - I)}{E_L} = \frac{0.6 \times (3 \text{ million} - 0.05 \times 9 \text{ million})}{12.6 \text{ million}}$

$= 0.1214 = 12.14\%$

d) $WACC = \frac{(1-t_c)EBIT}{V_L} = \frac{0.6 \times 3}{21.6 \text{ million}} = 0.0833$

$= 8.33\%$

12

Excellent

PROBLEM 2 (12 points – 3 points for each part)

An all-equity company has the following market value balance sheet at the end of the year:

Excess cash	**$200,000**	**Debt**	**$0**	**20,000 shares at $50 per share**
Other assets	**$800,000**	**Equity**	**$1,000,000**	
Total	**$1,000,000**	**Total**	**$1,000,000**	

The firm is considering the following Alternative uses of excess cash: (1) pay out dividends; (2) repurchase its own stock. Suppose you own 1,200 shares of the firm's common stock.

a. Suppose the company chooses Alternative 1. Show with calculations that, in absence of taxes and transaction costs, your wealth form the shares you own will be the same before and after the dividend payout.

b. Suppose the company chooses Alternative 2. Show with calculations that, in absence of taxes and transaction costs, your wealth from the shares you own will be the same before and after the repurchase.

c. What will you do to create "home-made dividend" for yourself if the company chooses Alternative 2?

d. Suppose you had purchased the shares you own at $20 per share. Also suppose that the dividends are taxes at 30% and the capital gains are taxed at half the regular income tax rate of 40%. How much difference will there be in the tax you will pay if the company chooses Alternative 2, instead of Alternative 1, and you create "home-made dividend" in part c.

(12)

a. Paid: $200,000 dividends.

DPS: $\frac{200,000}{20,000} = \$10$/share. ✓

New share price: DPS + Sp = 10 + 40 = 50.

Post-Dividend Sp: 50 − 10 = $40/share.

Excellent again

Before: 1200 × 50 = 60,000

After: 1200 × 50 = 60,000 ✓

Therefore: Same as before.

b. Repurchase by $200,000. shares.

$\frac{200,000}{50} = 4000$ shares.

Shares left: 20,000 − 4000 = 16,000 shares.

New Equity: $1,000,000 − 200,000 = 800,000

New share price: $\frac{800,000}{16,000} = \$50$/share

Before: 1200 × 50 = 60,000 Therefore

After: 1200 × 50 = 60,000 ✓ Same as before

C. home-made Divid:

the dividends I will get from A1 is $1200 \times 10 = 12{,}000$

$\frac{12{,}000}{50} = 240$ shares.

Therefore I can sell 240 shares to create my home made dividends

d. A1: Divides paid : $10 \times 1200 = 12000$

Tax : $12000 \times 0.3 = \$3{,}600$

A2:

Tax:

Home made D: capital gain $(50-20) \times 240$

$= 7200$

Tax: $7200 \times 0.5 \times 0.4 = \$1440$

$3600 - 1440 = \$2{,}160$ (Tax)

Therefore, I will paid less Tax ($\$2{,}160$)

If I company choose A2 instead A1.

PROBLEM 3 (6 points; 2 points for each part)

You own 100 shares of stock in the unlevered (all-equity) Chao corporation which has 1,000 shares outstanding. Based on its investment plan, Chao plans to pay $4,400 dividend at the end of the current year (i.e. one year from to-day) and a liquidating dividend of $9,680 at the end of 2 years from to-day. The required return on Chao stock is 10 percent (ignoring taxes, and transaction costs).

a. What is the value of your shares of stock? Show calculations to support your answer.

b. Suppose shareholders want Chao to increase its $4,400 dividend payout at the end of the current year to $8,000 and Chao decides to issue $3,600 worth of new stock to increase the dividend payout at the end of the current year. What will be the value of *your* shares of stock under those circumstances? Show calculations to support your answer.

(i) How many shares of new stock will be issued in part b above? Show calculation.

a.

$$P = \frac{4400}{(1+0.1)} + \frac{9680}{(1+0.1)^2}$$

$= 4000 + 8000$

$= \$12000$

O.K. but Value of your shares?

$Sp = \frac{12000}{100} = 120$/share (Today) not shares

(6)

b.

End of Year 1: 8000

~~$8000~~

End of Year 2: $9680 - (8000 \times 1.1)$

$= \$720$

$$P = \frac{8000}{(1+0.1)} + \frac{720}{(1+0.1)^2}$$

$= 7272.73 + 4727.27$

$= 12000$

$Sp = \frac{12000}{100} = 120$/share (Today)

issue $3600 stock does not affect share price

(ii) Sp at end of year two: $\frac{9680}{100} = 96.8$

Sp at end of year one: $\frac{96.8}{(1+0.1)} = 88$

~~Amt~~ # of new stock need to ~~issue~~: $\frac{3600}{88} = 40.91$ shares

Therefore at ~~end~~ end of year one

40.91 ($3600) shares ~~issued~~ need to be issue.

Excellent good logic

$\frac{9680}{1.10} / 100$

$= 8800/100$

$= 88$ ✓

REACH FOR THE TOP: Bonus question for 1 mark

Refer to problem 3: Suppose the funds raised from the new stock shares issued are invested by the firm instead of financing the dividend increase at year-end 1. Will this action of the firm increase the value of your shares? Reason out your answer in not more than 50 words.

Issue = $ 3600 shares.

New shares will be issue: 40.91 (from Q.b.ii)

At end of year 2 shares will be 100 + 40.91

at end of year 2. Equity will be 9680 (X) (3600 x 1.1)

= 13640.

Sp at end of year 2 : $\frac{13640}{140.91} = 96.80$

As we can see the share price at end of year two is same as before

$\frac{9680}{100} = 96.80$/share.

good logic

This action of the firm will not affect the value of my shares.

1

FORMULAS

With only corporate tax rate t_c

1. $V_U = \dfrac{(1-t_c)EBIT}{ROE^U}$

2. $V_L = V_U + t_c D$

3. $E_L = V_L - D$

4. $WACC = \dfrac{(1-t_c)EBIT}{V_L}$

5. $WACC = \left(\dfrac{E_L}{V_L}\right) ROE^L + \left(\dfrac{D}{V_L}\right)(1-t_c)\, i$

6. $ROE^L = \dfrac{(1-t_c)(EBIT - I)}{E_L}$ (Where I = Interest (in dollars = iD))

7. $ROE^L = ROE^U + \dfrac{D}{E_L}\left(ROE^U - i\right)(1-t_c)$ (where i is the interest rate)

With t_s, t_b and t_c

8. $V_L = V_U + \left[1 - \dfrac{(1-t_s)(1-t_c)}{(1-t_b)}\right] D$ (where t_s = personal tax rate on dividend income and t_b = personal tax rate n interest income, t_c = corporate tax rate)