ADM 3350 (Summer)

Solutions of Midterm Exam

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Problem 1

(a) $V_U = 300{,}000 \times \$60 = \$18m$

$V_L = V_U + t_c D = \$18m + (.40)\$9m = \$21.6m$

Thus: $E_L = V_L - D = \$21.6m - \$9m = \boxed{\$12.6m}$

(b) With \$9m debt proceeds the firm will retire \$9m/\$60 = 150,000 shares. The shares that remain = 300,000 − 150,000 = 150,000 shares

Thus the share price will become $= \frac{E_L}{150{,}000} = \frac{12.6m}{150000} = \boxed{\$84}$

(c) Cost of Equity: $ROE^L = \frac{(1-t_c)(EBIT - I)}{E_L}$ where

$I = 5\%$ of \$9m debt = \$450,000

Thus: $ROE^L = (1-.40)(\$3m - \$450{,}000) / \$12.6m$

$= \boxed{12.14\%}$

(d) $WACC = \frac{(1-t_c)EBIT}{V_L} = \frac{(1-.40)(\$3m)}{\$21.6m} = \boxed{8.33\%}$

Problem 2

We are given $t_s = 20\%$, $t_b = 40\%$ and $t_c = 40\%$

(a) $V_L = V_U + \left[1 - \frac{(1-t_s)(1-t_c)}{(1-t_b)}\right] D = 18m$ (From Prob. 1 above) $+ \left[1 - \frac{(1-.20)(1-.40)}{(1-.40)}\right] \$9m$

$= \$18m + \$1.8m = \cancel{\$19.8m}\ \$19.8m$

Thus: $E_L = V_L - D = \$19.8m - \$9m = \boxed{\$10.8m}$

(b) From Problem 1 above, the shares that remain after \$9m debt proceeds are used to retire 150,000 shares = 150,000 shares

Thus the share price will become $= \frac{\$10.8m}{150{,}000} = \boxed{\$72}$

Problem 3

(2)

(a)

1 2

$2,200 $4,840

$$\text{Value of the firm} = \frac{\$2200}{(1+.10)} + \frac{\$4840}{(1+.10)}$$

$$= \$2000 + \$4000 = \$6000$$

$$\text{Share Price} = \frac{\$6000}{1000} = \$6$$

Therefore: Value of your 100 shares $= 100 \times \$6 = \boxed{\$600}$

(b)

1 2

$4000 $= \$2200 + \$1800$ increase

$\$4840 - \$1800(1+.10) = \$2860$

Value of 1000 existing shares is the PV of dividend payout

1 2

$4000 $2860

$$= \frac{4000}{1+.10} + \frac{2860}{(1+.10)^2}$$

$$= \$6000$$

~~Share price = $~~

Thus value of your 100 share which are $\frac{100}{1000} = \frac{1}{10}$ of existing shares

$$= \left(\frac{1}{10}\right)(\$6000) = \boxed{\$600}$$

Thus Issuing of \$1800 Worth of New Stock will NOT change the value of your Shares.

Problem 4

(a) Your wealth (value of your shares) BEFORE dividend ~~boost~~ payout

$= 600 \times \$50 = \$30,000$ ✓

Share price after dividend payout with \$100,000 excess cash $= \dfrac{\$500,000 - \$100,000}{10,000}$

$= \$40$

Therefore after the dividend payout your wealth (value of your shares) $= 600 \times \$40 +$ Dividend on your shares

$= \$24000 +$ (Dividend per share) 600

$= \$24000 + \left(\dfrac{\$100,000}{10,000}\right) 600 = \$24000 + (\$10)600$

$= \$24000 + 6000 = \$30,000$ ✓

Thus your wealth before, and after the dividend payout under Alternative 1 remains the same (equal to \$30,000).

b) Your wealth (value of our shares) **BEFORE** share repurchase (Under Alternative 2) = 600 x \$50 = \$30,000. To conduct the repurchase with the excess cash, the firm will repurchase (retire) \$100,000/\$50 = 2,000 shares. The shares that remain = 10,000 – 2,000 = 8,000. Price per share after the repurchase = $\frac{\$500{,}000 - \$100{,}000}{8{,}000} = \$50$ (i.e. the price per share will not change; will remain at \$50). Thus: your wealth = 600 x \$50 = \$30,000. Therefore under Alternative 2 of repurchase your wealth will remain the same.

c) If the company under Alternative 2 repurchases shares at \$50 per share, you can create \$6,000 of "home-made dividend" by selling $\frac{\$6{,}000}{\$50} =$ **120 shares**.

d) Under Alternative 1 of dividend payout, you would have obtained \$6,000 dividend on your shares and would have paid tax = 30% of \$6,000 = \$1,800. With creation of home-made dividend you will sell 120 shares (as in part c) at \$50 per share which you had purchased at \$20 per share. Thus you will make capital gain of 120 (\$50 - \$20) = \$3,600 on which you will pay capital gain tax of (\$3,600)(1/2) 40% = \$3,600 x 20% = \$720. Thus you will pay \$1,800 - \$720 = **\$1,080 less tax** if the company chooses the repurchase under Alternative 2 instead of Alternative 1 of dividend payout.

Answer to Bonus Question

Before the new stock issue:

1   2

$4.840

$$V_1 = \frac{\$4840}{1+.10} = \$4400$$

Therefore, the ~~shares~~ existing 1000 shares will be priced at $\frac{\$4400}{1000} = \$4.4$ per share

The # of new stock shares to be issued at year-end 1 $= \frac{\$1800}{\$4.4} = \frac{1800}{4.4}$

The total # of shares (existing and new) at ~~year-end~~ year-end 1 $= 1000 + \frac{1800}{4.4} = \frac{6200}{4.4}$ shares

The \$1800 raised with the new stock issue, if invested at year-end 1 will generate additional ~~cash~~ cashflow of $\$1800(1+.10) = \$1980$ at year-end 2.

Therefore the total dividend to all $\frac{6200}{4.4}$ shares at year-end 1 will equal: $\$4840 + \$1980 = \$6820$.

Thus the Dividend per share ~~(DPS)~~ at year-end 1 $(DPS_2) = \$6820 \div \frac{6200}{4.4} = \boxed{\$4.84}$

The question asked is answered in full above ~~so~~ So, what follows is just a comment, on the next page.

Comment

Proportionate ownership of existing shareholders at year-end 1 $= \dfrac{1000}{\left(\frac{6200}{4.4}\right)} = \dfrac{4400}{6200}$

Proportionate ownership of new shareholders at year-end 1 $= \dfrac{\left(\frac{1800}{4.4}\right)}{\left(\frac{6200}{4.4}\right)} = \dfrac{1800}{6200}$

Dividend payout to all 1000 existing shares at yr.end 1

$= \frac{4400}{6200}(\$6820) = \$4840$.

Therefore per-share dividend ~~to~~ at year-end 2 to each of 1000 existing shares $= \frac{\$4840}{1000} = \$4.84$

Dividend payout ~~at~~ to new shares at year-end 2

$= \left(\frac{1800}{6200}\right)(\$6820) = \$1980$

Therefore, per-share dividend at year-end 2 to each of $\frac{1800}{4.4}$ new shares

$= \$1980 \div \frac{1800}{4.4} = \$4.84$

So, the answer given earlier is confirmed again.