EXERCISES -12 (SOLUTIONS)

1.

a. These companies distribute a relatively low proportion of current earnings to offset fluctuations in operational cash flow. We expect to have a lower P/E ratio, since the price of these stocks should be low in order to reflect the risk of the company. This is equivalent to the fact that expected return should be high.

b. These companies distribute a relatively high proportion of current earnings since the decline is unexpected. We expect to have a higher P/E ratio, since current earnings have unexpectedly fall.

c. These companies distribute a relatively low proportion of current earnings in order to offset anticipated declines in earnings. We expect to have a lower P/E ratio, since the price should be low to reflect the expected decline in profits.

d. These companies distribute a relatively low proportion of current earnings in order to fund expected growth. We expect to have a higher P/E ratio, since the price should be high in order to reflect the expected growth opportunities.

2.

a. A t = 0 each share is worth \$20. This value is based on the expected stream of dividends of \$1 at t = 1, and increasing by 5% in each subsequent year. Thus, we can find the appropriate discount rate for this company as follows:

$$P_0 = \frac{D_1}{r-g} \Rightarrow 20 = \frac{1}{r-0.05} \Rightarrow r = 10\%$$

Beginning at t = 2, each share in the company will enjoy a perpetual stream of growing dividends, \$1.05 at t = 2, and increasing by 5% in each subsequent year. Thus, the total value of the shares at t = 1 (at t = 1 dividend is paid and after N new shares have been issued) is given by:

$$V_1 = \frac{\$1.05 \text{ million}}{0.10-0.05} = \$21 \text{ million}$$

This value belongs both to the old and the new shareholders. Thus if P_1 is the price per share at t = 1, then:

$$V_1 = P_1 \times (1{,}000{,}000 + N) = \$21{,}000{,}000$$

At the same time the new stocks should finance the extra \$1 million dividend, which implies that:

$$P_1 \times N = \$1{,}000{,}000$$

From the first equation we have that:

$$(1{,}000{,}000 \times P_1) + (N \times P_1) = \$21{,}000{,}000$$

Substituting from the second equation we obtain:

$$(1{,}000{,}000 \times P_1) + \$1{,}000{,}000 = \$21{,}000{,}000$$

so that P_1 = \$20.00.

b. With P_1 equal to \$20, and \$1,000,000 to raise, the firm will sell 50,000 new shares.

c. The expected dividends paid at t = 2 are \$1,050,000, increasing by 5% in each subsequent year. With 1,050,000 shares outstanding, dividends per share are \$1 at t = 2, increasing by 5% in each subsequent year. Thus, total dividends paid to old shareholders are \$1,000,000 at t = 2, increasing by 5% in each subsequent year.

d. For the current shareholders the present value of the cash flows is:

$$PV = \frac{\$2,000,000}{1.10} + \frac{\$1,000,000}{(0.10-0.05)\times(1.10)} = \$20,000,000$$

3.

a. If new shares are issued in t = 1 at \$10 a share, then the firm should issue 100,000 new shares to finance the \$1,000,000 extra dividend. Thus, at the end of year 1 the firm has 1,100,000 shares outstanding. At year 2 the dividend per share is 1,050,000/1,100,000 = 0.954545, increasing by 5% in each subsequent year. Thus total dividends paid to old shareholders are 954,545 at t = 2, increasing by 5% in each subsequent year. Their present value of the cash flows is:

$$PV_{old} = \frac{\$2,000,000}{1.10} + \frac{\$954,545}{(0.10-0.05)\times(1.10)} = \$19,173,554$$

Thus the drop in the PV of the cash flows of the old shareholders is 20,000,000 – 19,173,554 = 826,446.

The total dividends paid to new shareholders are 95,454.5 at t = 2, increasing by 5% in each subsequent year. The value of these cash flows at year 1 is:

$$V_{1,new} = \frac{95,454.5}{0.1-0.05} = 1,909,091$$

Thus the gain of the new investors is 1,909,091 – 1,000,000 = 909,091 at year 1. The present value of it is 909,091/1.10 = 826,446. Note that the loss of the old shareholders is equal to the gain of the new shareholders. Thus the issuance of new shares at price lower than the fair price implies a transfer of value from the old to the new shareholders.

b. In that case dividend policy is not irrelevant. The choice to increase dividends at year 1 and finance them by issuing new stocks in a price lower than the fair price destroys the wealth of the old shareholders.

4. One problem with this analysis is that it assumes that net profits for shareholders remain the same after the stock repurchase. But in order for the firm to repurchase 200,000 shares it has to either issue debt or sell a part of its assets. In both cases the net profits for shareholders will decrease.

Assume for example that the firm decides to finance the stock repurchase program by issuing \$40,000,000 of perpetual bonds. This implies a change in the capital structure of the firm. According to MM proposition 1 (see Chapter 11) the value of the stock would not change. So, even in the earnings per share increase to \$12.50 the price of the stock will remain equal to \$200 and the P/E ratio will decrease.

The second choice that the firm has is to sell part of its assets. In order for the firm to buy back 20% of its stocks it needs to sell 20% of its assets. If the assets sold are representative of the company as a whole, we would expect net profit to decrease by 20%, to \$8,000,000. Thus, the earnings per share would be equal to 8,000,000/800,000 = \$10, much lower than the financial manager has assumed. If the P/E ratio remains the same, then the stock price will remain equal to \$200.

5.

a. Because this is a regular dividend, the announcement is not news to the stock market. Hence, the stock price will adjust only when the stock begins to trade

without the dividend and, thus, the stock price will fall on the ex-dividend date.

b. With no taxes, the stock price will fall by the amount of the dividend, here \$1.
c. With taxes on dividends but no taxes on capital gains, investors will require the same after-tax return from two comparable companies, one of which pays a dividend, the other, a capital gain of the same magnitude. The stock price will thus fall by the amount of the after-tax dividend, here: \$1 × (1 - 0.30) = \$0.70.
d. If dealers are taxed equally on capital gains and dividends, then they should not demand any extra return for holding stocks that pay dividends. Thus, if shareholders are able to freely trade securities around the time of the dividend payment, there should be no tax effects associated with dividends.

6.

a. At t = 1, a shareholder in company A will receive a dividend of \$10, which is subject to taxes of 30%. Therefore, the after-tax gain is \$7. Since the current price is \$100, the after-tax rate of return is 7/100 = 7%.
b. *After-tax return on share B after 2 years*: If an investor sells share B after 2 years, the price will be $(100 \times 1.10^2) = \$121$. The capital gain of \$21 is taxed at the 30% rate, and so the after-tax gain is \$14.70. On an initial investment of \$100, over a 2-year time period, this is an after-tax 2-year rate of return of ((100 + 14.70) – 100)/100 = 14.7%. The after-tax annual rate of return is given as: $(1+r)^2 = 1.147 \Rightarrow r = 7.098\%$.

   After-tax return on share B after 10 years: If an investor sells share B after 10 years, the price will be $(100 \times 1.10^{10}) = \$259.37$. The capital gain of \$159.37 is taxed at the 30% rate, and so the after-tax gain is \$111.56. On an initial investment of \$100, over a 10-year time period, this is an after-tax 10-year rate of return of ((100 + 111.56) – 100)/100 = 111.56%. The after-tax annual rate of return is given as: $(1+r)^{10} = 2.1156 \Rightarrow r = 7.78\%$.