Solutions
Security Analysis – 22.11.2011

1. Choice "c" is correct.

$$P = \frac{Div_1}{r_P} = \frac{\$5.00}{5\%} = \$100.00$$

Choice "a" is incorrect. This is the perpetual dividend, not the value of the preferred shares.

Choice "b" is incorrect. This is the result if the Company's 10% debt rate is used in the denominator, but the denominator should be the yield on similar quality preferred stocks.

Choice "d" is incorrect. This is the result if the risk-free rate of interest is used in the denominator, but the denomination should be the yield on similar quality preferred stocks.

2. Choice "b" is correct.

$$Current\ yield = \frac{Dividend}{Stock\ Price}$$

$$Stock\ price\ at\ year\ 3 = \frac{Dividend}{Current\ yield} = \frac{25\% \times \$2.40}{3\%} = \$20$$

$$P_{CS} = \frac{0.25 \times \$2.00}{1.15} + \frac{0.25 \times \$2.20}{(1.15)^2} + \frac{0.25 \times \$2.40}{(1.15)^3} + \frac{\$20.00}{(1.15)^3} = \$14.40$$

Choice "a" is incorrect. This is the price if the stock value at year three is incorrectly discounted for four periods, not three.

Choice "c' is incorrect. This is the next year's projected dividend (25% × $2.00 = $0.50) divided by the year three 3% current yield.\

Choice "d" is incorrect. This is the price that results if earnings, not dividends, are used in calculating the price.

3. Choice "a" is correct.

$$P_{CS} = \frac{Div_1 + P_1}{1+r} + \frac{\$1.50 + \$26.00}{1.15} = \$23.91$$

Choice "b" is incorrect. This is the value excluding the dividends, but the dividends should be included.
Choice "c" is incorrect. This is the result if the dividends are incorrectly double counted.
Choice "d" is incorrect. This is the cash flows, but they should be discounted by the 15% required return.

4. Choice "a" is correct.
First, calculate the next two year's dividends:
$$Div_1 = Div_0(1 + gDiv) = \$1.00(1.05) = \$1.05$$
$$Div_2 = Div_1(1 + gDiv) = \$1.05(1.05) = \$1.10$$
Next, calculate the terminal value:
$$P_{CS_2} = \frac{Div_2}{CY_2} = \frac{\$1.10}{2\%} = \$55.00$$
Finally, calculate the price today:
$$P_{CS_2} = \frac{Div_1}{(1 + r_{CE})} + \frac{Div_2 + P_{CS_2}}{(1 + r_{CE})^2} = \frac{\$1.05}{1.10} + \frac{\$1.10 + \$55.00}{(1.10)^2} = \$47.32$$
Choice "b" is incorrect. This is the value of all calculations are based on $1.00 being used as dividend$_1$ instead of the correct $1.05.
Choice 'c" is incorrect. This is the value of the stock in two years.
Choice "d" is incorrect. This is the expected year one dividend divided by the year two yield of 2%.

5. Choice "c' is correct. The current dividend of $2.00 will grow to $2.08 next year, using the 4% growth rate. Thus the numerator is $2.08. The denominator is the investor's required return minus the growth rate.

$$P_{CS_2} = \frac{Div_1}{r_{Ce} - g} = \frac{\$2.00(1.04)}{.09 - .04} = \$41.60$$
Choice "a" is incorrect. This is the result if the current dividend is divided by the 10-year Treasury rate.
Choice "b" is incorrect. This is the result if the current dividend is divided by the required rate of return less the growth rate.
Choice "d" is incorrect. This is the result if r_{CE} is calculated by adding the risk-free rate to the 10-year Treasury rate. The correct dividend and growth rate are used.

6. Choice "b" is correct. The value of the shares is calculated as follows:

$$Div_1 = Div_0 \times (1 + g_{HI}) = \$2.50 \times (1 + 20\%) = \$3.00$$
$$Div_2 = Div_1 \times (1 + g_{HI}) = \$3.00 \times (1 + 20\%) = \$3.60$$
$$P_2 = \frac{Div_3}{r_{CE} - g_m} = \frac{\$3.60 \times (1 + 3\%)}{12\% - 3\%} = \frac{\$3.71}{9\%} = \$41.22$$
$$P_0 = \frac{Div_1}{(1 + r_{CE})} + \frac{Div_2}{(1 + r_{CE})} + \frac{P_2}{(1 + r_{CE})} = \frac{\$3.00}{1.12} + \frac{\$3.60}{(1.12)^2} + \frac{\$41.22}{(1.12)^2} = \$38.41$$
Choice "a" is incorrect. This value incorrectly discounts the future price by $(1.12)^3$. The correct discount factor is $(1.12)^2$, as this future price is at the end of year two.

Choice "c" is incorrect. This is DIV_1 divided by $r_C.-g_M$. This ignores the second year of supernormal growth.

Choice "d" is incorrect. This value includes the current $2.50 dividend, which should not be included.

7. Choice "c" is correct. Since $4.00 is **next** year's dividend, D1 = $4.00

$$P_{CS} = \frac{D_1}{r_{CE} - g} = \frac{\$4.00}{0.12 - 0.05} = \$57.14$$

Choice "a" is incorrect. This is the dividend by the cost of equity capital. The growth rate must also be considered.

Choice "b" is incorrect. This result is found if the given dividend is grown by the growth rate and then divided by the cost of equity. Since $4.00 is the projected dividend, it should be discounted by the cost of equity minus the growth rate.

Choice "d" is incorrect. This result is found if the given dividend is grown by the growth rate and then divided by the cost of equity minus the growth rate.

8. Choice "d" is correct.

$$P_{CS} = \frac{D_1(1+g)}{r_{CE} - g} = \frac{\$2.00 \times 1.04}{0.15 - 0.04} = \$18.91$$

Note: The constant growth dividend discount model uses dividend 1 (next year's dividend) in the numerator, thus the current dividend $2.00 has to be grown at the 4% dividend growth rate.

Choice "a" is incorrect. This is the value if the current dividend is incorrectly used in the numerator and the denominator uses only the cost of equity, without adjustment for the growth rate.

Choice "b" is incorrect. This value results if the projected $2.08 dividend is used, but the denominator used is only the cost of equity. The denominator should be adjusted for the growth rate.

Choice "c" is incorrect. This is the value if the current dividend is incorrectly used in the numerator.

9. Choice "b" is correct.
Determine the dividend for year 1.
$$Div_1 = Div0(1 + g_{HI}) = \$5.00(1.40) = \$7.00$$
Calculate the price at the end of year 1:
$$P_{CS1} = \frac{Div_2}{r_{CE} - g} = \frac{Div_1(1 + g_m)}{(r_{CE} - g_m)} = \frac{\$7.00(1.03)}{(10\% - 3\%)} = \frac{\$7.21}{7\%} = \$103.00$$
Calculate the price per share today:
$$P_{CS} = \frac{Div_1 + P_{CS1}}{(1 + r_{CE})} = \frac{\$7.00 + \$103.00}{1.10} = \$100.00$$

Choice "a" is incorrect. This is the value that results if the $5.00 dividend is incorrectly used as the dividend in year one.

Choice "c" is incorrect. This is the value if the $5.00 dividend in year zero is grown at a 40% for two years. The 40% growth is a one-year growth rate.

Choice "d" is incorrect. This is the value if the current 45.00 dividend is added to the discounted $100.00 value. The current dividend is not part of the cash flows new investor will receive.

10. Choice "d" is correct. The constant growth dividend model can be reformulated to solve for the P/E ratio. The result is:

$$P / E_1 = \frac{k}{r_{CE} - g_{DIV}}; where\ K\ is\ the\ payout\ rate$$

If the yield on Treasury bills increases, the cost of equity will rise:

$$\left[r_{CE} = r_F + \beta \left(r_M - r_F \right) \right]$$

Since r_F is the yield on Treasury bills. A higher cost of equity will result in a lower P/E ratio (using the formula above).

Choice "a" is incorrect. A higher payout ratio will result in a higher P/E.

Choice "b" is incorrect. Less risk-averse investors will result in a lower cost of equity, thus increasing the P/E ratio.

Choice "c" is incorrect. Inflation is a part of the risk-free rate. A decline in inflation will result in a lower risk-free rate. This lower rate will decrease the cost of equity and the P/E should rise.

11. Choice "d" is correct. Because of the various accounting effects on reported net income (earnings), analysts may avoid normalizing earnings for use in price/earnings ratios and favor price/sales ratios. Price/sales ratios are also useful where negative earnings make price/earnings ratios meaningless, such as in startup companies.

Choice "a" is incorrect. A low debt ratio could not be determined by using price/sales multiples for a company.

Choice 'b" is incorrect. High turnover businesses would have high sales lending to lower price/sales multiples.

Choice "c" is incorrect. High price/sales ratios tend to indicate overpriced rather than underpriced shares.

12. Choice "d" is correct. Issuing stock at a price greater than book value per share adds equity at a faster rate than it adds number of shares, increasing book value per share.

Choice "a" is incorrect. Issuing long-term debt increases "cash" and adds an equal liability, resulting in no change in book value.

Choice "b" is incorrect. Retiring long-term debt decreases "cash" and reduces the liability for debt, resulting in no change in book value.

Choice "c" is incorrect. Retiring shares at a price greater than book value per share decreases equity at a faster rate than it decreases the number of shares, reducing book value.

13. Choice "d" is correct. Price to book values per share for XYZ and RDU are:

ROE = E / BV, this BV = E / ROE

Price = P/E × E

BV_{XYZ} = $1 / .10 = $10
$Price_{XYZ}$ = 20 × $1 = $20
P / BV_{XYZ} = $20 / $10 = 2x

BV_{RDU} = $2 / .20 = $10
$Price_{RDU}$ = 20 × = $40
P / BV_{RDU} = $40 / $10 = 4x

Choice "a" is incorrect. These are the price/earnings ratios rather than price/book ratios
Choice "b" is incorrect. These are the returns on equity, not the price to book values.
Choice "c" is incorrect. The book values for XYZ ad RDU are both $10, rather than the price/book ratio.

14. Choice "d" is correct. The lack of growth in earnings does not invalidate the use of P/E multiples. The likely outcome of no earnings growth would be a low P/E multiple.
Choices "a", b" and "c" are incorrect. Each describes a situation in which the use of P/E multiples would not be appropriate.

15. Choice "b" is correct. Historical cost may bear no resemblance to fair value for a firm's assets. When this is true, book value and price-to-book value are poor measures.

Choice "a" is incorrect. Is not possible for firms to record their human capital, this book values do not reflect such human capital.
Choice "c" is incorrect. Book value is fairly easy to calculate, as it is shareholders' common equity divided by the number of shares outstanding.
Choice "d" is incorrect. The fact that book values can be positive when earnings are negative is a justification for using price-to-book values.

16. Choice "d" is correct. The real risk-free rate is the risk-free rate of return adjusted for inflation and the market risk premium is the difference between the expected return on the market and the risk-free rate of return. The calculations are shown below:

Real risk-free rate:
$r_F \approx rr_F + E \text{ (INFL)}$ = 5% ≈ rr_F + 3%; rr_F = 2%

Market risk premium:
$r_M - r_F$ = 12% -5% = 7%

Choice "a" is incorrect. The real risk-free rate is correct, but the market risk premium incorrectly subtracts the real risk-free rate, instead of the ris-free rate.

Choice 'b" is incorrect. This has the terms reversed.
Choice "c" is incorrect. The market risk premium is correct, but the risk free rate of 5% is noted incorrectly as being the real risk-free rate.

17. Choice "d" is correct.
Find, first the growth rate.
Sustainable growth rate = Return on equity × (1 – Dividend payout rate)
Sustainable growth rate = 10% × (1 – 40%) = 6%
Use this growth rate in the constant growth dividend model

$$P_{CS} = \frac{Div_1}{r_{CE} - g} = \frac{Div_0 \times (1 + g)}{r_{CE} - g} = \frac{\$1.00 \times 1.06}{12\% - 6\%} = \$17.67$$

Choice "a" is incorrect. This is the $1.00 dividend by the difference between the required 12% return and the return on equity of 10%. But the firm does not grow at 10%, since it pays out 40%.
Choice "b" is incorrect. This is the dividend of $1.00 grown at 10% (ROE) and then divided by the difference between the required return of the return on equity. But the firm's growth rate is 6%, as shown above.
Choice "c" is incorrect. This is the result if the existing $1.00 dividend is used without growing it at 6%.

18. Choice "a" is correct. The real risk-free rate is the risk-free rate of return after adjusting for inflation.

Risk-free rate = real risk-free rate + Expected inflation
$r_F \approx rr_F + E$ (INFL)
$0.06 \approx rr_F + 0.05$
$rr_F \approx 0.01$ Or 1%

Choice "b" is incorrect. This is the average of the difference between the T-bill yield and the historical inflation and the difference between the T-bill and the expected inflation rate.

Choice "c" is incorrect. This is the difference between the Treasury bill yield and the historical inflation. Expected, not historical, inflation should be used.

Choice "d" is incorrect. This is the Treasury bill yield, not the real risk-free rate (see definition above).

19. Choice "d" is correct. Remember, the sustainable internal growth rate for a firm is equal to its return on equity times one minus its payout ratio. If two firms have the same return on equity, then the firm with the lowest payout ratio should have the highest growth in earnings and dividends.

Choices "a" and b are incorrect. The dividend payout ratio is not related to inventory turnover, thus there is no effect on the inventory turnover.

Choice "c" is incorrect. This is the reverse of the true effect. The firm with the highest payout ratio will have the lowest earnings growth.

20. Choice "c" is correct.

Internal growth rate = Return on common equity × Earnings retention rate

G internal = ROE × (1 − k) = 20% (80%) = 16%

Choice "a" is incorrect. This is the result if the 80% retention rate is incorrectly used as the payout rate (K).

Choice "b" is incorrect. This is the return on assets multiplied by the retention rate. The return on equity should be used when finding the internal growth rate.

Choice "d" is incorrect. This is the return on equity. The only way this would be equal to the internal growth rate is when a firm retains 100% of its earnings (pays no dividends).