**Seminar 5 SOLUTIONS**

**Equity valuation**

1. **(427/1.)** Which of the following assumptions does the constant-growth dividend discount model require?
2. Dividends grow at a constant rate.
3. ROE and the plowback rate are constant.
4. The required rate of return is less than the dividend growth rate.
5. Both a and b
6. **(398/1.)** You expect the price of IBX stock to be $59.77 per share a year from now. Its current market price is $50, and you expect it to pay a dividend 1 year from now of $2.15 per share.
7. What is the stock’s expected dividend yield, rate of price appreciation, and holding-period return?
8. If the stock has a beta of 1.15, the risk free rate is 6% per year, and the expected rate of return on the market portfolio is 14% per year, what is the required rate of return on IBX stock?
9. What is the intrinsic value of IBX stock, and how does it compare to the current market price?

*Solution:*

1. *Dividend yield=$2.15/$50=4.3%*

*Capital gains yield=(59.77-50)/50=19.54%*

*Total return=Dividen yield+ Capital Gain=4.3%+19.54%=23.84%*

1. *k=Risk Free rate+ Beta(exp. return of the portfolio-risk free rate)=6%+1.15(14%-6%)=15.2%*
2. *V0=($2.15+$59.77)/1.152=$53.75, which exceeds the market price. This would indicate a “buy” opportunity as the intrinsic value is higher than the market price.*
3. **(402/2.)** **IBX’s** stock dividend at the end of the year is expected to be $2.15, and it is expected to grow at 11.2% per year forever. If the required rate of return on IBX stock is 15.2% per year, what is its intrinsic value?
4. If IBX’s current market price is equal to the intrinsic value, what is next year’s expected price?
5. If an investor were buy IBX stock now and sell it after receiving the $2.15 dividend a year now, what is the expected capital gain (i.e., price appreciation) in percentage terms? What is the dividend yield, and what would be the holding-period return?

*Solution:*

1. *V=D1/(k-g)=$2.15/(0.152-0.112)=$53.75*
2. *P1=P0(1+g)=$53.75(1.112)=$59.77, so P1= FV of the current intrinsic value*
3. *The expected capital gain equals $59.77-$53.75=$6.02, for a percentage gain of 11.2%. The dividend yield is D1/P0=$2.15/$53.75=4%, for a holding-period return of 4%+11.2%=15.2%.*
4. **(425/10.)** A common stock pays an annual dividend per share of $2.10. The risk-free rate is 7%, and the risk premium for this stock is 4%. If the annual dividend is expected to remain at $2.10, what is the value of the stock?

*Solution:*

*P = div/risk free rate+risk premium=$2.10/0.11 = $19.09*

**Ratios**

1. **(405/3.)**
2. Calculate the price of a firm with a plowback ratio of 0.6 if its ROE is 20%. Current earnings, E1, will be $5 per share, and k=12.5%.
3. What if ROE is 10%, which is less than the market capitalization rate?
4. Compare the firm’s price in this instance to that of a firm with the same ROE and E1, but a plowback ratio of b=0.

*Solution:*

1. *g=ROExb=0.2x0.6=12%*

*P0=2/(0.125-0.12)=400*

1. *When the firm invests in projects with ROE less then k, its stock price falls.*

*If b=0.6, then g=10%x0.6=6% and P0=$2/(0.125-0.06)=$30.77. In contrast, if b=0, then P0=$5/0.125=$40.*

1. **(413/5.)** ABC stock has an expected ROE of 12% per year, expected earnings per share of $2, and expected dividends of $1.5 per share. Its market capitalization rate is 10% per year.
2. What are its expected grows rate, its price, and its P/E ratio?
3. If the plowback rate were 0.4, what would be the expected dividend per share, the growth rate, price P/E and the PEG ratio?

*Solution:*

1. *ROE=12%*

*b=$0.5/$2.00=0.25*

*g=ROExb=12%x0.25=3%*

*P0=D1/(k-g)=$1.5/(0.1-0.03)=$21.43*

*P0/E=$21.43/$=10.71*

1. *If b=0.4, then 0.4x$2=$0.8 would be reinvested and the remainder of earnings, or $1.2, would be paid as dividends.*

*g= 12%x0.4=4.8%*

*P0=D1/(k-g)=$1.2/(0.1-0.048)=$23.08*

*P0/E1=$23.08/$2=11.4*

*PEG= (P0/E1)/(g\*100)=11.54/4.8=2.4*

1. **(425/5.)** The market capitalisation rate for Admiral Motors Company is 8%. Its expected ROE is 10% and its expected EPS is $5.00. If the firm’s plowback ratio is 60%, what will be its P/E ratio?

*Solution:*

1. *g = 0.6 x 0.10 = 0.06*

*price = 2 / (0.08 - 0.06) = 100*

*P/E = 100 / 5 = 20*

1. **(425/13.)**
2. Computer stocks currently provide an expected rate of return of 16%. MBI, a large computer company, will pay a year-end dividend of $2 per share. If the stock is selling at $50 per share, what must be the market’s expectation of the growth rate of MBI dividends?
3. If dividend growth forecasts for MBI are revised downward to 5% per year, what will happen to the price of MBI stock? What (qualitatively) will happen to the company’s price-earnings ratio?

*Solution:*

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* 1. **

The price falls in response to the more pessimistic forecast of dividend growth. The forecast for *current* earnings, however, is unchanged. Therefore, the P/E ratio decreases. The lower P/E ratio is evidence of the diminished optimism concerning the firm's growth prospects.

1. **(426/15.)**
2. MF corp. has an ROE of 16% and a plowback ratio of 50%. If the coming year’s earnings are expected to be $2 per share, at what price will the stock sell? The market capitalization rate is 12%.
3. What price do you expect MF shares to sell for in three years?

*Solution:*

* 1. *g = ROE × b = 0.16 × 0.5 = 0.08 = 8.0%*

*D1 = $2(1 – b) = $2(1 – 0.50) = $1.00*

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* 1. *P3 = P0(1 + g)3 = $25(1.08)3 = $31.49*

1. **(425/11.)** The risk-free rate of return is 5%, the required rate of return on the market is 10%, and High-Flyer stock has a beta coefficient of 1.5. If the dividend per share expected during the coming year, D1, is $2.50 and *g* is 4%, at what price should a share sell?

*Solution:*

*High-Flyer stock*

*k = rf +  (kM – rf) = 5% + 1.5(10% – 5%) = 12.5%*

Therefore:



1. **(425/14.)** Even Better Products has come out with a new and improved product. As a result, the firm projects an ROE of 20%, and will maintain a plowback ratio of 0.3%. Its earnings this year will be $2 per share. Investors expect a 12% rate of return on the stock.
2. At what price and P/E ratio would you expect the firm to sell?
3. What is the present value of growth opportunities?
4. What would be the P/E ratio and the present value of growth opportunities if the firm planned to reinvest only 20% of its earnings?

*Solution:*

* 1. *g = ROE × b = 0.20 × 0.30 = 0.06 = 6.0%*

*D1 = $2(1 – b) = $2(1 – 0.30) = $1.40*

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*P/E = $23.33/$2 = 11.67*

* 1. *PVGO = P0 – = $23.33 – *
  2. *g = ROE × b = 0.20 × 0.20 = = 0.04 = 4.0%*

*D1 = $2(1 – b) = $2(1 – 0.20) = $1.60*

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*P/E = $20/$2 = 10.0*

*PVGO = P0 – = $20.00 – = $3.33*

1. **(426/19.)** The risk-free rate of return is 8%, the expected rate of return on the market portfolio is 15%, and the stock of Xyrong Corporation has beta coefficient of 1.2. Xyrong pays out 40% of its earnings in dividends, and the latest earnings announced were $10 per share. Dividends were just paid and are expected to be paid annually. You expect that Xyrong will earn an ROE of 20% per year on all reinvested earnings forever.
2. What is the intrinsic value of a share of Xyrong stock?
3. If the market price of a share in currently $100, and you expect the market price to be equal to the intrinsic value one year from now, what is your expected one-year holding-period return on Xyrong stock?

*Solution:*

*Xyrong Corporation*

* 1. *k = rf + [E(rM) – rf] = 8% + 1.2(15% – 8%) = 16.4%*

*g = b × ROE = 0.6 × 0.20 = 12%*

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* 1. *P1 = V1 = V0 × (1 + g) = $101.82 × 1.12 = $114.04*

*E(r) == *