Problem set 1 (Stocks)

Problem 1

You expect the price of SPB stock to be £29.43 a share a year from now. Its current market price is £28.57 and, you expect it to pay a dividend one year from now of £2 per share. Dividends are expected to grow forever at a constant rate.

a) What is the stock's expected dividend yield, expected (holding) period return and expected growth rate of dividends?

b) If the risk-free rate is 4 %, what is the risk premium that investors currently require to hold SPB stocks? Suppose that due to a sudden new wave of optimism, investors become happy with a risk premium equal only four-fifth of the previous risk premium. Assume no change in expectations of future dividend growth.

c) What would happen to SPB's stock price right now? What is the new expected dividend yield?

d) What would happen to SPB's expected stock price a year from now?

Problem 2

Two stocks - A and B - are traded on the same market in which the risk-free interest rate is 4%. The beta of A is 0,9 and the beta of B is 1,2.

One share of the stock of B is currently selling at 50 Euros. B is expected to have earnings per share in the coming year of 8 Euros. We also assume that B totally distributes its earnings and doesn't reinvest any portion of them, this situation going on forever.

a) What is the expected return rate of the market portfolio?

b) Assume that one share of the stock of A is currently selling at 65 Euros. How much is the expected earnings per share in the coming year for A if you assume that A also totally distributes its earnings and doesn't reinvest any portion of them, this situation going on forever?

c) Consider now a second scenario in which A would distribute only 40% of its earnings and reinvest the rest in a new project with a return on equity ROE_N. The required return on the capital is the same as the one computed in question b) whereas the expected earnings per share in the coming year is € 12 . This situation is expected to continue forever. How much would the price of one share of A be if $ROE_N = 15\%$?

d) To be more realistic in pricing A, we asked a financial analyst about his predictions for the earnings per share of A. He gives us the following table:

Year	1	2	3	4	5	From year 6 on
Expected earnings per share (in Euros)	9	9,40	10	10,2	10,5	11

The expected earnings per share starting in year 6 are constant and forever. The required return on the capital is the same as the one computed in question b)

How much is the price of one share of A under this scenario, if you assume that A distributes no earning for the first 3 years, that starting from year 4 it totally distributes its earnings and that the required return on the capital is the same as the one computed in question b)?

Answers to Problem set on Stocks

Problem 1

P(0) = 28.57 ; E[P(1)] = 29.43 ; E[D(1)] = 2 ; g is constant.
a) Expected dividend yield = E[D(1)] / P(0) = 7% ;
Holding period return : R = E[D(1)] / P(0) + {P(1) – P(0) }/ P(0) = 10 %
From the Gordon-Shapiro formula : g = E[P(1)] / P(0)-1 = 3 %.
b) R = riskfree rate + risk premium hence, risk premium = R – riskfree rate = 10 % - 4 % = 6 %.
New risk premium = four-fifth of old risk premium of 6 % _ new risk premium = 4.8 %
And new required return : R' = riskfree rate + new risk premium = 4 % + 4.8 % = 8.8 %.
c) P'(0) = 2/(0,088-0,03)=34,48
New expected dividend yield = E[D(1)] / P'(0) = 2 / 34.48 = 5.8 %.
d) In the new equilibrium, the required return (= holding period return if market is in equilibrium) is now 8.8 %.
The dividend yield is 5.8 %, hence the expected price appreciation over the year is
8.8 % - 5.8 % = 3 % , thus E'[P(1)] = (1+3%) P'(0) = 35.51.

Problem 2

$r_f = 4\%$, $\beta_A = 0.9$, $\beta_B = 1.2$, $P_B(0) = €50$, $e_B = €8$

a) $P_B(0) = e_B/k_B$, hence $k_B = 8/50 = 16\% = r_f + \beta_B(E[r_m] - r_f)$, thus $E[r_m] = (16\% - 4\%)/1,2 + 4\% = 14\%$.
b) Note that $k_A = 4\%+0,9+(14\% - 4\%) = 13\%$. As $P_A(0) = e_A/k_A$, we have $e_A = 13\%*65 = €8.45$
c) $P_A(0) = (1-b)e_A/(k_A – b*ROE) = 0.4*12/(13\% - 0.6*15\%) = € 120$
d) The price of stock A is equal to the present value of the dividends that are

Year	1	2	3	4	5	From year 6 on
Expected dividend per share (in euros)	0	0	0	10,2	10,5	11

Hence

$P_A(0) = 10,2/(1,13)^4 + 10,5/(1,13)^5 + (11/0,13)/ (1,13)^5 = €57,88$