Corporate finance, CAPM, miscellaneous, practice exam problems

(The attached PDF file has better formatting.)

*Question 1.1: Beta

A stock's CAPM beta is 1.375, the risk-free rate is 7%, and the market risk premium is 8%. If the stock now trades for $82.50 and it pays an annual dividend of $2.00 tomorrow, what is the expected stock price in one year?

A. $91
B. $92
C. $93
D. $94
E. $95

Answer 1.1: E

The stock price declines by the cash dividend. We should use a tax adjusted dividend, since the tax rate on dividends differs from the tax rate on capital gains, but the proper adjustment is unclear.

We derive the expected return on the stock after the cash dividend (the capitalization rate) from the beta and the CAPM equation. The expected return is 7% + 1.375 × 8% = 18%.

The expected stock price in one year is 1.18 × ($82.50 – $2.00) = $94.99 ≈ $95.

*Question 1.2: Beta

The risk-free rate is 7% per annum and the market risk premium is 8%. A project with a net present value of zero has an initial investment of $20,000 and no salvage value. It returns $11,300 in one year and $12,769 in two years. What is the project's beta?

A. 0.50
B. 0.75
C. 1.00
D. 1.25
E. 1.50

Answer 1.2: B

The project has an NPV of zero, so its internal rate of return is its capitalization rate. We work out the internal rate of return by a quadratic equation.

$$–\$20{,}000 + \$11{,}300 / (1+R) + \$12{,}769 / (1+R)^2 = 0$$

$$(1+R) = [\ 11{,}300 \pm (11{,}300^2 – 4 \times 20{,}000 \times –12{,}769)^{0.5}\ ] / 2 \times 20{,}000 = 1.130$$

The project's capitalization rate is 13%. We derive the β as (13% – 7%) / 8% = 0.75.

We verify this result by dividing into two investments of $10,000 each and maturities of one year and two years.

*Question 1.3: Betas

Which of the following is true for a stock with a CAPM beta of 0?

A. If $\beta = 0$, the stock's expected return is the risk-free rate.
B. If $\beta = 0$, the stock's equity return equals its debt return.
C. If $\beta = 0$, the stock's expected equity return equals its expected debt return.
D. If $\beta = 0$, the stock's expected return is zero.
E. If $\beta = 0$, the stock is risk-free.

Answer 1.3: A

The CAPM beta reflects only systematic risk, not all risk of the stock.

If the beta is zero, the expected return is the risk-free rate + 0 × the market risk premium = the risk-free rate. The stock is not risk-free, since it may have non-systematic risk.