Re-take Exam in Sï¿½K2005 Financial markets (Spring 2024)

Make the assumptions you find necessary. The weighting of the problems is only indicative.

Problem 1 (25%)

An investor has expected utility

$$U = E[r_p] - \frac{1}{2}A\sigma_p^2,$$

where $E[r_p]$ is the expected return on the investor's portfolio, σ_p is the standard deviation of the portfolio return, and A is a constant.

The investor has access to two different investment vehicles, a risk-free asset with return r_f and a risky investment with expected return μ and standard deviation σ. The investor invests a fraction w of his wealth in the risky asset.

a) Find the expected return and standard deviation of the return on the investor's portfolio.

b) Find the optimal portfolio weight w^*.

A financial advisor suggests that the following parameter values are good estimates: $\mu = 0.1$, $r_f = 0.03$, $\sigma = 0.2$, and $A = 2.5$.

c) Given the above estimates, calculate the investor's expected utility.

d) What will the investor's expected utility be if he only has access to

   i the risk-free asset?

   ii the risky asset?

Problem 2 (25%)

In the spring of 2023, the firm Petroleum Geo-Services—PGS—issued a new four-year coupon bond with semi-annual coupon payments. In an article published online in Finansavisen on March 20, financial analysts claim that the effective annual interest (i.e., the yield) on this bond is as high as 14.67%.

The par value of the bond is USD 450 million. The interest rate on the bond is 13.5%. The bond was issued at 98% of the par value.

a) If the bond was sold at 98%, show that PGS raised USD 441 million from this bond issue.

b) Calculate the semi-annual coupon payments.

c) Show that the analysts are correct in their estimate of the annualized yield—it is indeed 14.67%.

Problem 3 (25%)

Illustrate graphically the cashflows at the maturity time T for the following option strategies:

a) One unit of the underlying stock and one long put with strike $X > 0$.

b) One long put, one short call, and one unit of the underlying stock. Both options have strike $X > 0$.

c) Short one unit of the underlying stock and two long calls with strike $X > 0$.

d) One long call with strike $X = 0$.

e) What should be the initial value of the strategy in b)?

f) For which values S_T of the underlying asset will the strategy in c) give a positive payoff?

g) What should be the initial value of the call in d)?

Problem 4 (25%)

The expected return on the market portfolio is $E[r_M] = 0.1$ and the risk-free interest rate is $r_f = 0.04$. The stocks of firm A have a β-value of 1.2.

a) Calculate the expected return k on the stocks of firm A.

b) Firm A has earnings $E = 11.2$ per share. All earnings are paid as dividends. What is the value of one share of stock?

The firm's new CEO thinks the firm should retain 50% of the earnings to invest in a project giving an annual return of $ROE = 0.168$.

c) With this investment, what will be the growth rate g in the dividends?

d) Calculate the value of a share of stock.