

Problem set 8:

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Exercise 1: Option Pricing

Assume that the risk-free interest rate is $e^r = 1.05$

- (a) A share is traded at 108 kroner. It is known for sure that the share will not pay dividends for the next year. A European call option on the share is traded at the same time at 5 kroner. The option's maturity is in one year, and its exercise price is 105 kroner. Is it possible to earn arbitrage profits?

Use the formula for the lower bound of the price of a European option:

$$c \geq S - Ke^{-r}$$

- (b) Another share is traded at 108 kr. An American call option on the share is traded at 5 kroner. The option's maturity is in one year, and its exercise price is 105 kroner. There may be dividends, not exceeding 2 kroner per share. Is it possible to earn arbitrage profits?

Here you should use the inequality condition

$$C \geq S - Ke^{-rt} - D$$

where D , when unknown, should be interpreted as the net present value of the maximum possible dividend. This gives you the lower bound for the price of an American option that pays dividends.

Exercise 2: Using the CAPM

- (a) You observe the following situation:

Security	Beta	Expected return
Renewable Energy Corp	1.3	0.23
Statoil	0.6	0.13

Assume these securities are correctly priced. Based on the CAPM, what is the expected return on the market? What is the risk-free rate?

- (b) Assume the annual risk-free rate is $r_f = 1\%$ and that the annual mean and standard deviation of the return on the Oslo Børs OBX index are 6% and 10%, respectively. Using stock prices over the last three years you find that the return on Entra stocks have had an annualized covariance with the OBXindex of $cov(\tilde{R}_1, \tilde{R}_M) = 0.006$. A share in Entra is currently priced at 100 NOK per share.

Calculate an estimate of the market β of Entra.

- (c) Use the information from (b) for this exercise.

Suppose the CAPM is true. What is the expected price of an Entra stock one year from now?