Risky Assets

STK-MAT3700 - Autumn 2022

UiO : University of Oslo

1. Given the following returns and assuming that $S(0) = 55$ NOK, find the possible stock prices in a three-step economy and sketch a tree of price movements:

Scenario	$K(1)$	$K(2)$	$K(3)$
ω_1	5%	10%	-10%
ω_2	10%	-5%	10%
ω_3	−5%	10%	10%

2. In each of the following three scenarios find the one-step returns, assuming that $K(1) = K(2)$:

Scenario	$S(0)$	$S(2)$
ω_1	25	31
ω_2	25	22
ω_3	25	18

3. Given that $K(1) = 10\%$ or -10%, and $K(0, 2) = 21\%$, 10% or -1%, find a possible structure of scenarios such that $K(2)$ takes at most two different values.

4. It is known that the share price today is NOK 350 and the return rate for the first day is equal to the return rate for the second day. Nothing is known about the price of the share on the first day of trading, but it is known that on the second day of trading the

share price is NOK 410 in the case of a boom, NOK 320 in the case of stagnation, and NOK 280 in a recession. Find the return rates for the first and second days.

5. Find *d* and *u* if *S*(1) can take two values, NOK870 or NOK760, and the top possible value of *S*(2) is NOK920.

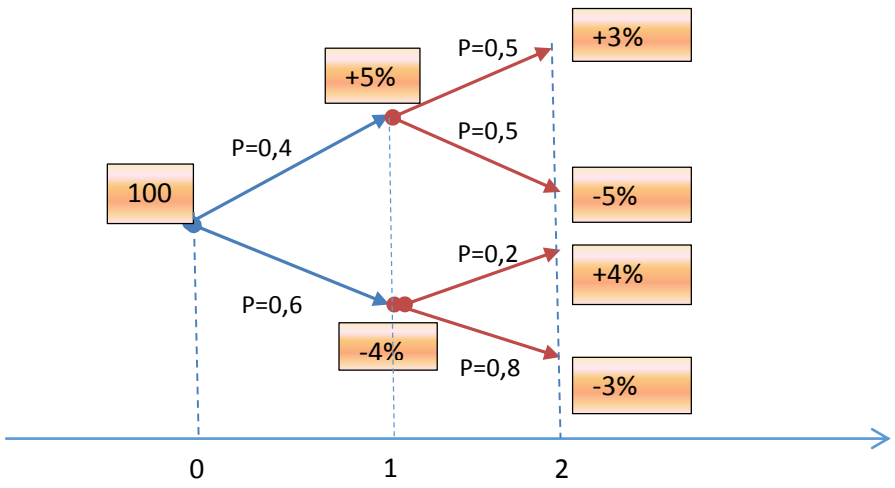
6. The stock is sold at a price of $950. We have a share price distribution for 2 years

Probability	0,1	0,15	0,05	0,2	0,3	0,2
Price	920	930	950	965	960	980

Find the coefficients of return of each of the periods of the given stock market, the expected returns for each of the periods of the given stock market and for the entire period.

7. Suppose that NOK320, NOK280 and *x* are the possible values of *S*(2). Find *x*, assuming that stock prices follow a binomial tree. Can you complete the tree? Can this be done uniquely?

8. Let the share price today is NOK 100, the following figure shows the distribution of the share price change.



Find stock prices at the end of each given stock market period, expected returns for each given stock market period, and for the entire period.