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Record Notes

Question

Difficulty: Mastery

Monitor Difficulty

Communicate with the Professor

You use a forward tree to price options on a futures contract. You are given:

i) The length of each time step is 1 year

ii) The volatility of the futures price is 25%

iii) The initial futures price is 70

iv) The continuously compounded risk-free interest rate is 5%

Calculate the price of a 2-year 75-strike European put option on the futures contract.

A 6.7

B 7.5

C 9.3

D 11.5

E 12.7

Helpful Strategies to Get You Started

Help Me Start

Recall that pricing an option on a futures contract is just like pricing an option on a dividend-paying stock with $\delta = r$. Also, a forward tree uses

$u = e^{(r-\delta)\times h + \sigma\sqrt{h}}$ and $d = e^{(r-\delta)\times h - \sigma\sqrt{h}}$.

Comprehensive Solutions and Alternatives when Available

Solution

Recall that pricing an option on a futures contract is just like pricing an option on a dividend-paying stock with $\delta = r$. Given $\sigma = 0.25$ and $h = 1$, we have:

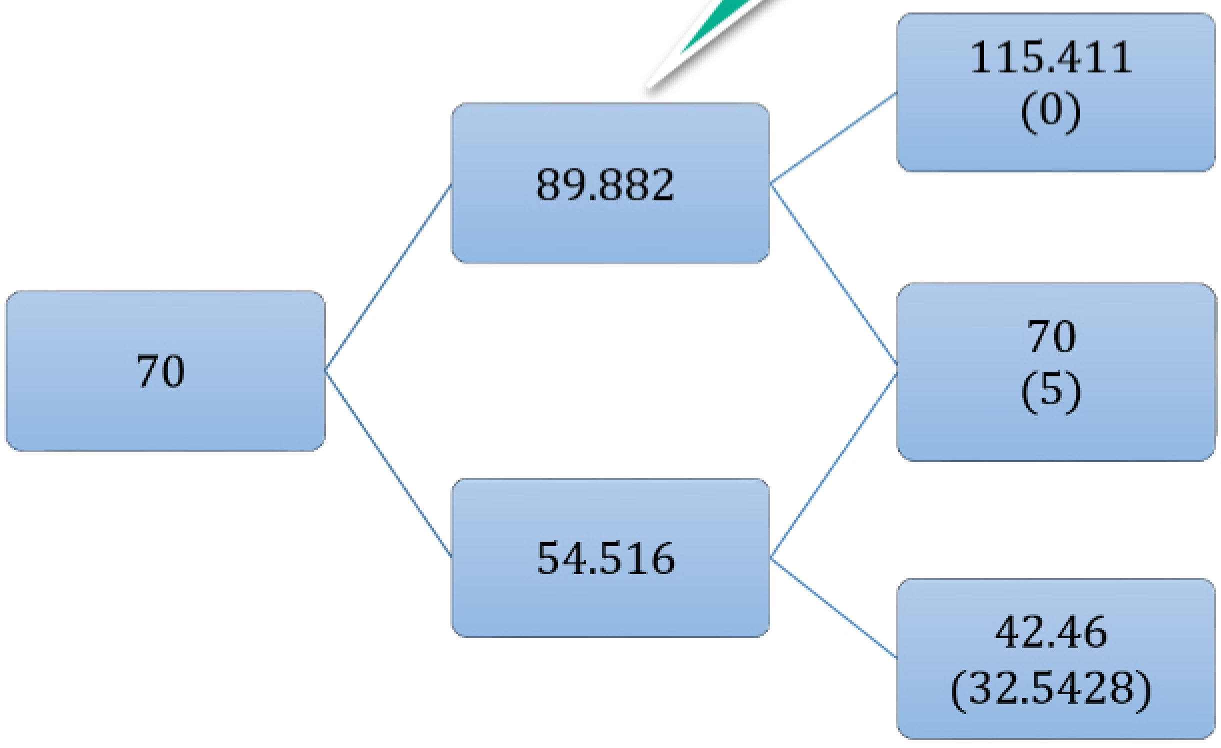
$u = e^{\sigma\sqrt{h}} = e^{0.25}$

$d = e^{-\sigma\sqrt{h}} = e^{-0.25}$

$p^* = \frac{1}{1+e^{0.25\sqrt{1}}} = 0.437823$

The two-period binominal tree is:

Graphs and Other Solution Techniques Demonstrated when Applicable



(Numbers in parenthesis represent the payoff at each node)

$C_u = e^{-0.05} \times [(1 - 0.437823) \times 5] = 2.6738$

$C_d = e^{-0.05} \times [0.437823 \times 5 + (1 - 0.437823) \times 32.5428] = 19.4849$

$C = e^{-0.05} \times [0.437823 \times 2.6738 + (1 - 0.437823) \times 19.4849] = 11.53$