Question:

Yara Inc is listed on the NYSE with a stock price of $40 - the company is not known to pay dividends. We need to price a call option with a strike of $45 maturing in 4 months. The continuously-compounded risk-free rate is 3%/year, the mean return on the stock is 7%/year, and the standard deviation of the stock return is 40%/year. What is the Black-Scholes call price?

Solution:

To calculate the Black-Scholes call price

Co =

d1 = , d2 = d1 -

Where:

Co = Current stock price

K = strike stock price

= represents the underlying volatility

r = risk-free interest rate

t = duration in years

N(d1) and N(d2) are cumulative distribution functions for a standard normal distribution

Given:

So = $40, K = $45, r= 3%, = 40%, T= 4 months (1/3 years)

d1 =

=

= -0.35

d2 = d1 -

= -0.35 – (0.4)

= - 0.58

Checking the normal distribution table for N(d1) and N(d2)

N(d1) = 0.3617, N(d2) = 0.28096

Calculating the call price now

Call price (Co) =

=

=

= 2.009

The call price is 2.009