October 24, 2024

Modelling Project 4: Binomial option Pricing

I uploaded a sample spreadsheet that can serve as guidance for what the final product looks like. Also, the YouTube link in the PowerPoint slides is useful when it comes to the most efficient Excel functions for this project.

The task

You are asked to submit a spreadsheet with two tabs: one for a European style Put option and a second tab with the equivalent American style Put option (i.e. using the same inputs). The terms of the option are as follows:

Type:	**European style Put and American style Put**
S_0:	$70
K:	$68
r:	4.75% continuously compounded !
σ:	38%
T:	8 months
Time steps:	**125 (!)**

Note: The template provided to you has 100 time steps, for this project you will need to use **125** time steps, so pls adjust the template accordingly.

Be sure to use **exp(-rT/#of time steps)** as your discount factor – not discrete discounting as shown in the YouTube video. And be sure to use **125** steps.

It is easiest to build two lattices: one for the share price and a second for the option value that feeds off the share price lattice. The lattice for the share price you build up from today, going toward the right until time T, the option maturity.

The lattice for the option values you go from right to left. The last column will have the simple payoff of the option at maturity in time T as a function of the share price for a particular path. You then work backwards through time using an if-statement to calculate the option values at every node until time t_0 which is the value of the option today!

Secondly, please calculate the **Delta** of the option by investigating what happens in the first time step at nodes $t_{1/125}$. The delta of the option is given by: [(the change in option value)/(the change in share price)], i.e. for instance (1.68 -2.16)/(30.60-29.40)= c. -40%.

When calculating the American style Put option you will need to return the maximum [of either the European Put value or (K-S)] at every node, i.e. **max[euro put; K-S]**. In other words, the Put value becomes the intrinsic value every time the intrinsic value is greater than the European value.

Required Output:

- European Put Option Value
- Delta of the European Put option
- American Put Option Value
- Delta of the American Put option

****** You must use the template provided ******

Project Due Date: Monday, November 4, 2024