Assignment 4 - V703
Financial Modeling Valuation

01/02/2007

1. This problem aims to compute the value for the option to invest in a project over the next $T = 10$ years. The underlying value of the project is assumed to follow a Geometric Brownian motion with volatility σ and pays dividends at an annualized rate δ. Assume that the investment sunk cost is $I = 100$ (in millions of dollars) and that the annualized risk free interest rate is $r = 0.04$. In each of the following items, use the Excel macro from lecture 5 to obtain a 26×101 grid of option values $F(i, j)$:

(a) Create an Excel chart which graphs the option values as a function of the project value when $t = 0$ (the first column in the grid), using a fixed $\delta = 0.03$ and three different values $\sigma = 0.2, 0.25, 0.3$ (make sure to plot the three functions on the same chart). Still on the same chart, graph the function $(V - I)^+$. Based on the graphs, explain how the exercise threshold varies with the volatility of the underlying project.

(b) On a separate chart, repeat the previous item for a fixed $\sigma = 0.2$ and three different values $\delta = 0.03, 0.05, 0.07$. Explain how the exercise threshold varies with the dividends paid by the project.