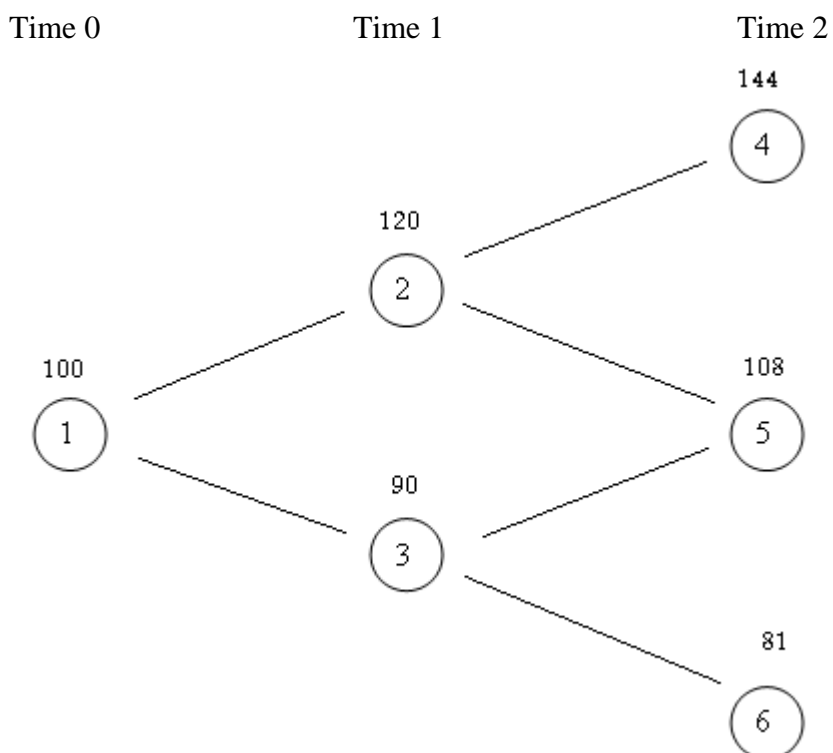


EXAM MFE QUESTIONS OF THE WEEK

S. Broverman, 2007

Week of March 5/07

You are given the following two-period binomial tree for stock prices. The stock price is above the numbered node. The annual effective interest rate is 10%.



An American call option with strike price 110 expires at time 2. Find the range of values of δ , (the continuous dividend rate on the stock) for which early exercise is optimal.

The solution can be found below.

Week of March 5/07 - Solution

The replicating portfolio at node 2 is $\Delta = e^{-\delta} \left[\frac{34-0}{144-108} \right] = \frac{17e^{-\delta}}{18}$ shares

and $B = \frac{1}{1.1} \left[\frac{-(.9)(34)}{1.2-.9} \right] = -92.73$.

The backward induction option value at node 2 is $\frac{17e^{-\delta}}{18}(120) - 92.73 = 113.33e^{-\delta} - 92.73$.

If the option is exercised at node 2 the payoff is 10, so early exercise is optimal if

$113.33e^{-\delta} - 92.73 < 10$, or equivalently, if $\delta > .098$.

There would be no early exercise at nodes 1 or 3.