WI3417TU
Kansmodellen voor Finance
Assignment 8

Lucas de Vries 1522442

November 22, 2011

Chapter 4, Exercise 3

$$
\begin{aligned}
V_3(HHH) &= 0 \\
V_3(HHT) &= 0 \\
V_3(HTH) &= 0 \\
V_3(HTT) &= 0 \\
V_3(THH) &= 0 \\
V_3(THT) &= 1 \\
V_3(TTH) &= 1.75 \\
V_3(TTT) &= 2.125
\end{aligned}
$$

$$
\begin{aligned}
V_2(HH) &= \max(0.8(0.5 * 0 + 0.5 * 0), 0) = 0 \\
V_2(HT) &= \max(0.8(0.5 * 0 + 0.5 * 0), 0) = 0 \\
V_2(TH) &= \max(0.8(0.5 * 0 + 0.5 * 1), 0.6667) = 0.6667 \\
V_2(TT) &= \max(0.8(0.5 * 1.75 + 0.5 * 2.125), 1.6667) = 1.6667
\end{aligned}
$$

$$
\begin{aligned}
V_1(H) &= \max(0.8(0.5 * 0 + 0.5 * 0), 0) = 0 \\
V_1(T) &= \max(0.8(0.5 * 0.6667 + 0.5 * 1.9375), 1) = 1.042
\end{aligned}
$$

$$
V_0 = 0.8(0.5 * 0 + 0.5 * 1.042) = 0.417
$$

If the first result is heads, the stopping time is infinite / never. The option can never be exercised for a profit in the future.

If the first result is tails, exercise the option at time 2, regardless of the second coin toss - exercising the option at time 1 is worth less than the expected value after waiting one more period. In cases TH and TT, however, exercising the option is always the optimal choice.

Chapter 4, Exercise 4

No, it is not necessary to charge more. The amount needed to hedge is not dependent on the actual probabilities of heads or tails, but only on the volatility - how much the stock price can change in one period.

By hedging, we make sure that *no matter the outcome of the toss*, we will still have a portfolio of the appropriate value. If the hedging was dependent on the actual outcome of the coin toss, it would not be hedging at all.