

Homework Assignment 1

Due: Jan. 31, 2012

Late homework is not accepted, and what you turn in must be legible and neat. I reserve the right to not accept your homework if this is not the case.

1. (10) Let $S_0 = \$100$ be the current price of an asset. Suppose the yearly risk free interest rate is 2%, and continuous compounding is in effect. Let T , the time to expiration, be 3 months.
 - (a) Determine the arbitrage free strike price in a forward contract for this asset.
 - (b) Suppose that 1 month from now the yearly risk free interest rate is 1.5%, and that the asset has increased in value to \$102. What is the value of the forward contract from part (a)?
 - (c) We developed a formula for the value of a forward contract at a time, t , before expiration. Show by a 'no arbitrage' argument that the following formula is also correct

$$f_t = S_t - PV(X),$$

where $PV(X)$ denotes the present value of the strike price. That is, this term is the strike price X discounted from the time of expiration, T , to the time t .

2. (10) Let $S_0 = \$100$, $S_u = \$105$, $S_d = \$96$, and $t =$ two months. Let V_0 denote the price of a European call. Using the binomial model for stock prices fill in the table below.

r	1.5	1.5	1.5	1.5	2	2	2	2
X	104	100	96	92	104	100	96	92
V_0								

3. (5) A share of stock costs \$12.90; a call and a put with the same strike price, $X = \$13$ cost 39¢ and 43¢ respectively. If the time to expiration is one month, what is the risk free annual interest rate. Assume that there is no compounding of interest. That is, the money earned by investing P dollars for t years is rtP , where $100r\%$ is the annual risk free rate. Hint, think put call parity formula.