

Quiz B for 2:30 Class: 11/13/13

Name Key

For short answers 1 and 2 assume that you want to build a replicating portfolio for a call on BlackFridayOnThanksgivingDay Inc. (BFOTD) that has a strike price of \$60 and which expires on Friday, December 6, 2013 (23 days from today). BFOTD's current stock price equals \$58.50, but you expect its stock price to rise to \$68.75 by Monday, December 2, 2013 (19 days from today) and then fall back to \$62 by Friday, December 6. You expect the standard deviation of returns on BFOTD stock to equal 32% between now and December 2 and 24% between now and December 6. As a result, you expect the standard deviation on the call on BFOTD's stock to equal 813% between now and December 2 and 610% between now and December 6.

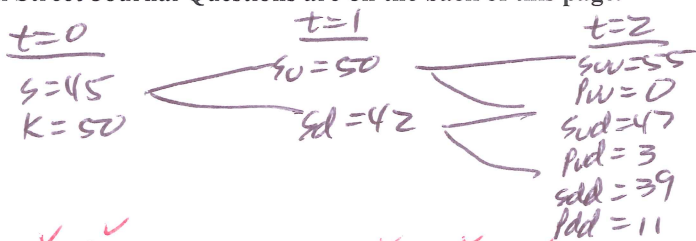
Short Answer 1 (15 points): What would you use for S when calculating your position in stock in the replicating portfolio? 58.50 + 15

Short Answer 2 (15 points): What would you use for σ when calculating your position in risk-free bonds in the replicating portfolio? 0.24 + 15

Problem (75 points): Assume you want to buy a put on Targeting Amazon's stock with a strike price of \$50 that currently trades for \$4.75. Assume also that the risk-free interest rate equals 1% per year and that Targeting Amazon's stock price currently equals \$45 per share and the stock will either rise by \$5 or fall by \$3 each of the next two years. Notes: Answer the following on a per-share basis. I will assume in inflow unless you use a "-" in front of any cash flows.

- What transactions and cash flows will occur today, one year from today, and two years from today if you buy the put today and the stock price falls in the first year but rises in the second year?
- What transactions and cash flows will occur today, one year from today, and two years from today if you build an equivalent portfolio to the put today and the stock price falls in the first year but rises in the second year? Note: You need to list all cash flows, not just net cash flows.
- Should you buy the put or the portfolio?

Wall Street Journal Questions are on the back of this page.



(i) $\Delta_u = \frac{0-3}{55-47} = -0.375$; $B_u = \frac{3 - (-0.375)(47)}{1.01} = 20.4208$; $P_u = 50(-0.375) + 20.4208 = 16.708$

(ii) $\Delta_d = \frac{3-11}{47-39} = -1$; $B_d = \frac{11 - (-1)(39)}{1.01} = 49.505$; $P_d = 42(-1) + 49.505 = 7.505$

(iii) $\Delta = \frac{16.708 - 7.505}{50 - 42} = -0.729275$; $B = \frac{7.505 - (-0.729275)(42)}{1.01} = 37.757$; $P = 45(-0.729275) + 37.757 = 4.9346$

- a. $t=0$: Buy put; CF = -4.75
- (16) $t=1$: nothing happens & no cash flow
- $t=2$: Buy stock in market; CF = -47; Sell by exercising put; CF = +50
- (17) $t=0$: Short 0.729275 shares; CF = +32.8174 (= 0.729275 x 45); Buy bonds; CF = -37.757
- (18) $t=1$: Short 0.270725 shares (= 1 - 0.729275); CF = +11.37045 (= 0.270725 x 42); Buy bonds; CF = -11.37045
- (19) $t=2$: Buy & return 1 share; CF = -47; bonds mature; CF = +50 (= 49.505 x 1.01)
- (20) c. Put