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Senior Seminar 4934

Option Pricing and Financial Risk Management
Homework #4

1. Using the most recent options on QQQQ that expire in December. (Hint: Use the Black-Scholes calculator for the Greeks)

   a. How would you create a delta and gamma neutral portfolio if you were short the ATM call and hedged with the stock and a 5% OTM option.

   b. How about vega and delta neutral using the same positions.

2. Using the 3-month futures prices of crude oil and the prices on the S&P 500 Index in 2001

   a. What is the 10 day portfolio VAR at 97.5% assuming $300,000 in oil and $500,000 in the Index?

   b. What is the VAR if you are short the oil? Choose either the historical simulation or the analytical distributions for your calculations.

   c. Back test your results using the 2002-2004 period

3. Compare the volatility estimates of the VIX index (CBOE.com) and a GARCH(1,1) and EMWA using a lambda of .94 on the S&P 100 over the 1986 through 2005 period. Plot them on a graph. What can you conclude from the different volatility series?