**Interview Questions**

**Basic Greeks**

* If we raise vol on an ATM option, what happens to gamma (increase/decrease/stay the same)?
  + Same question but on wing option

[vol up, gamma down for the ATM. Vol up, gamma up for the wing]

* Assuming that rates are independent of other stochastic factors. If rates are not fixed and very volatile, would the price of options be the lower, same or higher? Why?

[price of options will be higher; this is a similar problem to a cross currency option]

**American Exercise/Dividends**

* Given options on a dividend paying stock, how and when would you make early exercise decisions (assume interest rates are zero).

[ITM Calls evening before stock goes ex-div, any call with less time premium than div value – so can just compare to put value at same strike]

* How do non-zero interest rates change your decision process? Are there are other early exercise considerations? If so what? And when? *Don’t need exact answer here, just big picture.*

[with non-zero rates, need to account for PV(div), and deep puts become potential exercises due to cost of financing position – e.g. long put, long stock]

**Technical Questions**

* Write out the Black-Scholes equation (zero interest rates is fine). Discuss what each term represents?

[Equation is below. Only have the left hand side if ir =0. They should know it says something about the relationship between theta and gamma (esp with r = 0)]



* Which grid geometry we can use to solve the Black-Scholes by finite difference method? (explicit, implicit, Crank-Nicolson)
  + What are the convergence speed for these methods?

[explicit, implicit: O(dt, dS2), Crank-Nicolson: O(dt2,dS2)]

* + Does explicit method always converge? Under which condition?

[converge time step size: dt < dS2/S2/σ2] (doesn’t need to be exact, at least know the time step size need to scale with dS2

**Discussion Questions (work through with interviewer)**

* Using close-to-close market data, what does it mean to realize an annualized 16 volatility over 30 days (calendar time with 365days per year)?

[Sqrt( Sum of square of daily log returns / (30/365) ) = 0.16]

* + What’s the expected daily standard deviation for a 16 vol period.

[1%]

* + What’s the expected daily expected move for a 16 vol period.

[~ 0.8%]

* + Starting with a 4day 16% vol ATM straddle, which of the following sequence of moves would make the most amount of money assuming the position is hedged daily at the respective % moves? (sequence of numbers representing log returns starting from earliest day)
    - 1%, -0.5%, 1%, -0.5%
    - -0.5%, -0.5%, 1%, 1%

Why?

[Second sequence. Higher gamma near expiration and the second one is at the money for the 1% move]