10. OPTIONS

1   You are told the sterling delta for a derivatives portfolio is £125,000. The current underlying asset price is 100 and the annual asset price volatility is 20% per annum. What is the maximum delta loss expected over a two-week time horizon at a one-sided 99% confidence limit.

2   The price of a 6-month European call option with a strike price of 95 on a dividend paying stock is currently 6.5 and the current stock price is 100. You are expecting a dividend payment of 2 to be paid in 3 months time, and the 3-month interest rate and the six month interest rates are both 8%. Analyse any arbitrage profit that may be present in this set of prices, and how you trade to lock it in.

3   Give two possible reasons why the conventional Black-Scholes model applied to bond prices may not be appropriate for the valuation of a six-month European option on a two year maturity government bond.

4   You are selling a 6-month European at the money call option on a non-dividend paying stock to an investor. The current stock price is 100 and the yield curve at 5% per annum (1.25% per quarter). If you use a standard two period binomial model with an upstep of 5% and a downstep of 2.5% to value the option, what is the current delta of the call option.

5   You decide to use a two step binomial model with upsteps and down steps of 5% to value an at the money call option on a non-dividend paying stock. The periodic interest rate is 1.25%. If the price of the stock is 100, determine the delta of a two period option.