

## Statistical Methods and Calibration in Finance and Actuarial Science

MA6622

Assignment of Lectures 16-17

**1.** Compute the instantaneous interest rates, from June 15 to December 31 (2006) departing from the term structure of forward interest rates, obtained from the futures prices of the HSI, taken from the SCMP, on June 16, 2006 (see the web page of MA6622). Take into account that

- The closing price (on June 15) was  $S(0) = 15248$ ,
- The number of trading days in 2006 is 247.
- The expiry of the futures is the previous to the last business day of the corresponding month.

Use the instantaneous interest rates computed to obtain the risk free interest rate for a call option with expiry on August.

**2.** Why the Open Interest (O.I.) is bigger than the Volume (Vol) for HSI options?

**3.** Compute the forward instantaneous volatilities for the HSI from prices of at the money options with the following data:

- $S(0) = 15816.5$ , corresponding to June 8.
- Maturities are June 29, July 28 and August 30.
- Take strike  $K = 15800$  and quoted prices from SCMP, June 8 2006 (see the web site of the course)

Note: You need to compute implied volatilities. If possible, do this by the Newton Raphson algorithm.

**4.** Price a Put option assuming:

- Current (spot) price on June 8 is  $S(0) = 15816.5$
- Strike price is 15600,
- Expiry date is August 8.

Follow the steps in the “detailed example” of Lecture 16, using the same interest rates as in the example.