CREDIT SUISSE

Lecture 5: Introduction to Option Pricing

1) Extend the Pricing App such that one can obtain put/call European Option prices (in cash units) and corresponding deltas (in units of stock) in Black-Scholes model. Please implement correct error handling and inputs validation (e.g. negative strike).

2) Prepare a short report:

   a. Check your implementation: verify that the difference of the deltas for put and call for the same stock price (S) is 1 (for call – put) and the difference of their values is $S - K$ (put-call parity).

   b. In a spreadsheet, plot **values** of a **call** option (on one chart) as a function of stock price:
      - for different times to maturity: 0.001 (almost at expiry), 0.5 and 1 year, for volatility being 10%
      - include spots "left from" and "right to" the option strike ($0 < S_L < K < S_H$)

   c. Repeat point b. for **values** of a **put** option

   d. Repeat point b. for **deltas** of a **call** option

   e. Repeat point b. for **deltas** of a **put** option

3) Repeat exercises 2b. and 2d. for a different volatility level (20%). What has changed compared to the case where $\sigma = 10\%$ and why?

4) How would you calculate a value of a contract paying 1 unit of cash, if stock price on maturity is above some level K (i.e. $S_T > K$), 0 otherwise. Explain your reasoning.

5) Think about what you would like to prepare for the final project – which financial products you are going to consider, what methods you would to like use to price them and calculate risks etc. Be ready to discuss your thoughts with us, do not treat it as an examination, though. Feel free to ask questions, we will be there to resolve all your doubts (if any).