Financial Engineering & Risk Management

An Example: Pricing a European Put on a Futures Contract

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Pricing a European Put on a Futures Contract

- We can also price an option on a futures contract.
- In fact many of the most liquid options are options on futures contracts

  e.g. S&P 500, Eurostoxx 50, FTSE 100 and Nikei 225.

  - in these cases the underlying security is not actually traded.
- Consider the following parameters:

  $S_0 = 100$, $n = 10$ periods, $r = 2\%$, $c = 1\%$ and $\sigma = 20\%$

  futures expiration $=$ option expiration $= T = .5$ years.
- Futures price lattice obtained using $S_n = F_n$ and then

$$F_t = \mathsf{E}_t[F_{t+1}] \quad \text{for } 0 \leq t < n.$$

- Obtain a put option value of 5.21.

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- In practice we don't need a model to price liquid options
  - market forces, i.e. supply and demand, determines the price
  - which in this case amounts to determining σ or the implied volatility.
- Models are required to hedge these options however
  - and price exotic or illiquid derivative securities.
- Will return to this near end of course.