Financial Algorithm GUI Project

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File path: FinancialAlgorithm\gui\FinancialAlgorithm_Project\mainForm.cpp

I implemented the following option pricing models in this project:

- **♦** Monte-Carlo Simulation
 - 1. European option
 - 2. European lookback option
 - 3. European average option
- **CRR Binomial Tree**
 - 1. European Option
 - 2. American Option

Interface & Parameter Description

Basic Parameter Settings (All fields are required, except that strike price K is omitted for Lookback options)

- S0: Initial stock price
- K : Strike price
- T : Time to maturity (in years)
- r : Risk-free interest rate
- q : Continuous dividend yield
- sigma: Volatility of returns (standard deviation)
- call_put : Call / Put

CRR

• layer: Number of layers in the binomial tree

Monte Carlo Parameters

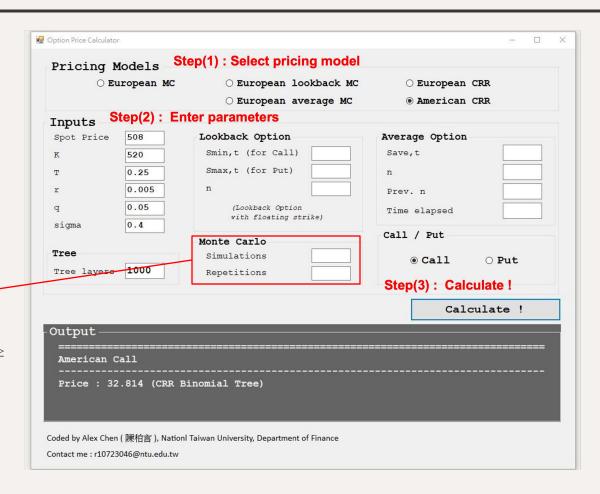
(required when using Monte Carlo):

- sims: Number of simulations (1 = one sample). Recommended ≥ 10,000.
- rep: Number of repetitions. Recommended ≥ 30.

Note:

Each repetition simulates **Sims** paths and calculates one average.

The function returns the mean, standard error, and 95% confidence interval across rep repetitions.

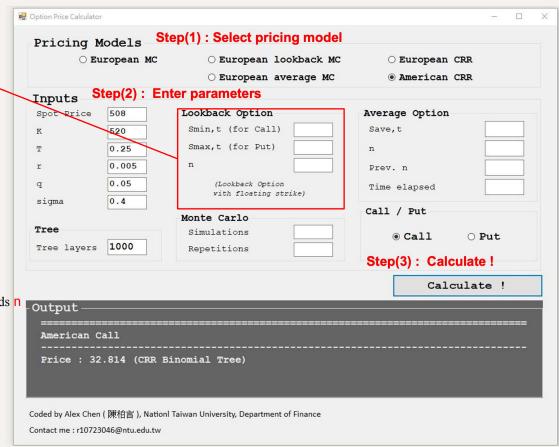


Lookback Option (MC) Parameters

Lookback Option (Monte Carlo)

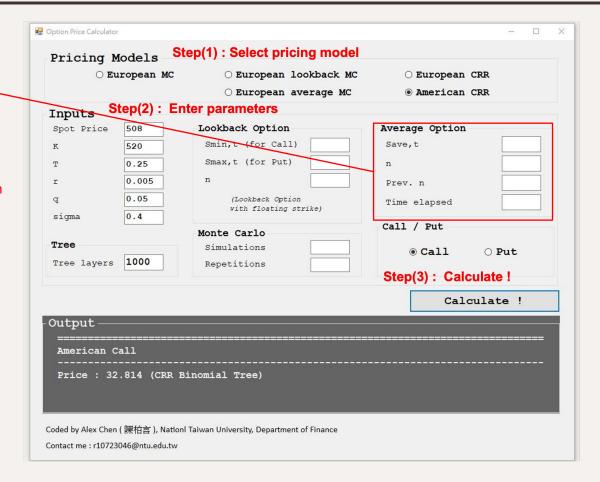
- 1) Lookback option with floating strike:
 - Call payoff = $max(S\tau Smin, \tau, 0)$
 - Put payoff = $max(Smax, \tau S\tau, 0)$
- 2) Input requirements:
 - Call requires Smin,τ
 - Put requires Smax,τ
- 3) n: Number of steps dividing T.

 Since Lookback options are **path-dependent**, each path needs n output simulated stock prices.



Average Option (MC) Parameters

- 1) Average Option (Monte Carlo)
 - Call payoff = $max(S\tau, ave K, 0)$
 - Put payoff = $max(K S\tau, ave, 0)$
- n: Number of steps dividing T.
 Like Lookback, this is also path-dependent and requires n simulated stock prices.
- 3) Time elapsed: Time from issuance to present
- 4) n_prev: Number of steps dividing the elapsed time



Error Message:

Displays if parameter settings are incomplete

