Abstract No: 53 ***ICT, Mathematics, and Statistics***

EXPLICIT FINITE DIFFERENCE METHOD FOR THE VALUATION OF AMERICAN PUT OPTION WITH DIVIDENDS USING LOGARITHMIC FRONT FIXING TRANSFORMATION

S. Kajanthan* and P. Selvarajah

Department of Interdisciplinary Studies, Faculty of Technology, University of Jaffna, Jaffna, Sri Lanka.
**kajanthans@univ.jfn.ac.lk*

The most traded options are American options due to their early exercise features. An American option is a type of financial derivative contract that gives the holder (buyer) the right, but not the obligation, to buy (call option) or sell (put option) an underlying asset at a pre-specified time before the expiration date of the option. However, pricing American options has an intriguing problem. The early exercise behaviour makes the American option pricing problem become a free boundary problem. Logarithmic front fixing transformation is a class of transformation used to transform the American free boundary problem into a fixed boundary problem. Numerical methods are used to solve the transformed fixed boundary problem. The effects of dividend payments on American put option pricing valuation were studied, and the explicit finite difference method was used to obtain the numerical solution. Dividends can significantly impact the price of an underlying asset and, consequently, the pricing of American options. When a company pays a dividend, it reduces the value of the stock because the cash is transferred to the shareholders. For put options, which give the holder the right to sell the underlying asset, dividends can increase the option's value because the holder is protected from the drop in stock price caused by the dividend payment. The inclusion of dividends guarantees stability by the numerical experiments, and numerical results confirm that increase in the American put option price and the optimal exercise price. Thus, dividend yields early exercise of the American put option less likely.

Keywords: American put option, Finite difference method, Front fixing transformation, Optimal exercise boundary