Barrier Option Pricing Using Neural Network Model

L Xu[1], M Dixon[1], B Eales[2], B Read[1] and F F Cai[1]

[1]Computing, Information Systems and Mathematics Department
[2]Economics Department
London Metropolitan University
31 Jewry Street
London EC3N 2EY
UK

Abstract

Barrier options are widely traded over-the-counter because of their cheap price, flexible structure and ability to link to any underlying securities. The partial differential equation approach is generally accepted by practitioners for pricing barrier options. However, this approach relies heavily on some underlying stochastic process assumptions. For example, barrier options could be very sensitive to the assumptions concerning volatility.

This paper investigates whether Neural Networks (NNs) can be used to price barrier options with Rubinstein and Reiner's model as the benchmark. Due to a lack of publicly available barrier options data, our data are constructed from LIFFE European style FTSE100 index options data from March 1992 to April 1997. Our experiments demonstrate that NNs have achieved good performance in pricing barrier options when setting Rubinstein and Reiner's model as the target price. Moreover, our paper discusses alternative approaches and initial learning rate settings in order to obtain a good fit.