

## LEARNING SHORT-OPTION VALUATION IN THE PRESENCE OF RARE EVENTS

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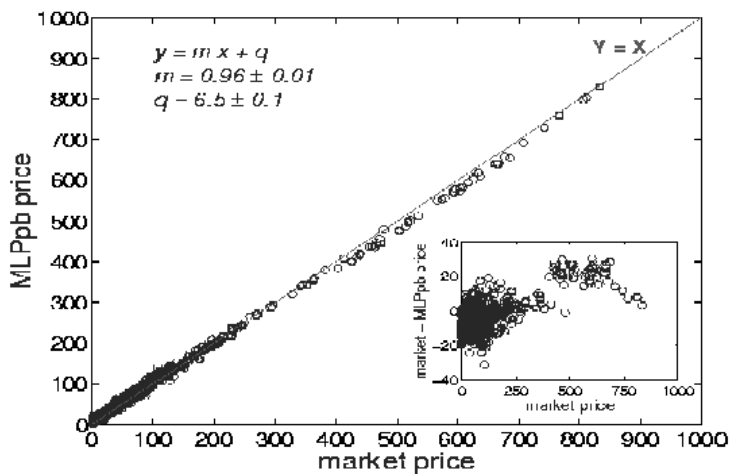
We extend the neural-network approach for the valuation of financial derivatives developed by Hutchinson *et al.* [1] to the case of fat-tailed distributions of the underlying asset returns. We use a two-layer perceptron with three inputs, four hidden neurons, and one output. The input parameters of the network are: the simulated price of the underlying asset  $F$  divided by the strike price  $E$ , the time-to-maturity  $T$ , and the ratio  $|F - E|/T$ . The latter takes into account the volatility smile, whereas the price  $F$  is generated by the method of Gorenflo *et al.* [2] based on fractional calculus. The output parameter is the call price  $C$  over  $E$ . The learning-set option price  $C$  is computed by means of a formula given by Bouchaud and Potters [3, 4]. Option prices obtained by means of this learning scheme are compared with LIFFE option prices on German treasury bond (BUND) futures.

*Keywords:* Econophysics, learning, option pricing, statistical finance.

The figure shows the network performance. In the inset, the difference between the market price and the estimated price is plotted vs. the market price. Further details can be found at [www.econophysics.org](http://www.econophysics.org) under the link “research”.

### References

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