Steps towards a high-frequency financial decision support system to pricing options on currency futures with neural networks

Christian von Spreckelsen*,
Hans-Jörg von Mettenheim and
Michael H. Breitner

Institute of Information Systems Research,
Gottfried Wilhelm Leibniz Universität,
Königsworther Platz 1, 30167 Hannover, Germany
E-mail: spreckelsen@iwi.uni-hannover.de
E-mail: mettenheim@iwi.uni-hannover.de
E-mail: breitner@iwi.uni-hannover.de
*Corresponding author

Abstract: In this paper, we present steps towards a model-driven financial decision support system (FDSS) to pricing options on currency futures, which can be embedded in a high-frequency trading process. Due to the difficulty of option valuation, we provide an alternative heuristic option pricing approach with neural networks. We show that the use of neural networks is not only suitable in generating accurate trading signals, but also in generating automated fast run-time trading signals for the decision taker. To achieve this, we conduct an experiment with an empirical tick data set of EUR/USD options on currency futures of four weeks. An essential advantage of our approach is the simultaneous pricing across different strike prices and parsimonious use of input variables. Nevertheless, we also have to take particular limitations into account, which give us useful hints for further research and steps.

Keywords: financial decision support system; FDSS; neural networks; high-frequency data; trading systems; option pricing; design science.


Biographical notes: Christian von Spreckelsen studied economics at the Leibniz University, Hannover. Currently, he is a doctoral student at the Institute of Information Systems Research. He specialises in forecasting financial markets, artificial neural networks and econometrics.

Hans-Jörg von Mettenheim studied economics and mathematics at the Leibniz University, Hannover. Currently, he is an Assistant Professor for Decision Support Systems in Hannover. His research topics are financial optimisation and the application of artificial intelligence to finance related problems.