
Forecasting the conditional volatility of stock indices using neural networks

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Volatility of financial time series plays a key role in constructing models for the valuation of derivative financial instruments, risk management, and optimization of investment portfolios. In some cases, volatility dynamics is characterized by significant nonlinearities, which includes, in addition to clustering in time and high values of the kurtosis and asymmetry volatility response to shocks of different signs. The paper discusses three commonly used models of the GARCH-family, GARCH-neural network model proposed by R. Donaldson and M. Kamstra and designed by the authors of this article "pure" two-layer neural network model in order to predict the conditional volatility of the major stock indexes (SP 500, FTSE 100, NIKKEI 225 and Hang Seng). Models are compared in terms of predictive power beyond the leaning sample using popular statistical criteria. As an approximation of the true conditional volatility a realized volatility calculated from intraday data is used. The results indicate that we constructed a "pure" neural network model that can predict the conditional volatility no worse, and in some cases even better than using popular models of GARCH-family.

Keywords: *volatility, neural networks, GARCH models*

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