

A comparison between the ARMA-GARCH-M and the backpropagation neural network in the estimation of conditional volatility and return for the Spanish Ibex-35 index

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Abstract

Volatility of financial assets has become a topic of major research in finance in last decades due to the globalization of the markets and the increased necessity of managing the risks associated to financial portfolios. In this context, several methods to quantify the volatility of the assets have been proposed; being the different versions of the GARCH models the most usual ones. Among those, the GARCH-M model has the advantage of incorporating the conditional volatility in the equation for the mean and so the effect on returns can be simultaneously studied. Together with the GARCH models, neuronal networks have been applied on the prediction of volatility as an alternative to those. One of the neural networks most widely employed and widespread is the Backpropagation network.

This paper presents a comparison between the GARCH-M model and the Backpropagation neural network for estimation and prediction of return and conditional volatility on the Ibex-35 (the main Spanish stock index). Results indicate an improvement in the predictions of volatility through the neural network for the case analyzed. As for the prediction of returns, no evidence has been found of significant improvement by the neuronal network.