

Modeling Financial Time Series with Soft Information

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Abstract: A hysteretic autoregressive model with GARCH effects and soft information, denoted by SHAR-GARCH, is proposed to model financial time series. The soft information contained in the daily news is extracted by the techniques of support vector machine and principal component analysis. A Markov Chain Monte Carlo algorithm is proposed for estimating model parameters. A corresponding risk-neutral SHAR-GARCH model is derived by Esscher transform for option pricing. The returns and options of the S&P500 index and the daily news posted on the website of Reuters are used for our empirical study. The numerical results indicate that the proposed model has satisfactory performances in depicting the dynamics of financial time series and in pricing deep-in-the-money options.