

# CONSTRUCTION OF PREDICTION OF DYNAMIC RISK MEASURES VAR AND CVAR FOR FINANCIAL TIME SERIES WITH DIFFERENT VOLATILITY

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## ABSTRACT

The article considers the method of constructing of predictive values of dynamic risk measures  $VaR$  and  $CVaR$  on the basis of an optimizational smoothing of autocorrelation function, proposed by the authors in the previous works. The method is based on the heteroscedastic time series model and is designed to predict the time series with long range dependence. For dispersion modeling the FIGARCH model is used, which is reduced to the AR model of the infinite order. In this paper, we study the feasibility and effectiveness of the proposed method for obtaining predicted values of dynamic risk measures  $VaR$  and  $CVaR$  for time series with different volatility. We consider tree time series of logarithmic return on a daily basis of the Nasdaq-100 index over the period 2005-2015: the original time series data, and two modified time series obtained from the original by deleting time periods with high volatility. So we have the opportunity to compare the forecasts built for data with similar statistical characteristics, but different volatility. The forecast values of risk measures are built in accordance with the procedure of direct multi-step prediction. Analysis of the predicted values is carried out using the Kupiec test, the Kristoffersen, the V-test and analysis of Probability of Exceedance values. The obtained predicted values and test results are shown in the figures and are displayed in tables. The analysis of the test results shows the effectiveness of this approach for obtaining risk measures  $VaR$  and  $CVaR$  prediction values for time series with long range dependence in a wide range of volatility. The proposed algorithm allows to obtain the forecast that qualitatively repeats both the regular behavior and emissions of time series.

**Keywords:** Dynamic risk measures  $VaR$  and  $CVaR$ , long range dependence, heteroscedastic model, prediction.