The volatility of tomorrow - Comparison of GARCH and EGARCH models applied to Texas Instruments stock returns

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Abstract

In this thesis we will apply and compare two autoregressive conditional heteroscedasticity models, the GARCH$(1,1)$ and EGARCH$(1,1)$, to see which one is the better to use for predicting future volatility in time series data. In statistics these models are used when we encounter time series data that is heteroscedastic, i.e. has a non-constant variance. Both models use information about previous values and volatility to determine future volatility, but EGARCH$(1,1)$ includes properties that takes in to consideration that volatility respond asymmetrically to positive and negative shocks. In this thesis we will apply both the assumption of standard normal distribution and Student's t distribution to the stock returns of Texas Instruments and then apply the models to this time series. The models and distributions will be compared by constructing confidence intervals based on predicted variances, computed AIC and MeSSIE values and Ljung-Box tests. The results will show us that the models and assumed distributions were quite alike, but after discussion we would rather assume a Student's t distribution and use a EGARCH$(1,1)$ model to predict the volatility of tomorrow of Texas Instrument stock returns.

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