

Historical Volatility Distribution in Gaussian and GARCH(1,1) models

Lutz Molgedey

Humboldt University Berlin

Invalidenstr. 110, 10115 Berlin, Germany, Email: Lutz@Molgedey.de

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ABSTRACT

On experimental data the historical volatility is usually calculated by averaging the local variance (or its generalizations) over a finite time window. Already in the case of a constant volatility in the Gaussian model the resulting historical volatility is non-Gaussian distributed. We will calculate historical volatility distributions in the Gaussian and GARCH(1,1) model for different time window sizes and compare them with those obtained from the S&P500 data¹.

Keywords: Volatility Distributions

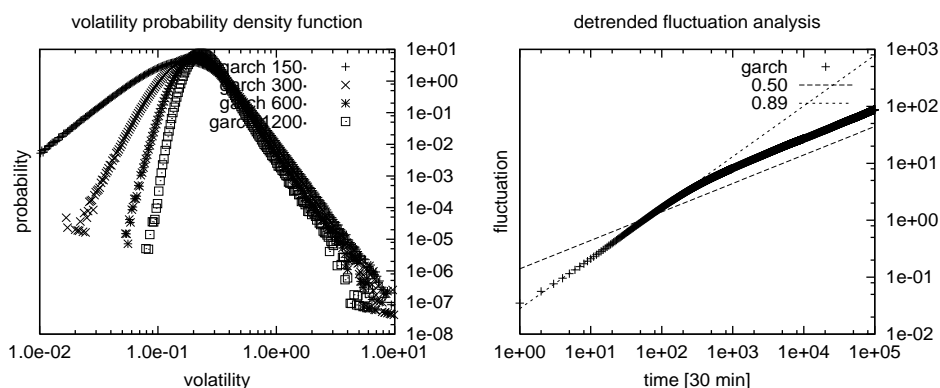


Fig. 1. Left: Volatility distribution for a GARCH(1,1) model with parameters from² - time lag $\Delta t = 30$ min. as in¹. The standard deviations are calculated in a time window of 150, 300, 600 and 1200 minutes. Right: The GARCH(1,1) process generates the same powerlaw as the S&P500 data¹. However for a long time horizon the scaling breaks down to that of the Gaussian process.

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