

3 Conditional volatility models: EWMA, ARCH and GARCH

Using your daily returns for JPM stock:

1. Produce volatility forecasts using the EWMA model specification. Compare your results for two lambda parameterizations: 0.94 and 0.99.

$$\hat{\sigma}_t^2 = (1 - \lambda)r_{t-1}^2 + \lambda\hat{\sigma}_{t-1}^2$$

2. Produce ARCH(1) and GARCH(1,1) volatility forecasts using the following R functions: `ugarchspec`, `ugarchfit`.
3. Compare the ARCH(1) and GARCH(1,1) models with the Likelihood Ratio test.
4. Diagnose the GARCH(1,1) model using residual analysis.

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