

**VOLATILITY IMPULSE RESPONSE FUNCTIONS FOR  
MULTIVARIATE GARCH MODELS**

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**Abstract**

In the empirical analysis of financial time series, multivariate GARCH models have been used in various forms. As it is typical for nonlinear models there is yet no unique framework available to uncover dynamic covariance relationships for vector return processes. We introduce a new concept of impulse response functions tracing the effects of independent shocks on volatility through time. The advocated methodology avoids typical orthogonalization and ordering problems. Theoretical properties of volatility impulse response functions are derived and compared with conditional moment profiles introduced by Gallant, Rossi and Tauchen (1993) for semi-nonparametric models. In an empirical study of a bivariate foreign exchange rate series we use volatility impulse response functions to compare alternative parametric volatility specifications. It is shown that for shocks affecting foreign exchange rates in an asymmetric way, the difference between our methodology and conditional volatility profiles can be substantial.

Keywords: Multivariate GARCH, impulse response, exchange rate, volatility

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