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# Value-at-Risk under Lévy GARCH models: Evidence from global stock markets

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## Abstract

The aim of this paper is to reconsider the evidence on the forecasting ability of GARCH-type models in estimating the Value-at-Risk (VaR) of global stock market indices with improved return distribution. The performance of twenty one VaR models that are generated by a combination of three conditional volatility specifications including GARCH, GJR and FIGARCH and seven distributional assumptions for return innovations is investigated. We implement stringent backtesting during crisis and post-crisis periods for developed, emerging and frontier markets. Results show that the skewed- $t$  along with heavy-tailed Lévy distributions considerably improve the forecasts of one-day-ahead VaR for long and short trading positions during crisis period, regardless of the volatility model. However, we find no evidence that a given volatility specification outperforms the others across markets. The relevant models show evidence of long memory in developed markets and conditional asymmetry in frontier markets; whereas the standard GARCH is found to be the best suited specification for estimating VaR forecasts in emerging markets. The inclusion of high volatility period in the estimation sample highlights the predictability of VaR during post-crisis period, where even the normal distribution rivals the more sophisticated ones in terms of statistical accuracy and regulatory capital allocation.

### *Keywords:*

Value-at-Risk, Risk management, Lévy distributions, GARCH model, Asymmetry, Long memory

*JEL:* C22, G17

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