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*In estimation, the key is the volatility index, not the returns*

This paper proposes a new methodology to estimate a GARCH model using only returns and volatility index (vli) data. The approach is centered on applying likelihood to the vli with an approximation to returns, denoted A-C-VIX-Ret, rather than the standard approach of applying likelihood to returns with an approximation to the vli, denoted A-Ret-VIX. The new approach overcomes the ill-posed problem of an infinite likelihood from the vli, proposing the well-posed A-C-VIX for working with vli data only. We apply and compare the methodologies on three GARCH models, several volatility indexes, and stock data sets, with the main focus on the GARCH model of Heston & Nandi (2000), i.e., the HN-GARCH model, and the time series of S&P 500 and VIX from CBOE. Our analyses demonstrate that the volatility index holds more information on the parameters of a GARCH model than the returns, leading to A-C-VIX-Ret improving the quality of estimation compared to A-Ret-VIX, as seen by RMSE reductions of up to 90%; with significant improvements also in predicting the variance process. As part of the novelty, our methodology overcomes the problem of infinity-likelihood arising from Chi-squares with 1 degree of freedom, delivering a robust numerical procedure.