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Expected shortfall assessment in commodity (L)ETF portfolios with semi-nonparametric specifications

Esther B. Del Brio, Andrés Mora-Valencia & Javier Perote

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ABSTRACT

This paper studies the risk assessment of semi-nonparametric (SNP) distributions for leveraged exchange trade funds, (L)ETFs. We applied the SNP model with dynamic conditional correlations (DCC) and EGARCH innovations, and implement recent techniques to backtest Expected Shortfall (ES) to portfolios formed by bivariate combinations of major (L)ETFs on metal (Gold and Silver) and energy (Oil and Gas) commodities. Results support that multivariate SNP-DCC model outperforms the Gaussian-DCC and provides accurate risk measures for commodity (L)ETFs.

KEYWORDS:

Gram–Charlier DCC expected shortfall backtesting commodity ETF

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Previous article View issue table of contents Next article

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Disclosure statement

No potential conflict of interest was reported by the authors.

Notes

1 Another variant is to employ G2(x)=exp(x)/(1+exp(x)), thus g2(x)=log(exp(x)+1), as suggested by Fissler, Ziegel, and Gneiting (2016). We also implement this function as a check on the robustness of the test.

2 The reason to choose these three leveraged ETFs is because they are the largest commodity LETFs by total assets for 2018 according to the ETF Database (ETFdb.com). More details are found in Appendix A.

3 Important events related to (L)ETFs that affected financial markets have occurred in the three analyzed periods. In 2017, A LETF was blamed for highly fluctuations in gold stock prices from Toronto to Sidney. In September 2016 the Bank of Japan hit a record in ETF (tracking the Nikkei 225) purchase (before May 2018) and then diminished its stock purchases. The stock market crash in 24 August 2015 was, in part, caused by ETFs trading. Source: Financial Times and Bloomberg news.

4 Source: McKinsey Corporate Performance Analytics.

5 The rolling window procedure results in higher forecast accuracy than other (recursive) backtesting procedures and its use seem to be analytically convenient in economic time series (Giacomini and White, 2006).

Additional information

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