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On the application of the dynamic conditional correlation model in estimating optimal time-varying hedge ratios

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Abstract

This article applies the dynamic conditional correlation model of Engle ([2002]) with error correction terms in order to investigate the optimal hedge ratios of British and Japanese currency futures markets. For a comparison, the estimates of three other models -- traditional generalized autoregressive conditional heteroskedasticity (GARCH), ordinary least squ[...] [...] [...]sults show that the [...] [...]ormance in both fut[...] [...]el (which exhibits [...] [...]rforms the wors[...] [...]thods (OLS and EC[...] [...]odel can therefor[...]

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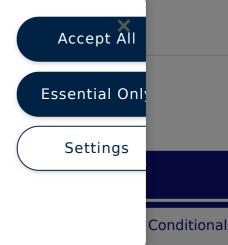
Notes

[1] Bautista ([2003](#)) uses the DCC of Engle to obtain the dynamic correlation between the interest rate and the exchange rate in the Philippines in order to observe its structural changes. Recognizing the dynamic conditional correlation, we instead use this approach, incorporated with ECM, to obtain the variance matrix so as to analyse the hedging effectiveness of foreign currency futures, which is then compared with OLS and other multivariate GARCH hedges.

[2] The hedge ratio is calculated as the ratio of the covariance between spot and futures prices to the variance of the futures price.

[3] For discussions of other hedging strategies, readers can refer to Chen et al. ([2003](#)).

[4] Bollerslev ([1990](#)) decomposes the covariances into SDs and correlations and assumes CCCs between financial variables. Engle and Kroner ([1995](#)) instead propose the BEKK (named after Baba, Engle, Kraft and Kroner) multivariate GARCH model to ensure time-varying second moments and a positive-definite conditional-variance matrix. Its disadvantage is that the parameters cannot be easily interpreted.

[5] Kroner and Sultan ([1993](#)), who were the first to introduce an ECM for the first moment into a multivariate GARCH, studied the hedging effectiveness in five foreign exchange futures markets, which again are examined by Lien and Luo ([1994](#)).

[6] The minimum risk hedge ratio minimizes the variance of the hedge portfolio, $+ +$ according to Johnson ([1960](#)), where and are the variance of the spot and futures prices, respectively; and X_s and X_f are the spot and futures positions, respectively. By the first-order condition, the optimal hedge ratio can be obtained , where and the negative

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