Review of Securities and Futures Markets, 25:3, 173-220 (2013)

以 ECM、M-GARCH、門檻 M-GARCH 評估鎳金屬商品期貨契約與 NTD/USD 遠匯避險績效

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本文研究鎳進口商原料價格與匯率風險的規避問題，使用三個避險模型：避險誤差修正模型、避險 M-GARCH(1,1)模型、避險門檻 M-GARCH(1,1)模型，配合三種避險策略與三類避險組合(即鎳現貨、鎳 3 個月期期貨與 10 天期、3 個月期美元遠匯或 3 個月期無本金交割美元遠匯即 NDF)，以 6 次移動視窗方式評估樣本外期間(04/29/2008~01/031/2011)的避險績效。考量避險成本並使用均值變異最大效用法，以報酬率推導成本文避險比率公式，由公式可知最適避險比率即是最小變異與預期報酬所構成的兩個內在成份間的最適替代結果，避險模型必需有估計波動及預期報酬的能力。實證結果顯示：在均值變異法下，ECM 與 M-GARCH(1,1)可能高或低估報酬或風險，使績效表現各有優劣，而在移動視窗#2 即次貸風暴下，M-GARCH(1,1)與 ECM 的避險效果皆很強；以顯著的門檻效果分類成八種避險狀況後，在鎳現貨、期貨處於高波動但不計美元現匯的波動狀態下，門檻 M-GARCH(1,1)配合策略二或三的避險績效無疑提高許多；然而策略一不論在何避險狀況下皆需承擔匯兌風險因此表現最不理想。因美元遠匯日價格變動不大以及與現匯價間的相關性與變異很低，依均值與變異法，遠匯避險在策略三中使用的部位並不大。此外，NDF 除了本身波動較大外，與鎳現貨或鎳期貨則有較高的負相關，其績效在風險不高時比其他遠匯還佳。

關鍵詞：誤差修正模型、M-GARCH 模型、門檻 M-GARCH 模型、避險比率、避險績效。

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Evaluating the Hedging Performance of Nickel Futures and NTD/USD Currency Forwards by ECM, M-GARCH, and Threshold M-GARCH

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This paper studies the risk hedging of nickel raw material prices and USD to NTD exchange rate frustrations for importers. Three models: error correction model (ECM), M-GARCH(1,1), and threshold M-GARCH(1,1) with three kinds of hedging strategies and three types of hedging portfolios (established by nickel spots, nickel futures, and NTD/USD 10-day or 3-month forwards, or 3-month non-deliverable forward, NDF) are used to evaluate the hedge performance by six moving windows during the out-of-sample period (04/29/2008~01/031/2011). The equations of hedge positions in this paper are derived by taking into account hedging cost using the mean-variance method to maximize utility function. Apparently, the equations are the optimal trade-off result between the two embedded components resulted respectively from the minimum variance and the returns prediction. Thus, the applied models are supposed to have the abilities to not only estimate volatilities but predict returns. Evidently under the mean-variance method, the ECM or M-GARCH(1,1) model could over- or under- estimate volatility or returns and hence they have advantageous or disadvantageous performance. However, they both have better performance in moving window #2, i.e. the subprime crisis. The eight hedging states are created significantly by the threshold effects. As the nickel spot and futures

prices are in high volatility state despite the volatility state of spot exchange rates, the threshold M-GARCH(1,1) definitely has a great deal of hedging performance using hedging strategy two or three. Contrarily, the hedging strategy one requires bearing the exchange rate risk and performs the worst no matter in what states it is. Due to the low daily price changes of forwards and their low correlations and variances with the daily price changes of spot exchange rates, the hedging positions of forwards using strategy three are not large according to the mean-variance method. Besides, the NDF has higher volatility of their own and the higher negative correlations with nickel spot and futures prices, it has better performance in not high risk than the other forwards.

Keywords: error correction model, threshold M-GARCH, hedge cost, hedge ratio, hedge performance