

# 考慮匯率風險與高狹峰分配之 最小變異數避險比率估計 —新加坡摩根台股指數期貨之驗證

王健聰\*

本文採用 Wang and Low (2003)所推導出的納入匯率風險考量之最小變異數避險比率(MVHR)，以評估投資人持有以台幣計價摩根台股指現貨投資組合，如果採用美元計價 SGX 摩根台股指數期貨以進行避險之避險績效。至於在 MVHR 的估計方法方面，由於金融資產報酬具時變波動性，因而一些如等權重移動平均法(MA)以及指數加權移動平均法(EWMA)等時變 MVHR 估計式經常被使用。然而 MA 法與 EWMA 法均係依據樣本的變異數及共變數估計式以估計 MVHR，其並未考量報酬高狹峰分配。因此在報酬分配高狹峰情況下，依 MA 法與 EWMA 法估計出的 MVHR 將可能賦予極端值過多的權重，導致樣本變異數及共變數估計式並不具效率性。本文另採用能捕捉到報酬分配具高狹峰特性的多變量固定相關 GARCH(1,1)模式與 Guermat and Harris (2002)所推導出的冪次方 EWMA 估計式以估計 MVHR，並與 MA 法與 EWMA 法所估計出避險績效進行比較。以 SGX 摩根台股期貨為研究對象，實證發現在報酬分配具高狹峰特性較為明顯的亞洲金融危機期間，多變量 GARCH 模式與冪次方 EWMA 估計式相較於 MA 與 EWMA 估計式，所估計出的避險組合的變異數有較大的降幅，並且總預期效用也有明顯較大的增幅。本文實證結果意味著，當報酬分配具高狹峰特性時，除了可採用具有良好避險績效之多變量 GARCH 模式之外，台股投資人亦可使用計算簡易的冪次方 EWMA 估計式以估計時變避險比率。

**關鍵詞：**高狹峰分配、匯率風險、總預期效用、多變量固定相關 GARCH(1,1)模式、冪次方 EWMA 估計式。

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\* 作者為國立高雄第一科技大學金融系教授，高雄市燕巢區大學路 1 號，Tel: 886-7-6011000 Ext.3112, Fax: 886-7-6011039, E-mail address: janchung@nkfust.edu.tw。作者衷心感謝兩位匿名評審委員之評論與寶貴建議。作者也感謝國科會提供本文之研究經費補助(國科會編號: NSC-97-2410-H-327-011)。

# Estimation of Minimum Variance Hedge Ratio Incorporating Exchange Rate Risk and Leptokurtic Distribution: Evidence from the SGX MSCI Taiwan Index Futures

**Janchung Wang**

Professor, Department of Money and Banking,  
National Kaohsiung First University of Science and Technology

This study used the minimum variance hedge ratio (MVHR) of Wang and Low (2003) incorporating exchange rate risk to evaluate the hedging performance of the US dollar denominated MSCI Taiwan index futures for hedging the MSCI Taiwan stock portfolio denominated in New Taiwan dollars. Some time-varying estimators (e.g. equally weighted moving average (MA) and EWMA estimators) are commonly used, owing to time-varying volatility in financial asset returns, to estimate the time-varying MVHR. However, the MA and EWMA estimators are based on the sample variance and covariance estimators of returns, irrespective of the leptokurtic distribution of returns. These estimators will attach too much weight to extreme observations in the case of the leptokurtosis of distribution. Therefore, they are not generally efficient. This study used the multivariate constant correlation GARCH(1,1) model and the power EWMA estimator developed by Guermat and Harris (2002), which capture the leptokurtic distribution of returns, to estimate the time-varying MVHR. Meanwhile, this study compared the hedging performances of the multivariate GARCH model and the power EWMA estimator to those based on the MA and the EWMA estimators. Our empirical analysis was restricted to the SGX MSCI Taiwan stock index futures. The empirical results showed that both the multivariate GARCH model and the power EWMA estimator generate a relatively large degree of reduction in the variance of the hedged portfolio and a relatively large increase in the total expected utility of the hedged portfolio during the Asian financial crisis with high kurtosis as compared to MA and EWMA estimators. These results imply that when the distribution of returns is leptokurtic, in addition to the multivariate GARCH model, investors use the easily calculated power EWMA estimator to estimate the time-varying MVHR.

**Keywords:** Leptokurtic Distribution, Exchange Rate Risk, Total Expected Utility, Multivariate Constant Correlation GARCH(1,1) Model, Power EWMA Estimator.