

摘要

在巴塞爾協議 III 增強了對於信用曝險的資本要求與引進極端情況下的風險值(Value at Risk, VaR)後，對於風險的管理愈趨重要，因此適當地對信用風險與系統風險建立模型成為風險管理人員重要的功課。信用違約交換(Credit Default Swap, CDS)的出現讓銀行有更加方便的管道為其所持有的投資組合信用風險避險。本篇論文依據 Patton(2006)、Huang et al.(2009)與 Fei et al. (2013)的研究，以美國市場為研究對象，資料期間為 2004 年 12 月開始到 2014 年 10 月，期間涵蓋次貸危機與歐債危機。將北美投資等級指數(CDX.NA.IG)分別搭配 S&P500 股價指數、VIX 指數形成投資組合，探討與權益市場的互動關係，以 GARCH-skewed-t 模型來描述指數報酬率的特性，以靜態與動態 copula 函數搭配來估計投資組合資產報酬率的聯合分配，最後估計投資組合在 copula 模型下的風險值，並進行回溯測試結果的比較探討是否能有效改善風險值(VaR)的預測能力。實證結果顯示，邊際分配服從 GARCH-skewed-t 之 time-varying SJC copula 不論在市場處於何種情況下都有比其他模型更好的風險預測能力。Copula-GARCH 模型同時考慮了個別指數報酬率序列相關的性質並能捕捉到尾端相依性與分配不對稱性，改善了傳統風險值模型之常態性假設所無法捕捉到的資產分配現象。

關鍵字:關聯結構、風險值、信用違約交換。

Abstract

After enhancing the capital requirement of credit risk exposure and introducing the stressed-VaR in Basel III, management of risk is much more important. Therefore, modeling credit risk and systemic risk appropriately is a important task the risk management personnel must take. The appearance of credit default swaps (CDS) let banks have more instruments to hedge credit risk of portfolio they held. In this paper, according to Patton(2006) 、Huang et al.(2009) and Fei et al. (2013), we research for the US market and sample period is from December, 2004 to October, 2014, including subprime crisis and euro debt crisis. We combine CDX.NA.IG with S&P500 and VIX as a portfolio respectively to investigate the interaction between CDX market and equity market. We use GARCH-skewed-t model to describe the characteristics of individual index returns and then use static and dynamic copula model to describe the relationships between indices. Finally, we estimate VaR of portfolio using copula-GARCH and backtest VaR estimate to clarify whether copula-GARCH model can improve VaR estimate or not. Empirical results show that dynamic copula GARCH model can improve the estimation of VaR. Copula-GARCH model considers the characteristic of series correlation of individual index, asymmetric of distribution and the tail dependence and, therefore, describes the characteristics that cannot be captured under the assumption of normality.

Keywords: copula; GARCH; CDS; VaR.