

PIIGS 歐洲五國之風險值估計-極值理論應用

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中文摘要

2011 年歐債風暴不斷影響全球的經濟與股市，一連串風暴的中心點來自於歐洲其中五個國家：葡萄牙(Portugal)、義大利(Italy)、愛爾蘭(Ireland) 希臘(Greece)、西班牙(Spain)，將五國的英文字母縮寫即為 PIIGS，至今，歐債仍然對全世界的經濟有著極大的影響。極值理論模型(Extreme Value Theory Model) 主要應用描述尾部特性，不需對整個分配做假設，減少模型的選擇風險。本文將以 PIIGS 五國的股價指數做為資料，將股價指數取過對數後的一階差分來計算股價指數報酬率，使用 Ljung-Box 統計量檢定發現資料具有序列相關。因此，根據 McNeil and Frey(2000)所提出的方法，先以 GARCH 模型來過濾股價指數資料，得到非常態分配與 iid 之標準化殘差，再以極值理論模型來估計 GARCH 標準化殘差的分配尾部。本文使用 Hill 估計式與 GPD 分配，在三種信賴水準之下，以三種不同的門檻值分別估算 PIIGS 五國的形狀參數、規模參數、理論穿透次數、實際穿透次數、預期損失與 Kupiec(1995)的概似比統計量(LR-test)。由形狀參數來看，除了愛爾蘭為薄尾分配的情況，其餘四國為厚尾的分配。在模型的相互比較之下，由實證結果中的 LR-test 顯示 Hill 估計式與 GPD 分配，在信賴水準 99.5%且門檻值為 5%的情況下，兩種模型表現最好，表示模型預測能力良好。本文將表現最好的模型假設之下，進一步估算兩種模型風險值，並以去年義大利與希臘債務事件做為爆發點，將兩個國家的實際報酬率與模型風險值做比較。然而，實證結果再度顯示 Hill 估計式與 GPD 分配，兩種模型的預測能力結果良好。

關鍵詞：歐債危機、極值理論、GPD 分配

Estimating Value at Risk of PIIGS Countries

-An Application of Extreme Value Theory

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ABSTRACT

Europe's debt crisis continue to affect the global economy and the stock market in 2011, the center of the series of storms from Europe and five European countries: Portugal, Italy, Ireland, Greece, Spain, English initials of the five countries is the PIIGS, so far, the European debt still has a great influence on the world economy. Extreme value theory model applications describe the tail characteristics, assumptions, without the entire allocation to reduce the risk of model selection. This article will be the PIIGS five stock index as the data, take off the stock index stock index returns to calculate the number of first-order differential rate, find the data with serial correlation using the Ljung-Box statistic test. Thus, McNeil and Frey (2000), used the GARCH model to filter the stock price index data, non-normal distribution with iid standardized residuals, then the extreme value theory model to estimate the distribution of the tail of the GARCH standardized residuals. Hill estimator and GPD distribution used in this article, under the three confidence level in three different threshold values to estimate the shape parameter of the PIIGS, the scale parameter, the number of theoretical violation, actual violation of the number of expected shortfall and Kupiec (1995), the likelihood ratio statistic (LR-test). Shape parameters from the point of view, in addition to the Irish thin tail distribution of the remaining four thick tail distribution. LR-test the empirical results show Hill estimator formula in the model compared with the GPD distribution. In the case of the 99.5% confidence level and the threshold value of 5%, the two models performed the best, said the model predictive ability is good. This article will show the best model assumes that under further estimate the risk value of the two models, and the debt event in Italy and Greece last year as a flashpoint, the actual rate of return of the two countries with the model value at risk to compare. However, empirical results show once again Hill estimator and GPD distribution, the predictive ability of the two models with good results.

Keywords: Europe's debt crisis, Extreme value theory, GPD distribution

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