

## 摘要

依據之前的文獻研究，市場上主要是在 LHP (Large Homogeneous Portfolio) 假設下利用單因子常態關聯結構模式 (One factor double Gaussian copula model) 評價擔保債權憑證 (Collateralized debt obligation, CDO)。但這會造成擔保債權憑證的評價與市場報價的差距過大，且會造成 base correlation 偏斜的情況。Kalemanova et al. (2007) 提出用 Normal inverse Gaussian (NIG) 取代常態分配評價擔保債權憑證，此模型不但計算快速而且可以準確估計權益分券 (equity tranche) 的價格，但是它也過於高估了其它的分券的價格。

在本文中使用的多變量封閉常態分配 (Closed skew normal, 簡稱 CSN) 分配取代 NIG 分配作擔保債權憑證分券的評價，CSN 分配具有常態分配的性質，其線性組合仍具有封閉性的特質，且具有較多的參數以控制分配的偏態與峰態。但是與單因子常態關聯結構模式相同，多變量封閉常態分配的單因子關聯結構模式仍然無法估計的很準確，僅有在最高等級分券 (senior tranche) 的評價上有明顯的改進。

因此在本文中我們使用 NIG 與 CSN 複合分配之單因子關聯結構模式評價擔保債權憑證分券，在實例分析時得到極佳的評價結果，並且比單因子常態關聯結構模型具有更多的參數以使模型更符合實際的需求。

**關鍵字：**擔保債權憑證、單因子關聯結構模式、多變量封閉常態分配、複合分配

# Abstract

This article extends the Large Homogeneous Portfolio (LHP) and one factor double Gaussian copula approach for pricing CDOs. In the literature, the one factor double Gaussian copula model under LHP assumption fails to fit the prices of CDO tranches, moreover, it leads to the implied base correlation skew. Some researchers proposed using one factor double NIG copula model to price CDO tranches. It not only economizes on time but also fits the equity tranches exactly, but NIG models do not price other tranches well simultaneously. On the other hand, we substitute the NIG distribution with the Closed Skew normal (CSN) distribution. This family also has properties similar to the normal distribution, which is closure under convolution, and has extra parameters to control the shape. By using this model we get a better fit in the senior tranches, but it seriously overprices subordinate tranches. Thus we consider a mixture distribution of NIG and CSN distributions. The employments of this mixture distribution are comparatively well, and furthermore it brings more flexibility to the dependence structure.

**Keyword:** collateralized debt obligation, one factor copula model, closed skew normal distribution, mixture distribution.