

# **Integrating Accounting Information and Corporate Governance Indices for Building Up a Credit Rating Forecasting Model-Comparison of Multivariate Discriminant Analysis and Genetic-Algorithm-Based Neural Network**

**Chai-Chiao Lee** \*

## **Abstract**

Credit rating systems have existed for a long time in most financial markets and played a major role in corporate capital raising, providing investment information for both individual investors and institutional investors, and credit granting in banks. How to predict enterprise credit rating and effects of incorporating corporate governance indices now are the focus. The methodologies used are conventional MDA model and artificial intelligence based techniques- GAANN for building up a credit rating forecasting model to test that which one has better preciseness and integrity, and provide basis for enterprises to predict credit rating. Our empirical results reveal that after corporate governance indices be incorporated into the model which is constructed by multivariate discriminate analysis, hit ratio achieves 89.52% much better than what we get simply by using financial ratio without incorporating corporate governance indices and that would boost the preciseness and integrity we considered. Furthermore, by using Genetic Algorithm, we extract variables having heavy impact to credit rating results, and find that more than half of variables belong to corporate governance indicators, and that means corporate governance really important information source of business evaluation. Finally, we compare the forecasting ability of Multivariate Discriminate Analysis model with that of Artificial Neural Network Model. Credit rating model constructed by using Artificial Neural Network Model has whole validity (90% hit ratio), internal validity (89.29% hit ratio) and external validity (88.57% hit ratio) , and all of those three indicators are better than those from Discriminant Analysis model. It means that Artificial Neural Network model has better generality that can provide external stakeholders to apply different businesses to forecast risk degree.

---

\* Lecture, Department of Accounting, Yu Da College of Business.

**Key Words: credit rating, multivariate discriminate analysis (MDA), corporate governance, Genetic-Algorithm-based Artificial Neural Network (GAANN)**

## 以會計資訊與公司治理指標建構信用評等預測模型：區別分析與基因神經網路之比較與應用

李在僑\*

### 摘 要

信用評等制度在金融市場已行之有年，其在企業籌資、投資人資訊取得、銀行授信參考，以及規範一般機構投資標的上，均扮演著相當重要的角色。如何對企業評等加以預測，加入非財務資訊之公司治理指標的影響為何，更是目前大家所關心的焦點。本研究分別利用傳統多變量區別分析及人工智慧之基因類神經網

---

\* 育達商業技術學院會計系講師

路建立預測模型，以檢定兩者何者具有較高之預測能力，藉以提供企業作為信評預測的依據。經由實證結果，以區別分析法選擇關鍵變數建構模型，加入公司治理指標後之模型擊中率為 89.52%，較單純採用財務比率指標之 83.33%，更能提升整個模型考量之完整性及準確度；以基因演算法萃取對企業風險等級的重要影響變數時，甚至發現過半比例變數來自於公司治理指標，意味著公司治理的確對信評結果有高度貢獻性。最後，在比較區別分析及基因類神經網路模型之預測能力方面，基因類神經網路信評預測模型在模型整體之效度(擊中率 90%)，內部效度(擊中率 89.29%)、外部效度(擊中率 88.57%)，皆高於區別分析模型，表示基因類神經網路模型之預測效果有較佳的一般性，更能提供外部關係人未來將模型應用於樣本外之企業風險預測。

關鍵詞：信用評等、區別分析、公司治理、基因類神經網路