Predicting Credit Risk for Japanese SMEs with A Neural Network Model

Michiko Miyamoto (Akita Prefectural University)
Masakazu Ando (Chiba Institute of Technology)

It is significantly important for banks to model credit risk for small and medium enterprises. Recently, a neural network approach on credit risk analyses has been explored, which provides a new framework for representing, quantifying and managing the uncertain knowledge in concentration of credits risk exposures. The purpose of this study is to explore an experimental neural network analysis, a decision tree analysis and compare the result with those of the traditional logistic analysis for a Japanese SMEs.

Neural networks, or artificial neural networks, are forecasting methods that are based on simple mathematical models of the brain. They allow complex nonlinear relationships between the response variable and its predictors. Angelini, et al. (2008) review neural networks application to economics and finance, and found those application to classification and discrimination have proved to be very effective and often to be able to outperform traditional methods. Angelini, et al. (2008) applied the neural network approach in the small-business lending analysis to assess credit risk of Italian companies, using eight financial ratios and credit line related data. They pointed out that the output of the network could be used as a rating value for classifying the company and it may also be incorporated into a probability of default prediction model. Leong (2016) analyzed the assessment of credit risks in personal loans to consumers in Singapore by logistic regression, neural network, and Bayesian network. His data were mainly non-financial data, such as income, age, gender, marital status, number of kids, job designation, car ownership, type and length of residence of customers.

This study describes an application of neural networks to credit risk assessment, using financial ratio data consists of nearly 1 million Japanese SMEs collected by credit guarantee corporations, as well as government-affiliated and private financial institutions involving SME business in 2010.

References

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