

Developing Financial Distress Prediction Models

A Study of US, Europe and Japan Retail Performance

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Abstract

This paper constructs retail financial distress prediction models based on five key variables previously shown to have good classification properties (Hu and Ansell, 2005). Five credit scoring techniques—Naïve Bayes, Logistic Regression, Recursive Partitioning, Artificial Neural Network, and Sequential Minimal Optimization (SMO) were considered. A sample of 491 healthy firms and 68 distressed retail firms were studied over a five-year time period from 2000 to 2004.

An international comparison analysis of three retail market models –USA, Europe and Japan– shows that the average accuracy rates are above 86.5% and the average AUROC values are above 0.79. Almost all market models display the best discriminating ability one year prior to financial distress. The US market model performs relatively better than European and Japanese models five years before financial distress.

A composite model is constructed by combining data from US, European and Japanese markets. All five credit-scoring techniques have the best classification ability in the year prior to the financial distress, with accuracy rates of above 88% and AUROC values of above 0.84. Furthermore, these techniques still remain sound five years before financial distress, as the accuracy rate is above 85% and AUROC value is above 0.72. However, it is difficult to conclude which modelling technique has the absolute best classification ability, since the composite model's performance varies according to different time scales.

Regarding the applicability of the composite model, a comparison is made using Moody's credit ratings. Results indicate that SMO is the better performing model amongst the three models, closely followed by the neural network model. Logistic regression model shows lowest performance in terms of similarity with Moody's.

Keywords: Credit Risk, Financial Distress Prediction; Multivariate statistics; Artificial intelligence

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