Credit Scoring Model Based on Group Feature Selection: the Case of Chinese Small-sized Manufacturing Enterprises

***Abstract*:** Credit scoring models are used to determine the default possibility of enterprises. Small-scale operation, low collateral value and a lack of financial information make the establishment of a proper credit scoring system theoretically and practically difficult for small-sized manufacturing enterprises. In this study, we select a group of financial and other indicators in lieu of using a single indicator, to establish a credit scoring model for small manufacturing enterprises. In our methodology, we first select a group of indicators using the 0-1 programming method, with the objective function of maximizing the Gini coefficient (GINI) of the credit score to identify the possibility of default. Then we introduce a constraint to remove any redundant indicators in the same group, provided they reflect the same information. Finally, we assign weights to different indicators according to the Gini coefficient, ensuring that the weight of the indicators reflects their discriminatory power. Our empirical results show that the selection of a set of indicators more effectively identifies default status than a single-indicator approach. Moreover, a rating system with more indicators does not have better discriminatory power. As the number of indicators increases, the discriminatory ability of the system increases up to a certain point, and then begins to decrease.

Keywords: Credit scoring; Feature selection; Default discriminatory; Gini coefficient; 0-1 programming.