

Corporate Value Prediction Model and Sensitivity Analysis of Taiwan Traditional Industry Based on Machine Learning Algorithm

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Abstract

The evaluation of corporate value is extremely important in business decision-making. This study innovatively uses the eXtreme Gradient Boosting (XGBoost) machine learning algorithm to train a nonlinear tree ensemble model to investigate the important influence factors of corporate value from three aspects of environment, economy, and corporate governance (CG) including energy policies. The nonlinear XGBoost models are compared with linear panel regression models in terms of their findings. The indicators of corporate value, environment, and economy are Tobin's Q, Corporate Social Responsibility (CSR), and capital structure (debt ratio), respectively. The annual panel data for 383 Taiwanese traditional industries from 2014 to 2017 comes from Taiwan Economic Journal (TEJ) database. For Tobin's Q fitted model, the trained tree ensemble model with 0.43% historical MAPE (Mean Absolute Percentage Error) is much better than the linear panel regression model with 17.54% MAPE. The ranking of the important influence factors of Tobin's Q is the shareholding ratio of directors and supervisors, CSR (environment), asset turnover rate and debt ratio (economy). We also trained a tree ensemble forecasting model for Tobin's Q, the one-step-ahead out-of-sample MAPE is 13.48%. The proposed good forecast model can be used for scenario analysis to enhance Tobin's Q for a single company. On the whole, strengthening the ownership structure and optimizing economic-energy-environment interaction policies can effectively enhance the corporate value of traditional industries.

Keywords

Corporate value, Machine learning algorithm, XGBoost, Environment, Energy policy

Biographies

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