

Corporate Social Irresponsibility and Credit Risk Prediction: A Machine Learning Approach

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Abstract

This paper examines the prediction accuracy of various machine learning (ML) algorithms for firm credit risk. It marks the first attempt to leverage data on corporate social irresponsibility (CSI) to better predict credit risk in an ML context. Even though the literature on default and credit risk is vast, the potential explanatory power of CSI for firm credit risk prediction remains unexplored. Previous research has shown that CSI may jeopardize firm survival and thus potentially comes into play in predicting credit risk. We find that prediction accuracy varies considerably between algorithms, with advanced machine learning algorithms (e.g., random forests) outperforming traditional ones (e.g., linear regression). Random forest regression achieves an out-of-sample prediction accuracy of 89.75% for adjusted R^2 due to the ability of capturing non-linearity and complex interaction effects in the data. We further show that including information on CSI in firm credit risk prediction does not consistently increase prediction accuracy. One possible interpretation of this result is that CSI does not (yet) seem to be systematically reflected in credit ratings, despite prior literature indicating that CSI increases credit risk. Our study contributes to improving firm credit risk predictions using a machine learning design and to exploring how CSI is reflected in credit risk ratings.

Keywords: Corporate Social Irresponsibility, Credit Risk, Machine Learning, Random Forests, Regression, Classification, ESG

JEL Classification: G10, G15, G17, G32

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