

Financial Distress Prediction in Mature Markets: A Machine Learning Approach across G7 Economies

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Abstract: This study examines the determinants and predictive accuracy of financial distress for seven mature market economies: Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States. The aim is to assess whether distress can be predicted through a uniform set of financial determinants, or whether country- and sector-tailored models deliver stronger performance. The analysis uses Thomson Reuters data on publicly traded companies for 2011 to 2023. Financial distress is captured through a three-factor model based on interest coverage, equity growth, and asset growth. After assembling 29 financial and market-based ratios, a feature selection procedure is used to identify the most informative predictors at aggregate, sectoral, and country levels. Balanced subsampling is applied to address class imbalance, and the study deploys a binomial logit model alongside four machine learning techniques: Support Vector Machines, Artificial Neural Networks, Random Forest, and Gradient Boosting. The ensemble models — Random Forest and Gradient Boosting — achieve the highest predictive accuracy across all configurations. Sectoral analysis across 11 sectors confirms strong predictability, and country-specific models consistently outperform their aggregate counterparts. The study contributes a hybrid, context-sensitive machine learning framework for mature-market distress early warning systems.

Keywords: Financial Distress, Machine Learning Models, Statistical Models, Feature Selection, Mature Markets, G7 Economies

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