

Machine learning and sentiment analysis for predicting zombie companies on the Johannesburg Stock Exchange

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Abstract

The art and science of company failure prediction has undergone substantial evolution in two main areas: modelling approaches and variable selection. Traditional bankruptcy prediction models commonly use financial ratios and classical statistical models for classification tasks. However, the financials of a company do not capture the story beyond the numbers, which reveal the company's current and expected future performance, as expressed by the chairman. Hidden within the language and choice of information shared by the chairman in their annual statement could be key indicators that help predict the likelihood of a company entering financial distress or zombie status. Given the negative domino effect that the collapse of bankrupt companies and the presence of zombie companies would have on the South African economy, it is critical to ensure that stakeholders are equipped with models that use the most appropriate features to predict financial distress and zombie status.

This study, therefore, investigated the effect of sentiment on the prediction of zombie companies among JSE-listed companies. Annual financial reports were collected for the period 2000 to 2023 for companies across the basic materials, industrials, consumer discretionary, consumer staples, and ICT industries. Sentiment analysis was conducted on the chairmen's statements of each company across all industries using FinBERT. Using feature-selected data and sentiment tones from the chairmen's statements, this study developed zombie prediction models that combine traditional and machine-learning approaches. The results showed that the impact of sentiment on zombie prediction differs per industry.

Keywords: Machine Learning; Bankruptcy; Zombie; FinBERT; Text Mining