

Predicting Bankruptcy: A Financial & Textual Approach

The Clients

This project focuses on analyzing financial and textual data to predict when a company might go bankrupt. We worked with a dataset of companies from the Chemicals and Allied Products industry (SIC 28), combining financial data with sentiment analysis.

The Challenges

- Developing a model that can accurately predict bankruptcy using both financial ratios (Dupont Analysis) and sentiment from corporate filings.
- Addressing the issue of class imbalance between bankrupt and non-bankrupt companies in our dataset.
- Combining lagged financial features with textual sentiment to improve prediction accuracy.

The Approach

Phase 1: Data Collection and Preparation

- Merged three datasets: WRDS financial data (2000-2023), bankruptcy records from Stock Analysis, and sentiment data using the Loughran-McDonald Master Dictionary.
- Focused on companies in SIC 28, with data from both bankrupt and non-bankrupt firms.
- Created lagged financial variables for analysis.

Phase 2: Dupont Analysis and Sentiment

- Analyzed financial ratios such as ROE, ROA, Profit Margin, and Total Asset Turnover.
- Observed trends in these ratios as companies approached bankruptcy, such as increased ROE and EM (Equity Multiplier), but decreased Profit Margins and ROA.
- Investigated sentiment from corporate filings, linking negative sentiment with impending bankruptcy.

Phase 3: Predictive Model Development

- Developed multiple models, including Logistic Regression, Neural Networks, and Random Forest.
- Logistic Regression performed best, handling class imbalance and small datasets effectively, with 77% accuracy.
- Feature importance showed ROA, ROE, and EM as key predictors of bankruptcy.

The Results

- The model achieved an AUC of 0.68, showing better-than-chance prediction accuracy.
- Logistic Regression outperformed other models in this small dataset, with a focus on financial ratios and sentiment data.
- Despite the small sample size, we found a clear relationship between financial health, sentiment, and bankruptcy.

Conclusion

The study confirmed that financial ratios and corporate sentiment could be used to predict bankruptcy within the Chemicals and Allied Products industry. However, limited data availability and the narrow industry focus limit the generalizability of these findings.