QF634 Applied Quantitative Research Methods

Chia Jun Xian Edmund
Eko Widianto
Anirudh Krishnan
Yohanes Alfredo Phoa

Beyond Credit Ratings: A Machine Learning Approach to Real-Time Default Probability Prediction

Real-Time Default Probability Prediction

The study uses machine learning, to predict market-implied default probabilities in real-time, overcoming the limitations of traditional credit risk models.

Application of Machine Learning Models

LightGBM, XGBoost, & neural networks were applied to financial data (X) and market-implied default probabilities derived from CDS prices (Y), with hyperparameter optimization

Superior Performance of Tree-Based Models

Tree-based models provided more stable and accurate predictions, highlighting the advantages of dynamic, market-driven models for pricing and risk management.

Data Sources

CDS Spread Price

Macro Factors

Financial Ratios / Company Information

Modelling

Standard Scalar

1 One-Hot Encoding

70 / 30 Train-Test-Split

LightGBM / XGBoost

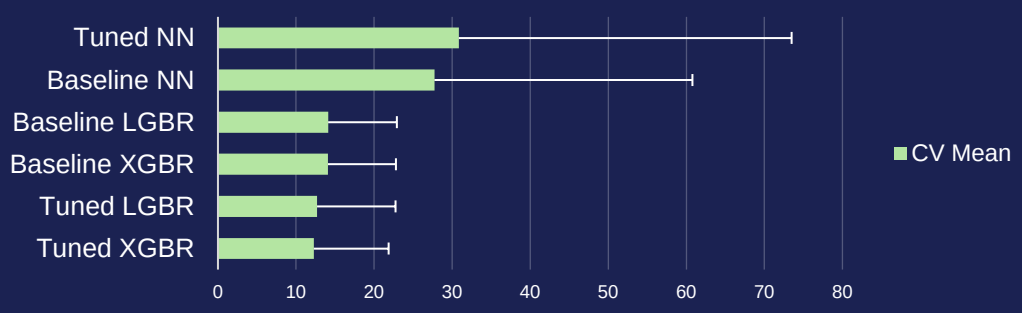
Artificial Neural Network

10 Fold Cross-Validation

Hyperparameter Tuning

Results

Cross-Validation (Mean Squared Error)



Model Performance (Mean Squared Error)