



TOPICS:

Credit Risk

SOURCE:

Bank of Italy

Bankit: Credit Risk Assessment with Stacked Machine Learning

- This Banca d'Italia (Bankit) report evaluates **the effectiveness of using stacked machine learning (ML) techniques to enhance credit risk assessments** for Italian non-financial corporations within the In-House Credit Assessment System (ICAS). ICAS, part of the Eurosystem's collateral framework, combines a statistical model (S-ICAS) with expert analyst evaluations. The authors compare S-ICAS's performance against ML approaches - random forests (RF), extreme gradient boosting (XGBoost), and deep learning (DL) - as well as a stacked meta-model that integrates all three.
- The study, using a dataset of over 2.5 million observations from 2014–2023, finds that **ML models consistently outperform S-ICAS** across its financial and credit behaviour components. RF and XGBoost models increase discriminatory power by 2.3 to 3.3 percentage points in the financial component, while gains in the credit behaviour component are more modest (0.5–1.5 points). The stacked meta-model achieves the highest overall performance, especially in challenging environments such as the COVID-19 period and its aftermath,
- highlighting its robustness in conditions where data quality may be compromised.
- Recognizing that **lack of interpretability has been a barrier to ML adoption in regulatory settings**, the report incorporates eXplainable AI (XAI) tools, particularly Shapley values. These provide transparency into model predictions by quantifying each variable's contribution to credit risk assessments. Such insights help analysts understand divergences between ML outputs and S-ICAS, potentially improving the second-stage expert evaluation process.
- However, the authors caution that due to interpretability constraints, **ML models cannot fully replace traditional models**. Instead, they should be viewed as complementary tools that enhance ICAS's accuracy and resilience.