FinRegLab

# Framework for Managing Machine Learning Models in Consumer Credit Underwriting

## *Report Describes Evolving Risk Management Practices by US Banks*

FinRegLab has released a new report detailing practical considerations for banks in adopting machine learning models for underwriting consumer credit. The framework was developed through discussions with banks that participated in a Technology Working Group convened under the Office of the Comptroller of the Currency's Project REACh (Roundtable for Economic Access and Change), which FinRegLab co-chaired. The report is intended to facilitate greater understanding among financial institutions, regulatory staff, and other stakeholders about evolving industry practices to support responsible innovation in credit underwriting.

Advances in data science and machine learning have the potential to improve credit risk prediction and expand access to responsible credit for consumers and small businesses. For example, prior empirical research by FinRegLab found that machine learning models substantially improved predictive accuracy and increased credit approval rates by as much as 4% in simulations with risk thresholds likely to be used by mainstream lenders. At 2023 levels, a 4% increase at those thresholds would work out to roughly two million additional credit card accounts and 150,000 additional mortgages.

However, uncertainty about regulatory expectations, compliance processes, and technical implementation has affected adoption—particularly among smaller and mid-sized banks with more limited resources. By outlining practical risk management approaches and considerations, the framework is designed to help reduce uncertainty, facilitate responsible adoption, and inform conversations among banks, examiners, and other critical constituencies.

### Why Machine Learning Matters for Credit Underwriting

Machine learning techniques are increasingly being adopted across financial services because they can analyze complex patterns in large datasets and improve the accuracy of credit risk predictions. Compared with traditional statistical models, ML can capture nonlinear and context-specific relationships in borrower data. With or without incorporating additional information sources such as transaction-level cash-flow data, these capabilities can produce several benefits:

- More accurate risk assessment, reducing both mistaken denials and loans made to borrowers who cannot repay.
- Improved pricing and portfolio performance through better prediction of default risk.
- Greater innovation, helping lenders responsibly serve new or traditionally overlooked customer segments.

However, the transition to ML can introduce greater technical complexity and operational considerations, requiring new governance, compliance, and validation approaches. Practical frameworks for responsible implementation can help unlock the benefits of these technologies while maintaining strong consumer protections.

### Risk Management Considerations and Approaches

The report describes a range of key considerations and approaches when adopting ML models:

**1. Model Design, Data Selection, and Resource Management**

Initial choices about model architectures, algorithms, and input data have important downstream implications for ML models' predictive accuracy, transparency, and operational feasibility. While banks may take a variety of approaches on questions such as the appropriate number of variables for an underwriting model based on technical, compliance, and business considerations, careful documentation of analyses and design choices is a common thread.

Practical considerations about technical expertise and infrastructure are also important. While the availability of open source software has reduced barriers to entry for lenders that decide to build models in-house, smaller institutions often find it advantageous to leverage third party vendors' experience and systems. In both cases, appropriate oversight, transparency, and governance are important to establish early in the development process.

**2. Compliance with Consumer Protection Requirements**

The report describes considerations and approaches that lenders can take in adapting their disclosure processes for machine learning models, including validating the reliability of particular explainability techniques as applied in particular contexts.

ML underwriting models must comply with existing laws such as the Equal Credit Opportunity Act and Fair Credit Reporting Act. These laws require lenders to provide adverse action notices that specifically and accurately explain the principal reasons for credit denial or higher rates.

**3. Model Risk Management**

Banks are expected to apply established model risk management processes—including independent validation, documentation, and ongoing monitoring—to ML underwriting models just as they do to traditional models. The report discusses critical considerations and potential techniques for processes such as validating models' conceptual soundness, managing the risk of overfitting or data drift, and monitoring after deployment to detect shifts in applicant populations, economic conditions, or model behavior, while recognizing that bank practices vary depending on a range of considerations.

**4. Vendor and Second-Look Models**

The report also highlights particular considerations when working with models developed by third party vendors or implementing ML models on a limited basis to review applications declined by traditional models. These approaches can allow institutions to gain more confidence in working with machine learning models while maintaining robust governance and consumer protections.

**About the Report**

FinRegLab co-chaired the working group and facilitated drafting of the report. The document is not endorsed by the Federal Government, does not necessarily represent OCC views, and is not subject to Federal information quality, privacy, security, and related guidelines. It does not constitute an endorsement, recommendation, approval, or favoring of any Project REACh participant or other entity or their products, programs, initiatives, or other actions by the OCC.