

Regulatory Compliance and Model Risk Management Report for Credit Risk Modeling

1 Model Purpose & Scope

This document describes a credit risk model developed to estimate the probability of loan default. The model supports lending decisions and is designed in alignment with SR 11-7 Model Risk Management guidance.

2 Data Description & Governance

- Dataset source (Kaggle German Credit – simulated)
- Number of records (1000)
- Missing data handling

Missing values were handled using domain-appropriate techniques to ensure data quality and auditability.

3 Exploratory Data Analysis (EDA) Summary

- Default rate
- Class imbalance
- Key risk factors
- Correlation analysis

4 Feature Engineering

- Ratio-based features
- Interaction features
- Log/sqrt transformations
- Data dictionary

Engineered features were reviewed to avoid proxy variables for protected demographic attributes.

5 Model Development

- Logistic Regression (baseline)
- LightGBM (advanced)
- Cross-validation

-Hyperparameter tuning

6 Model Validation & Performance

-AUC results

-Calibration

-Stability

Model performance was evaluated using stratified cross-validation to ensure robustness and generalization.

7 Fairness & Interpretability

-Demographic group (Sex)

-Disparate Impact

-Equal Opportunity

-SHAP-style explanations

- Adverse action reasons

8 Model Limitations & Monitoring

- Proxy target limitation

-Need for real default data

-Monitoring metrics (AUC, fairness, drift)

9 Governance & Approval

The model follows best practices aligned with SR 11-7 Model Risk Management standards.