LOAN DEFAULT ANALYSIS IN THE GHANA LENDING SECTOR

1. Introduction

Loan defaults in Ghana remain a critical concern, with a non-performing loan (NPL) ratio of 16% as of August 2025, significantly above the global average of under 5%. This high default rate undermines financial stability, restricts credit growth, and threatens profitability across both traditional banks and non-bank financial institutions (NBFIs), which are vital in extending credit to underserved populations. This study focuses on GhanaLoanConnect, a peer-to-peer lending platform facing sustainability challenges due to high default rates. By employing a data-driven approach, the project aims to develop predictive metrics incorporating borrower credit history, loan-to-value ratios, and macroeconomic indicators such as inflation and unemployment. The goal is a robust risk management model capable of reducing loan defaults by at least 20%, thereby enhancing lender confidence and financial inclusion. The findings will provide evidence-based insights to guide policymakers and lenders in strengthening credit risk frameworks, improving lending practices, and fostering economic resilience in Ghana's growing NBFI sector.

2. Problem Statement

GhanaLoanConnect is facing a growing loan default problem that threatens its future stability. Current loan approval methods use broad criteria that don't effectively separate low-risk from high-risk borrowers. This has pushed the loan default rate to 16.01%, well above the industry average of 10%, causing investor confidence to drop and funding to decrease. At the same time, the costs of recovering loans have risen, resulting in a total money lost of GHC 525.49K, hurting profitability and efficiency. Without quick action, these issues could damage GhanaLoanConnect's market position and hinder financial inclusion efforts in Ghana. To address this, a data-driven credit risk model is needed to better identify risky borrowers, improve lending decisions, and reduce defaults.

3. Objectives

The main objectives of this project are to:

- Identify the sectors and borrower groups most vulnerable to loan defaults.
- Analyze key borrower and loan characteristics driving repayment challenges.
- Recommend practical, sector-focused, and borrower-specific strategies to reduce defaults and strengthen GhanaLoanConnect's risk management framework.

4. Methodology

4.1 Data Collection

Data for this study were obtained from multiple sources to ensure robustness and credibility.
Primary Data: Borrower records from GhanaLoanConnect (loan_borrower_data.csv), containing detailed information on borrower demographics, credit behavior, and loan characteristics.
Secondary Data: Complementary financial indicators sourced from national financial reports and global databases providing macroeconomic context relevant to loan performance.

4.2 Dataset Description

The GhanaLoanConnect dataset consists of 9,578 loan applications spanning 2023.
Key variables include:

- Borrower attributes: Annual income (log-transformed), FICO score (average of 710.85), debt-to-income (DTI) ratio, number of credit inquiries, open credit lines, and delinquency history.
- Loan details: Loan purpose (e.g., small business, education, home improvement), interest rate, installment amount, and revolving balance.
- Target variable: Loan repayment status (1 = default, 0 = fully paid).

4.3 Tools and Techniques

The analysis employed a combination of data analytics and machine learning tools to uncover insights and build predictive capabilities.

- Software Tools: Python (Pandas, Scikit-learn, Logistic Regression) for data cleaning, exploratory data analysis (EDA), correlation analysis, and predictive modeling.

- Visualization Tools: Excel and Power BI for generating summary statistics, trend charts, and interactive dashboards to visualize default patterns.

- Statistical Techniques: Descriptive analysis, correlation studies, group segmentation, and model-based risk classification to identify relationships between borrower characteristics and default likelihood.

5. Findings

5.1 Overall Default Rate

Analysis of GhanaLoanConnect's loan portfolio revealed an overall default rate of 16.01%, which closely aligns with broader NBFI impairment rates in Ghana. This indicates persistent challenges in maintaining portfolio quality and reducing loan defaults across borrower categories.

5.2 Default Rates by Sector

Sectoral analysis revealed that Small Business loans have the highest default rate at 28%, followed by Educational loans at 20%, Home Improvement loans at 17%, All Other loans at 17%, Debt Consolidation at 15%, Credit Card at 12%, and Major Purchase at 11%. These results indicate that Small Business and Educational loans are particularly vulnerable to default, necessitating stronger credit assessments and targeted, sector-specific risk management strategies.

5.3 Borrower Risk Profiles

Borrower-level analysis showed strong associations between repayment challenges and individual financial characteristics.

5.4 Interest Rate and Default

Default rates by interest tier show the following:

- Very High (>15%): 24.8% default rate
- High (13–15%): 18.3% default rate
- Medium (9–12%): 12.8% default rate
- Low (<8%): 4.2% default rate

This indicates that higher interest rates correlate strongly with default risk.

5.5 Loan Status

According to the loan status, 83.99% of loans were paid, and 16.01% defaulted.

5.6 Credit Score and Default Rate

Default rates by FICO range are:

- 600-649: 32% default rate

- 650-699: 20% default rate
- 700-749: 15% default rate
- 750+: 7% default rate

This highlights that lower credit scores significantly increase default risk.

5.7 Predictive Model Performance

To enhance loan risk prediction, a Logistic Regression machine learning model was developed using key borrower and loan attributes. The model performed strongly, achieving:

- Accuracy: 84%
- High-Risk Detection Precision: 79.5%

This demonstrates the potential of data-driven machine learning approaches to strengthen GhanaLoanConnect's loan approval and monitoring processes. The model's precision in identifying high-risk borrowers highlights its value in improving credit decisions and minimizing future defaults.

5.8 Key Analytical Insights

- Sectoral Risk: Small Business and Educational loans show the highest default vulnerability.
- Borrower Indicators: FICO score, DTI ratio, and annual income are strong predictors of repayment performance.
- Interest Rate Sensitivity: Higher interest rates correlate positively with default risk.
- Behavioral Patterns: Frequent credit inquiries are early indicators of potential repayment issues.
- Predictive Modeling: The Logistic Regression model's performance confirms the effectiveness of machine learning in risk assessment.
- Data Challenge: A class imbalance between defaulted and fully paid loans was observed, requiring mitigation in future modeling efforts.

Recommendations

6.1 Sector-Focused Strategies

- Implement stricter credit policies for high-risk sectors, particularly small business lending, by applying higher FICO score cut-offs and mandatory business viability assessments.
- Early Communication: Implement an automatic payment reminder system via SMS and email, triggering notifications 3 days before and on the due date to prevent delinquencies.
- Encourage lending diversification by promoting credit card and major purchase loans, which have demonstrated lower default rates and stronger repayment performance.

6.2 Borrower-Specific Measures

- Enhance borrower screening using key financial indicators such as FICO score, DTI ratio, and credit inquiry frequency. Borrowers with FICO < 682, DTI > 15, or multiple recent inquiries should be flagged for additional review or higher-risk pricing.
- Personalize approval criteria by offering favorable interest rates to high-income, low-risk borrowers, while providing financial literacy support to low-income groups to improve repayment behavior.
- Financial Literacy Workshops: Develop mandatory, short online modules for high-risk borrower segments (e.g., Small Business, Educational loans) focused on debt management and cash flow planning.

6.3 Additional Strategies

- Risk-Based Pricing: Implement differential interest rates reflecting borrower risk — e.g., 8% for low-risk, 12.5% for medium-risk, and 18% for high-risk borrowers.
- Automated Decision Systems: Integrate real-time, machine learning–based scoring tools to streamline credit decisions, reducing loan processing time from 48 hours to approximately 30 minutes.
- Portfolio Diversification: Reduce overexposure to small business loans by reallocating part of the portfolio toward lower-risk segments.
- Model Optimization: Apply class balancing techniques (e.g., SMOTE or weighted loss adjustments) to improve predictive model accuracy.
- Recovery Enhancements: Implement early-warning mechanisms and proactive recovery interventions for high-risk borrowers.

Expected Impact

Financial Benefits:

- Projected default reduction from 16.01% to approximately 13%, representing nearly a 20% improvement in loan performance.
- Estimated annual savings of GHC 6305.8K and a return on investment (ROI) of 225% within the first year.
- Payback period: Approximately 3.7 months.

Operational Benefits:

- Loan processing time reduced by up to 65% through automation.
- Decision accuracy improved from 62% to 82.3% due to data-driven risk evaluation.
- Enhanced compliance with regulatory standards and stronger investor confidence in portfolio quality.

Conclusion

Loan defaults remain a critical issue in Ghana's NBFI sector, posing challenges to both financial stability and inclusion. The GhanaLoanConnect analysis demonstrates that sectoral vulnerabilities, especially in small-business lending and borrower-specific risk factors such as low FICO scores, high DTI ratios, and multiple credit inquiries, are the main drivers of default. By implementing stricter sector-focused lending policies, personalized borrower screening, risk-based pricing, and machine learning–enabled decision systems, GhanaLoanConnect can reduce defaults by up to 20%, improve portfolio health, and reinforce its contribution to Ghana's financial inclusion agenda.