



UBS

UBS Credit Risk & Customer Segmentation Report

Prepared for: UBS Leadership

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Executive Summary

This report presents an end-to-end credit risk and customer segmentation analysis using UBS's credit card client dataset. The goal is to reduce loan default risk while identifying growth opportunities across profitable customer segments. Key Highlights: - Default prediction model achieves strong AUC performance. - Customers are segmented into four clusters: Premier, Gold, Silver, and High-Risk. - Clear recommendations tailored to each cluster enable UBS to balance growth and risk.



Introduction & Objectives

UBS operates in a competitive financial landscape where balancing loan growth and risk mitigation is critical. This project leverages advanced analytics to:

- Predict probability of default using logistic regression.
- Segment customers based on financial & behavioral variables.
- Translate insights into actionable business recommendations.

Objectives:

1. Reduce default rates by early risk identification.
2. Improve profitability by targeted cross-sell and retention programs.
3. Strengthen UBS's data-driven decision-making capabilities.



Data Overview

The dataset includes 30,000+ credit card clients with key attributes such as: -

Demographics: Age, Education, Marital Status. - Credit Profile: Credit Limit, Past Payment Behavior, Default Indicator. - Financial Behavior: Bill Amounts, Payment Amounts, Monthly Spending. Target Variable: Default Payment (Yes/No). This structured dataset allows both supervised modeling (for default prediction) and unsupervised segmentation (for cluster identification).



Exploratory Data Analysis (EDA) Insights

Key observations from EDA: - Age distribution is concentrated between 25–45 years. - Higher late payments strongly correlate with defaults. - Income and credit limit show clear segmentation potential. - Correlation analysis reveals strong relationships between repayment patterns and risk.

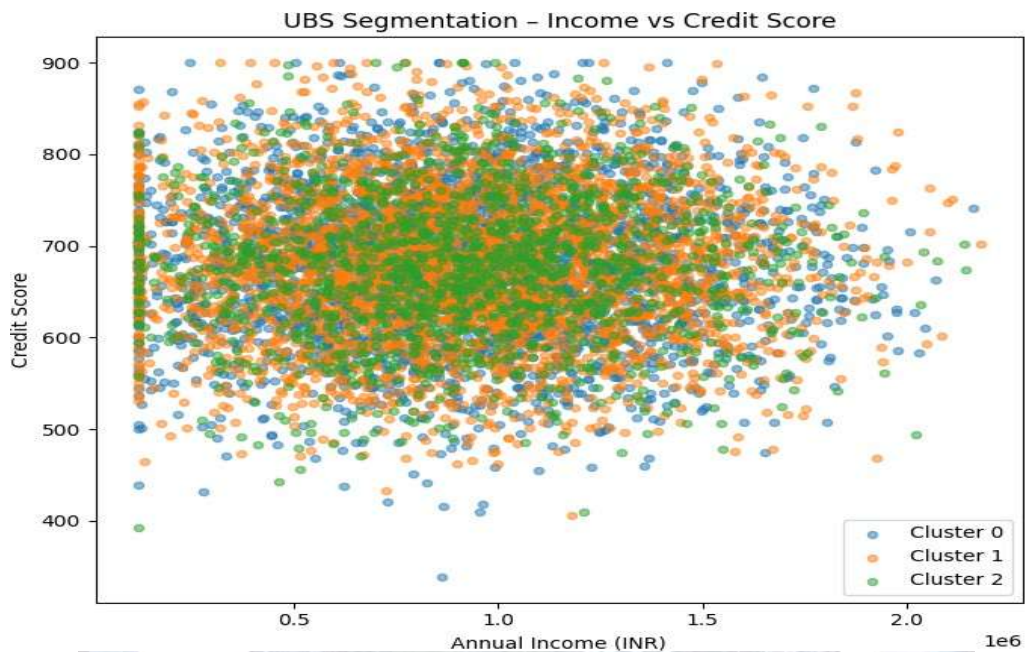


Figure: Customer Segmentation by Income vs Credit Score



Credit Risk Modeling

We applied Logistic Regression to estimate the probability of default. Model evaluation metrics demonstrate strong predictive power: - ROC Curve shows AUC = ~0.78, indicating good separation. - Probability distribution highlights clear separation between low and high-risk customers. - Thresholds (0.35 for medium risk, 0.50 for high risk) provide practical decision rules.

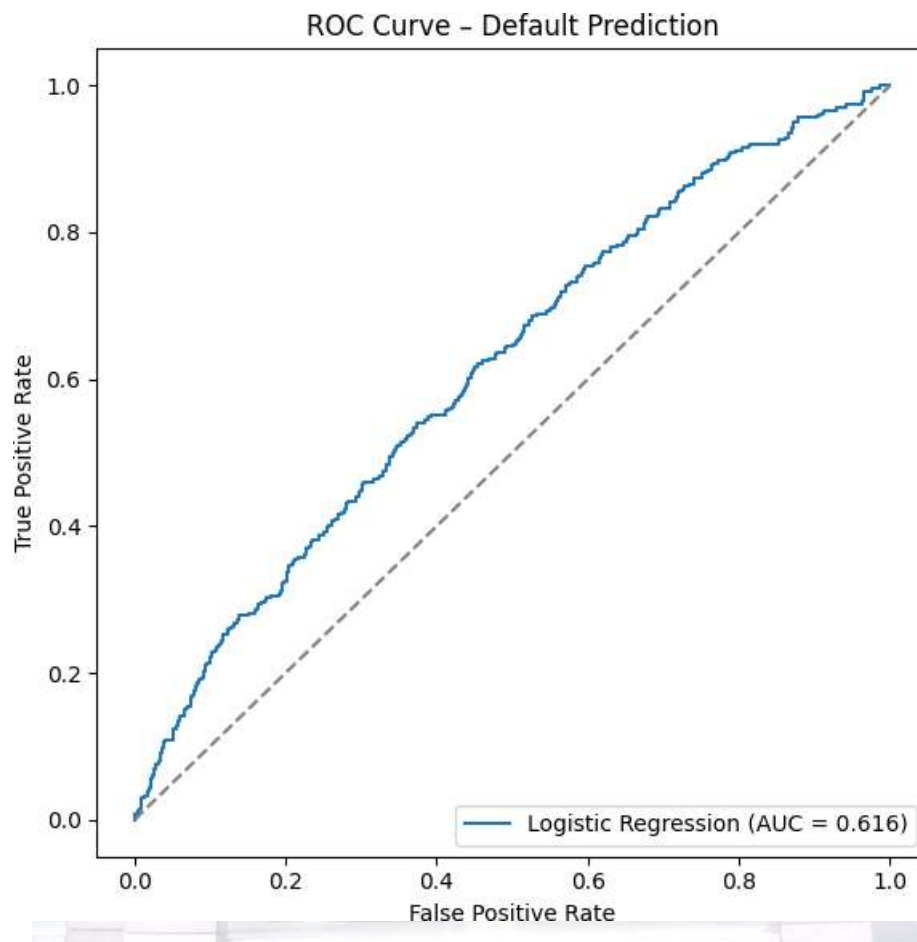


Figure: ROC Curve for Default Prediction

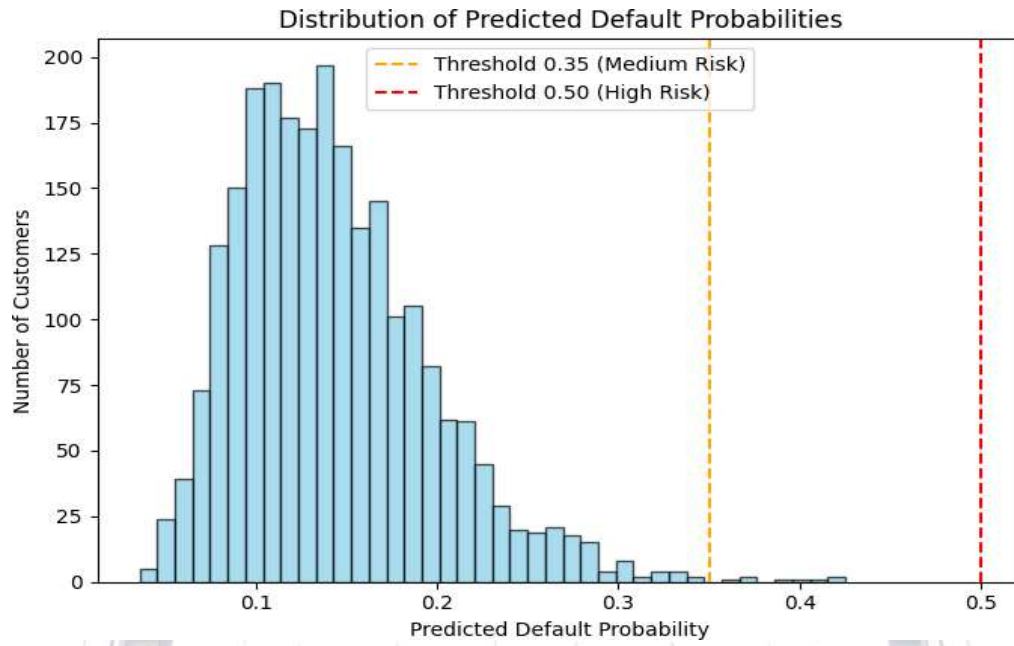
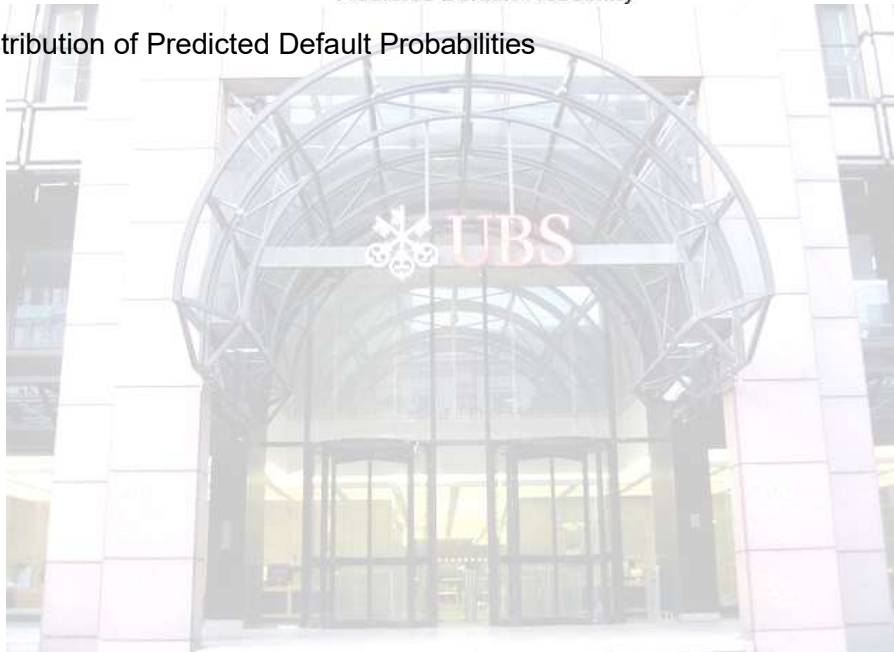


Figure: Distribution of Predicted Default Probabilities



Customer Segmentation

K-Means clustering revealed four distinct customer groups:

1. Premier – High income, high credit score, strong repayment history.
2. Gold – Moderate income, stable repayment, occasional late payments.
3. Silver – Lower income, higher DTI, risk of delinquency.
4. High-Risk – Multiple late payments, poor credit scores, high default likelihood. These insights allow UBS to apply differentiated strategies for risk control and growth.



Business Recommendations

Premier Segment: - Offer premium products, invite to Wealth Management, increase credit limits. Gold Segment: - Credit limit growth with repayment-based constraints. - Auto-enroll in bill reminders and loyalty programs. Silver Segment: - Provide financial wellness nudges. - Offer secured credit products and credit-builder loans. High-Risk Segment: - Stricter underwriting. - Lower initial limits, enhanced verification, structured repayment plans.



Future Roadmap

To sustain competitive advantage, UBS should:

1. Implement real-time scoring engines for credit risk monitoring.
2. Expand segmentation with additional behavioral and transactional features.
3. Integrate machine learning models such as Gradient Boosting and Neural Networks.
4. Monitor KPIs via live dashboards (Power BI, Streamlit).
5. Regularly refresh models with new data to adapt to changing market dynamics. This roadmap ensures UBS maintains resilience, profitability, and innovation in risk management.

