

# Home Credit Default Risk Analysis: Business Insights Report

**By: Mehdi Mouja, Badr Benesrighe, Jean Jiptner, Othman Bakki**

Prepared For: Executive Credit Committee, Risk Management, and Product Development Teams

Date: December 4, 2025

Scope: A business-focused analysis of factors driving Home Credit default risk and strategic recommendations for improving portfolio resilience and client support.

## Section 1: Executive Summary and Key Findings

This report presents the findings from an analytical study aimed at isolating the key factors that lead our clients to struggle with loan repayments. We utilized advanced analytical models to process our client data. The study confirms that the risk of default is determined by three essential and interconnected elements: the client's prior financial conduct, the severity of the loan's monthly burden relative to their income, and the documented stability of their employment history.

Despite utilizing our efforts to perfect the predictive tools created, their ability to perfectly forecast a default remains challenging. Our most accurate model, based on advanced machine learning, only correctly identifies about half (50%) of the clients who will eventually default. This highlights a critical limitation: while our screening systems are effective at flagging high-risk applications, credit default is fundamentally influenced by complex, often unseen human factors, such as unexpected illness or job loss, which are not captured in the initial application data. Therefore, our models must be viewed as essential risk *ordering* tools, not flawless predictors.

### Client Profile Overview

Our typical applicant pool is characterized by significant financial needs. Most applicants fall between the ages of 30 and 45 years, a phase often defined by large expenses where household budgets are highly sensitive to unexpected economic pressure. A substantial segment of our clientele is in the low to moderate-income range. These clients rely heavily on access to credit but possess minimal financial reserves, which increases their overall financial fragility. We also observe considerable variance in work history; job stability is consistently identified as a primary indicator of a client's ability to withstand financial setbacks.

### Model Performance Summary

We tested four modeling methodologies. The Advanced Scoring Model (our best performer) provides the highest capability for distinguishing low-risk from high-risk applications. For internal auditing and regulatory transparency, we also maintain a simpler, more interpretable

Secondary Model (Logistic Regression), which provides clear, straightforward risk rules. Our recommendation is to deploy the Advanced Scoring Model for daily operational use due to its superior accuracy, while leveraging the Secondary Model for compliance and rule clarification.

## Section 2: Core Drivers of Default Risk

This section details the specific data points that hold the greatest predictive power for identifying future default risk.

### Dominant Risk Drivers: External Financial Scores

External indicators of credit health and reliability are, across the board, the most powerful predictive variables. These scores, known in our data as **EXT\_SOURCE\_1**, **EXT\_SOURCE\_2**, and **EXT\_SOURCE\_3**, function as a comprehensive report card on a client's history with other financial entities. A low reading on these external scores is the single strongest and most immediate warning sign of potential future default. *Actionable Implication:* These External Scores must be mandatory and non-negotiable criteria for all automated loan approval processes.

### Financial Strain: Affordability Metrics

Calculations that quantify the financial burden of the loan relative to the client's income are highly influential. Key affordability metrics include the ratio of the loan amount to income (**CREDIT\_TO\_INCOME**) and the ratio of the annual payment to income (**ANNUITY\_TO\_INCOME**). Loans where the repayment constitutes an excessive proportion of the client's total income sharply increase the probability of default, as the household is left without the necessary financial cushion to manage unforeseen expenses. *Actionable Implication:* We must implement stricter maximum thresholds for these affordability ratios and actively pursue the creation of income-adapted products featuring lower initial payments to alleviate stress on vulnerable clients.

### Stability and Ownership

Metrics relating to personal and professional history offer crucial context regarding a client's resilience. Employment Stability, measured by continuous years of employment relative to age, is critical. A consistently long work history signals financial strength, whereas frequent job changes or short tenure indicate structural vulnerability. Similarly, ownership of major assets, such as a car or real estate (**INCOME\_CAR\_OWN** and **INCOME\_REALTY\_OWN**), typically correlates with higher economic resilience, reflecting accumulated wealth. *Actionable Implication:* These stability and ownership metrics must be integrated as positive weighting factors during manual review or as multipliers within the automated scoring system.

The analytical evidence clearly shows risk is concentrated in these external and stability metrics. While our models are robust tools for risk assessment, their limitation in predicting human events means they must serve as guidance for expert judgment, rather than providing

absolute, final decisions.

### **Section 3: Strategic Recommendations and Implementation Roadmap**

Based on the analysis, we propose the following concrete steps to strengthen our risk framework and improve client service.

#### **Enhanced Risk Management & Scoring Deployment**

Our first immediate action is to Deploy the Advanced Scoring Tool as our primary prediction engine to capitalize on its superior accuracy. The tool's probability output must be used to set different loan rates (pricing tiers) based on risk.

Because the tool cannot perfectly identify all future defaulters (its accuracy remains under 50% for this task), a crucial priority is to Adjust the Approval Thresholds. We need a detailed analysis to determine the optimal cut-off point, specifically aiming to prioritize the identification of high-risk cases even if this slightly impacts the overall number of loans approved.

#### **Product and Pricing Strategy**

To maintain profitability and market share, we recommend Dynamic Tiered Pricing. This means developing a more granular pricing structure that uses the advanced tool's risk output to offer the best competitive rates to low-risk clients (those with strong external scores) and apply appropriately higher margins to clients with moderate risk. Furthermore, we must introduce Flexible Repayment Products specifically designed for clients under high financial stress (high loan burden). These innovative products can incorporate features such as lower initial payments, grace periods, or the option to skip a payment once a year at a cost. The expected positive outcome is a reduced rate of early default among vulnerable segments and enhanced customer loyalty.

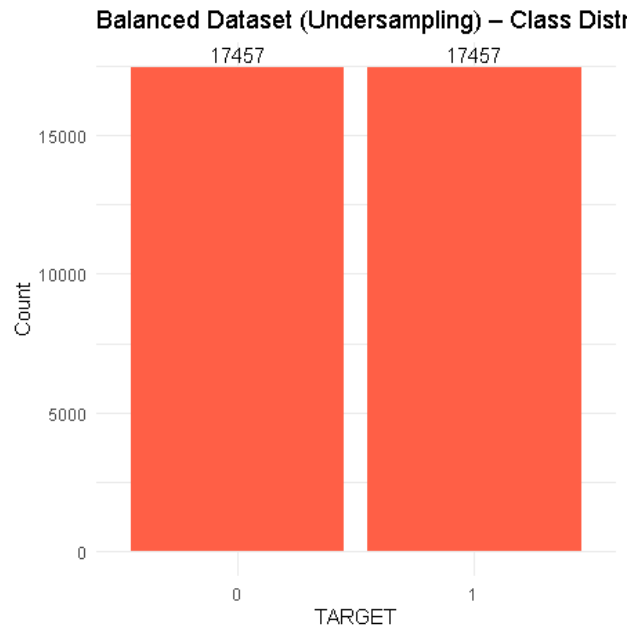
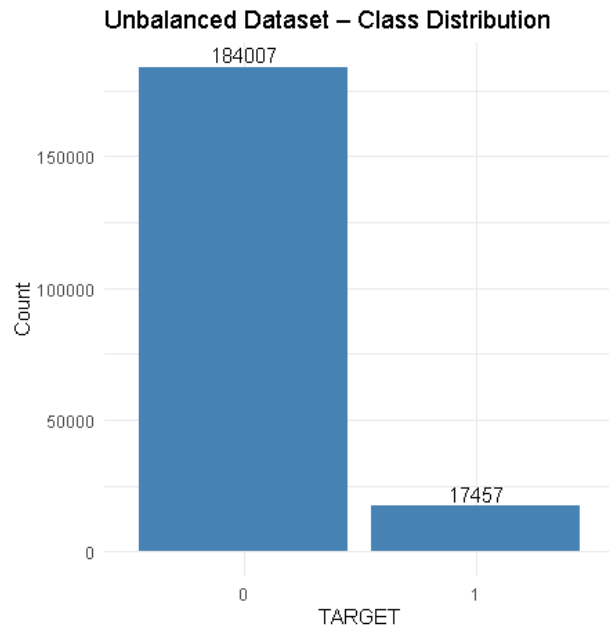
#### **Early Warning and Client Support**

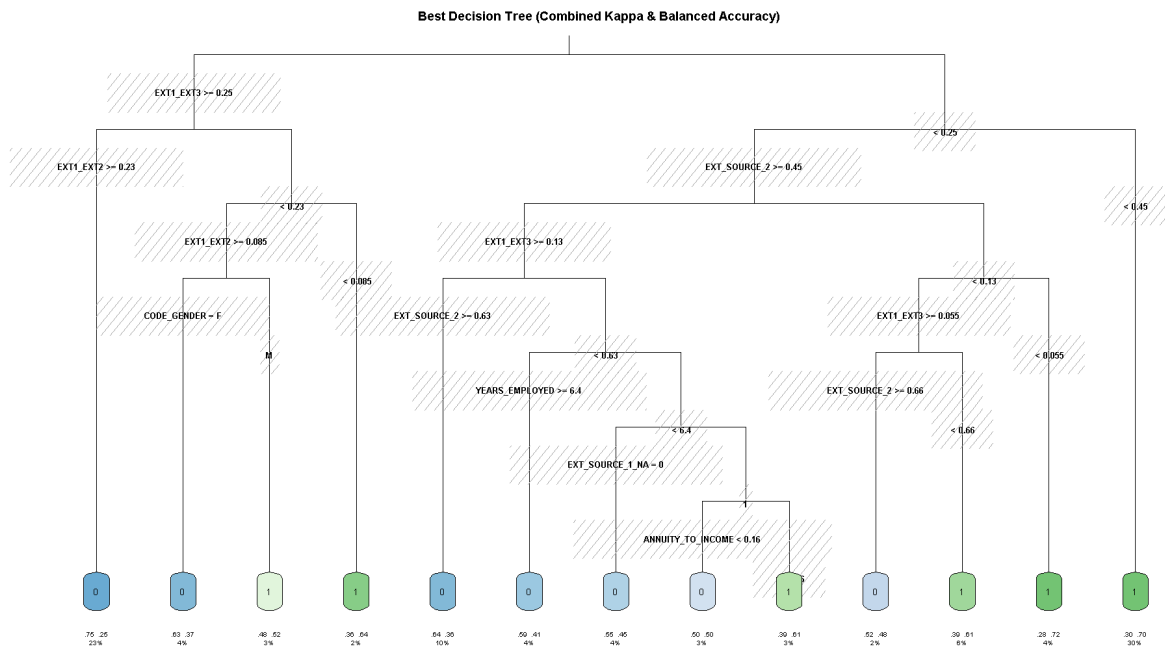
A proactive approach is essential for post-approval risk management. We must launch Proactive Vulnerability Outreach by implementing an early warning system that flags clients who show signs of financial distress after loan approval. Such signs could include minor payment delays or changes in asset ownership status. The goal is to facilitate early intervention, possibly through loan restructuring, to prevent a major default. Finally, we recommend Mandatory Financial Onboarding Support for younger clients or those with weaker job stability. This initiative provides crucial guidance on budgeting and risk management, which will improve their long-term ability to repay and reduce over-indebtedness.

**Final Conclusion:** This study provides a strong, data-supported framework for modernizing our credit risk operations. By deploying the Advanced Scoring Model, strictly focusing on external reliability and affordability metrics, and pairing this technology with responsive

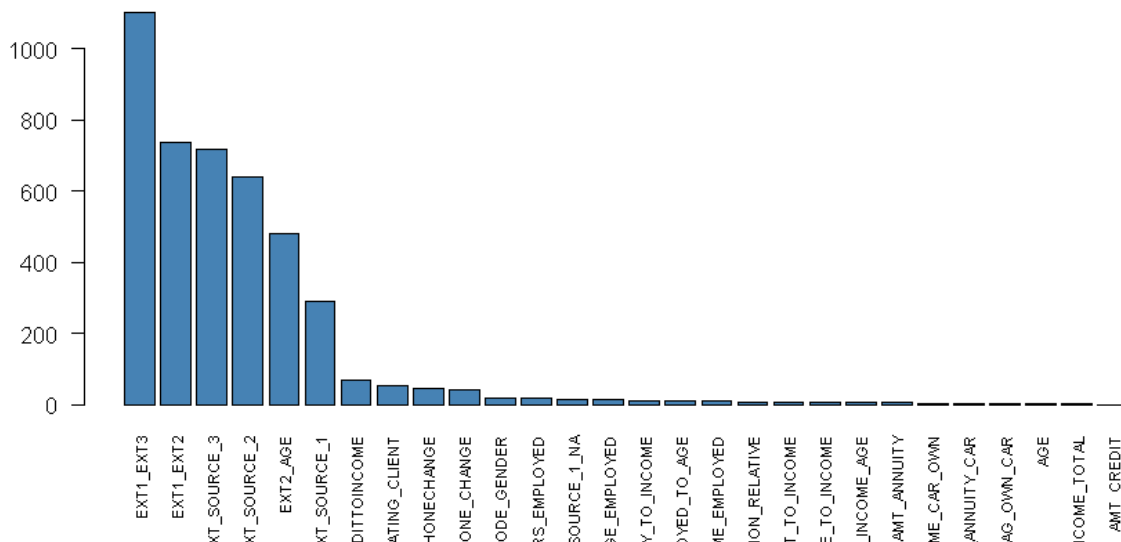
product design and proactive client support, we can significantly reinforce our portfolio's stability and ensure responsible lending practices.

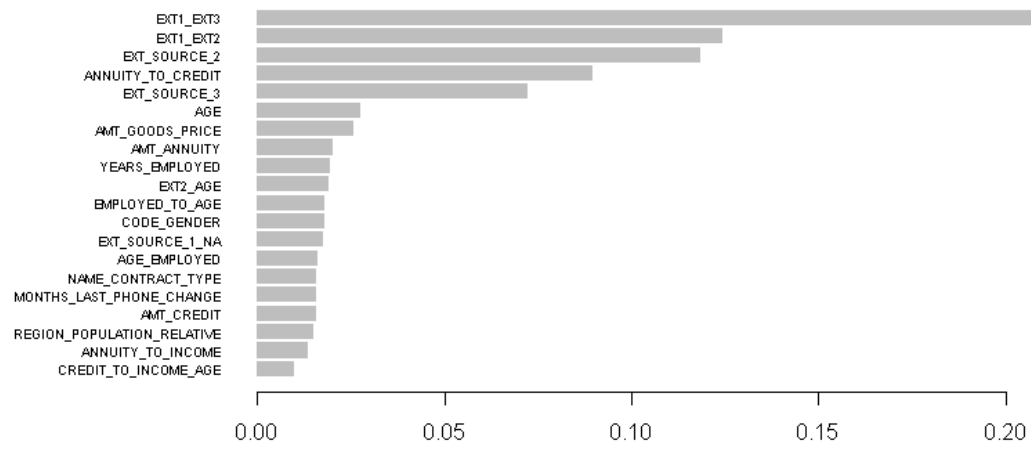
## **Appendix:**





**Variable Importance (Best Tree)**





**Variable Importance XGBoost**

