

Logit – Probit regression mathematical model and Z-Score in analyzing and forecasting non-performing loans at Nayoby Bank, Oudomxay Province Branch, Laos

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Abstract: This study develops and evaluates a mathematical model integrating Logit, Probit, and Z-Score methodologies to analyze and predict non-performing loans (NPLs) at Nayoby Bank, Oudomxay Province Branch, Laos. Utilizing historical credit data, the research compares the predictive accuracy of binary regression models (Logit and Probit) against Altman's Z-Score, a discriminant analysis tool. The findings indicate that the Logit model demonstrates superior predictive performance for NPL classification, followed closely by the Probit model, while the Z-Score provides a robust complementary measure for financial distress assessment. Key determinants of credit risk identified include loan purpose, repayment history, and borrower income stability. The integrated framework enhances early warning capabilities, enabling proactive risk management. This research contributes to banking risk assessment in developing economies by offering a tailored, quantitative approach for NPL forecasting, thereby supporting more informed lending decisions and financial stability at the branch level.

Keywords: Logit, Probit, Z-Score, non-performing loans