

## Development of a Predictive Model to Prevent Financial Crisis

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**Abstract :** Delinquency has been a crucial factor in economics throughout the years. Commonly seen in credit card and mortgage, it played one of the crucial roles in causing the most recent financial crisis in 2008. In each case, a delinquency is a sign of the loaner being unable to pay off the debt, and thus may cause a lost of property in the end. Individually, one case of delinquency seems unimportant compared to the entire credit system. China, as an emerging economic entity, the national strength and economic strength has grown rapidly, and the gross domestic product (GDP) growth rate has remained as high as 8% in the past decades. However, potential risks exist behind the appearance of prosperity. Among the risks, the credit system is the most significant one. Due to long term and a large amount of balance of the mortgage, it is critical to monitor the risk during the performance period. In this project, about 300,000 mortgage account data are analyzed in order to develop a predictive model to predict the probability of delinquency. Through univariate analysis, the data is cleaned up, and through bivariate analysis, the variables with strong predictive power are detected. The project is divided into two parts. In the first part, the analysis data of 2005 are split into 2 parts, 60% for model development, and 40% for in-time model validation. The KS of model development is 31, and the KS for in-time validation is 31, indicating the model is stable. In addition, the model is further validation by out-of-time validation, which uses 40% of 2006 data, and KS is 33. This indicates the model is still stable and robust. In the second part, the model is improved by the addition of macroeconomic economic indexes, including GDP, consumer price index, unemployment rate, inflation rate, etc. The data of 2005 to 2010 is used for model development and validation. Compared with the base model (without microeconomic variables), KS is increased from 41 to 44, indicating that the macroeconomic variables can be used to improve the separation power of the model, and make the prediction more accurate.

**Keywords :** delinquency, mortgage, model development, model validation

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