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BANKRUPTCY PREDICTION MODEL CONVENTIONAL BANK RURAL BANKS IN INDONESIA

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Abstract

This study aims to form a prediction model for the bankruptcy of rural banks in Indonesia. The analytical method used logistic regression by first analyzing the factors followed by testing the validation of the model based on new data. The study population is the Rural Credit Bank in Indonesia. The sample used was 229 banks consisting of 29 bankrupt banks and 200 non-bankrupt banks. The data used is the quarterly financial statement data of the bank from 2006 to 2016 as a design sample and 2017 data as a validation sample. A total of 120 were used as design samples to form a bankruptcy prediction model and 109 banks as validation samples to test the accuracy of the model formed. The results showed that of the four prediction models that were successfully built, it turned out that only MP3s were eligible to be used as a prediction model for Bank Credit in Indonesia. At the level of MP3, modeling has a classification accuracy of 100% with a cut-off point of 0.2, and at the level of MP3, validation has a classification accuracy of 88.99% with a cut-off point of 0.09. The interest rate of the LPS guarantee is the dominant financial risk factor that predicts the probability of bankruptcy of rural banks in Indonesia.

Keywords: Financial Risk, Prediction, Bankruptcy, Logistic Regression.

Introduction

Indonesian banks in carrying out their functions are based on the principle of prudence. The main function of Indonesian banking is as a collector and distributor of public funds and aims to support the implementation of national development in order to improve the distribution of development and its results, economic growth, and national stability, towards improving the lives of many people. Based on Law Number 10 of 1998, the banking structure in Indonesia consists of Commercial Banks and Rural Credit Banks. The main difference between Commercial Banks and Rural Credit Banks is that in terms of their operational activities, Commercial

Banks carry out conventional business activities and / or based on sharia principles in their activities providing services in payment traffic, whereas Rural Credit Banks conduct business activities conventionally or based on sharia principles. In its activities do not provide services in payment traffic. Rural Credit Banks in Indonesia are regulated in Law No.7 of 1992 concerning Banking, where Rural Credit Banks are given a clear legal basis as one type of bank other than commercial banks. Law No.7 of 1992 was strengthened by PP No. 71 of 1992, specifically on Rural Credit Banks, where Rural Credit Banks were given clear status and guidance and were directed to expand their service coverage and the certainty of trying to reach all corners of the country. The Rural Credit Bank has been operating with specific operational characteristics that make it possible to reach and service micro and small businesses since 1988.

Research on the topic of bankruptcy or bankruptcy continues to be carried out using different variables and analytical tools. Beaver (1966), about corporate failure, uses 30 financial ratios on 79 pairs of bankrupt and non-bankrupt companies. Univariate discriminant analysis method as a statistical test tool. The accuracy of the predictions of 90% and 88% of the samples in the Beaver (1966) study makes this study often used as the main reference to incorporate failure research. Altman (1968), also researched the same topic but different statistical test equipment. The multivariate discriminant analysis technique was used by Altman (1968) to predict bankruptcy by using 5 financial ratios in 33 pairs of manufacturing companies in the insolvent USA and 33 companies not bankrupt, Altman model (1968) was able to correctly identify 90% of bankruptcy cases one year before bankruptcy occurs. The model, composed by Altman (1968), is popularly called the Z score.

Hadad et al. (2004) conducted a study on the prediction of bankruptcy of commercial banks in Indonesia. The method used is factor analysis and logistic regression, as the independent variable is the ratio of capital and financial risk factors with time variation as a dummy variable while the dependent variable is bankruptcy. The results showed that of the three prediction models that were built based on time variations, the MP3 model, or the condition of the bank 3 months before the bankruptcy was feasible to be used as a prediction model at commercial banks in Indonesia. Wilopo (2001) conducted a study of bankruptcy prediction using 13 financial ratios of the CAMEL model, the size or size of the bank as measured by assets and global variables in the form of current loans and management. The results of this study do not support the hypothesis that the CAMEL financial ratios, bank size, or compliance with Bank Indonesia can be used to predict bank failures.

Bankruptcy may not occur suddenly without warning of the behavior of the financial statements, which are a source of calculation of banking performance indicators. The Executive Director of Claims and Resolutions of LPS Bank, explained, "the average capital adequacy ratio (CAR) of liquidated banks reached minus 209.79% and the average ratio of non-performing loans (NPLs) reached 76.18%. So the condition of the banks, when they were

liquidated, was indeed very dying. The total deposits of 70 liquidated banks in Indonesia reached Rp. 1,625 trillion, out of that total deposits of 1 (one) commercial bank being liquidated reached Rp. 357 billion and 69 BPRs reached Rp. 1,268 trillion. Of the total deposits, as much as Rp. 1,042 trillion are eligible deposits and those that are not worth paying up to Rp 283 billion "(Ferdinand in a press conference with LPS at Hotel Mulia, 9/6/2016).

The gaps in this study that want to be investigated include the fact that there is still not much research on the bankruptcy prediction model at Bank Perkreditan Rakyat in Indonesia. Previous research had focused more on commercial banks because bankruptcy on commercial banks is considered to have a more systematic impact, and indeed before 2005, most of the banks that were liquidated were commercial banks. Research to compile early detection of the bankruptcy of Rural Credit Banks has not been done much in previous studies. In general, the types of banks studied are commercial banks. Another gap is the use of external factors as predictors of insolvency, especially interest insurance LPS, which is an external variable that has not been found studied in previous studies.

This phenomenon is the main reason for assessing the cause of bankruptcy in which the problem being faced is the Rural Credit Bank in Indonesia requires a system that can provide early warning of financial problems and external factors that threaten bank operations and anticipate the emergence of financial difficulties at the bank. So based on the problems that have been raised and some research that has been done, this research is intended to be conducted with the "Bankruptcy prediction model for conventional people's credit banks in Indonesia."

Literatur Review

Agency Theory dan *Bank Failure*

Agency Theory is a concept that explains the contractual relationship between principals and agents. Principals are parties that give mandates to other parties, namely agents, to carry out all activities on behalf of the principal in his capacity as a decision-maker (Sinkey, 1992: 78; Jensen & Smith, 1984: 7).

Jensen and Meckling (1976) describe agency relationships as "agency relationships as a contract under which one or more people (the principals) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent." An agency relationship is a contract in which one or more people (principals) govern another person (agent) to perform a service on behalf of the principal and authorize the agent to make the best decision for the principal. If both parties have the same goal to maximize the value of the company, then it is believed that the agent will act in a manner consistent with the principal's interests. Jensen and Meckling (1976) also define agency costs as the sum of costs incurred by principals to supervise agents. It is almost impossible for companies to have zero agency costs in order to guarantee that managers will

make optimal decisions from the viewpoint of shareholders because of the large differences in interests between them.

Portfolio Theory and Bank Portfolio Risks

Portfolio Theory by Henry Markowitz (1952), arises with the premise of "do not put all eggs in one basket" (do not put all eggs in one basket), because if the basket falls, then all the eggs in the basket will break. Likewise, with investments made, do not invest all funds in one form of investment, because when the investment fails, then all funds that are embedded will likely not return. This portfolio theory teaches the concept of portfolio diversification quantitatively, which suggests to avoid risk and provide maximum returns on every investment decision by diversifying investments.

Portfolio Theory by Markowitz (1952) suggests avoiding risks and providing maximum returns on every investment decision by diversifying investments. In the banking sector, Sinkey (1998) discusses Bank Portfolio Risks while Greuning & Bratanovic (2009), in his book Analyzing Banking Risk also provide a framework for assessing corporate governance and banking risk management as a basis for analyzing banking risk. Meanwhile, Pyle (1997) in Bank Risk Management states that banks and similar financial institutions need to meet the applicable regulatory requirements for risk and capital measurement. Risk management is a process whereby managers meet the needs of identifying key risks, obtaining a measure of operational risk that is consistent, understandable, choosing which risks should be reduced and which ones should be increased and in what ways, and establish procedures to monitor the position of the resulting risk. Risk, in this context, can be defined as a reduction in the value of a company due to changes in the business environment. The main sources of value loss are identified as market risk, credit risk, operational risk, and performance risk.

Fama (1980), in Sinkey (1998: 92), has analyzed commercial banking from the viewpoint of financial theory. In its framework, it assumes that the bank performs two functions, namely (1) the transaction function and (2) the portfolio function. Bank transactions provide an exchange system where the transfer of wealth is carried out with bookkeeping entries. The distinguishing characteristic of this accounting system, which works through bookkeeping entries (debit and credit, usually in the form of electronic impulses), is that it does not require physical media to exchange such currencies. Although operating this accounting exchange system, banks cannot transfer wealth, as a result, banks also carry out portfolio management functions. That is, they collect deposits to make loans and buy securities. Focusing on the nature of banking, Fama (1980) assumes that when banking is competitive, bank portfolio activity is included in the type of pure financing decision. Thus, to get a stable general balance in terms of prices and real economic activity, bank portfolio activities do not have to be controlled by the government.

Sinkey (1998) discusses Bank Portfolio Risks. Bank risk management focuses on three main portfolio risks, credit risk, interest rate risk, and

liquidity risk. This risk arises from unforeseen changes in borrowing the ability to repay loans, unexpected changes in interest rates, and unexpected changes in balance sheet flows. Problems with credit risk due to bad credit related to energy, agriculture, developing countries, transactions with high leverage, and commercial real estate loans have hit banks in the past decade. In addition, due to the extraordinary growth in balance sheet activity, especially in large banks, and the development of securitization, bank risk management also focuses on innovations. The idea of managing bank portfolios or overall balance management comes from modern portfolio theory, as developed in 1950. The first attempt to apply modern portfolio theory to banking came in the form of linear and quadratic programming models. Although these models are quite elegant, they are too restrictive and complex for practical use.

The Banking Financial Risk

The study of bankruptcy prediction continues to grow using different predictor variables and analysis tools. Beaver's (1966) study of corporate failure uses 30 types of financial ratios used in 79 pairs of bankrupt and non-bankrupt companies. By using univariate discriminant analysis as a statistical test tool, Beaver's research produces a ratio of working capital funds flow / total assets and net income / total assets as ratios that can correctly distinguish companies that are going bankrupt and not bankrupt respectively by 90% and 88% from the sample used. The accuracy of predictions in Beaver's research makes this study often used as the main reference in research on corporate failure.

Gyamfi (2016), in his research Risk Facing International Banking, divides banking risk into interest rate risk, credit risk, liquidity risk, market risk, and political risk. This research identifies some of the main risks faced by international banks in their operations, their causes, and effects, and determines steps to reduce them. The main risks discussed include interest rate risk, credit risk, liquidity risk, market risk, operational risk, and political risk. The conclusion is that this risk is very important in international bank operations, and its impact can be very influential for the survival of any bank. Therefore it is necessary to formulate and implement an effective risk management policy that can identify various risks associated with their operations and implement appropriate mitigation measures.

Banking risk factors are also examined by Kanchu (2013) in his research on Risk Management in Banking Sector. This study aims to identify the risks faced by the banking industry and various techniques applied by the banking industry for risk management. The various types of risks studied consisted of Financial Risk consisting of credit risk, market risk, and Non-Financial Risk consisting of operational risk, strategic risk, funding risk, political risk, legal risk. Curchill (2014) in his research The Risk Profile of the Banking Industry in Ghana and Its Implication on the National Economy, assesses the risk profile of the banking industry in Ghana in the 2007 - 2012 period consisting of Assets, Capital, Loans (NPL), Concentration Risk, Inflation, Base Rate,

Operational Risk, Degree of Adherence, Economic. The conclusion is that the banking industry in Ghana does not have a very good risk profile. Ghana's economy was affected by the banking crisis in which the economy is exposed to potential risks from its banking sector.

Bankruptcy Bank Predictions

Martin (1977) was conducted on 5,700 member banks of the Federal Reserve System in the USA, with 58 banks failing identified in the 1970-1976 study period, to estimate the probability of bank failures. Independent variables of 25 financial ratios are classified into 4 (four) grp ratios of risk assets, liquidity, capital adequacy, and earnings. Based on information criterion, profitability variables, asset quality, and capital adequacy form the best model with an accuracy of 82.6-96.2%. By using the logistic regression formulation, at the beginning of the study period, it was found that fraud and the development of local economic conditions correlated with bank problems. But in 1973, the sharp increase in lending problems greatly affected the banking system were earning, and capital factors were increasingly important. The greater the loss of loans to a bank will be dangerous, even though economic conditions have changed. In Indonesia, Mongid (2000) uses a logit model and univariate analysis to build a prediction model of bank failures in Indonesia. The independent variable used refers to the CAMEL ratio classification. Banks that are called fail are banks in the status of BTO, BBO, recap banks, and banks under the supervision of IBRA. Accounting data from a sample of 87 banks in 1996 were used to predict bank conditions from 1997 to 1998.

Methodology

The population in this study is the financial statements of all Rural Banks in Indonesia as many as 1,637 Rural Banks in the healthy category and 82 banks in the category of bankrupt banks in the period from 2006 to 2017. The Rural Credit Banks used as a sample are divided into two categories, namely Credit Banks Bankrupt people and non-bankrupt people's credit banks. The sampling technique used was purposive sampling. Obtained a sample of 29 Bank Credit People who went bankrupt and 200 Bank Credit People were not bankrupt. Research sample data is divided into 2 (two) groups, namely design subsample, and validation subsample. What is meant by the design sample is a sample used to build a prediction model. The validation sample is a sample used in conducting validation tests on predictive models that are generated from the design sample. The data used for sample design are quarterly financial statement data for Rural Banks in Indonesia for the period 2006 to 2016, while for validation samples are quarterly financial statement data for Rural Banks in Indonesia for 2017. The analytical method used is logistic regression analysis, where each model can be predicted.

Results and Discussion

Factor Analysis

This factor analysis is carried out to answer the first objective in this study, namely to obtain empirical evidence of financial risk factors that can distinguish the Rural Credit Banks in Indonesia in the bankrupt and non-bankrupt groups. Factor analysis on each prediction model at various time variations produces the following data:

Table 1. Factor Analysis Results

Grouping Factors			
MP3	**MP6**	**MP12**	**MP24**
ROA	LPS	LPS	NPL
LPS	APYD	BOPO	BI *Rate*
NIM	IER	LDR	IRRR
BI *Rate*	NPL	IRRR	NIM
		IER	

Building a Bankruptcy Prediction Model

The prediction model was built from a logistic regression analysis conducted to answer the second objective in this study, namely to form a prediction model for Bankruptcy in Rural Banks in Indonesia based on financial risk using design sample data from 2006 to 2016, as many as 120 banks consisting of 20 bankrupt banks and 100 the bank is not bankrupt on each model.

Table 2. Prediction Models of Bankruptcy of Rural Credit Banks in Indonesia at the Modeling Level (Sample Design = 120)

Description	**MP 3**	**MP 6**	**MP 12**	**MP 24**
Sample design :				
Bankrupt bank	20	20	20	20
The bank is not bankrupt	100	100	100	100
Cut-off Point	0, 20	0, 20	0, 20	0, 20
Correct Estimates (%)	100	91,7	92,5	83,3
The goodness of Fit	Layak	Layak	Layak	Layak
(α=5%)	100%	71,4%	71,8%	52,0%

Measuring Model Accuracy or Model Validation

This study has the advantage that in addition to producing a bankruptcy prediction model, this study also assesses the performance of a bankruptcy prediction model formed from estimation data. According to Sumarno (1994: 23), a model should be evaluated by testing the accuracy of its prediction based on the design and validation sample. As long as the data used for validation accuracy is different from the data used to form the classification (or prediction) function, the error rate obtained is unbiased (Rencher, 1995: 337).

This stage is carried out by measuring the accuracy of the equation models in each prediction model, namely the regression models MP3, MP6, MP12, and MP24,

using validation data. The use of classification accuracy tables is still used to measure the accuracy of the intended equation model. The grouping of a bank is determined based on the probability value. Therefore a cut-off value of 0.09 is obtained, which is the proportion between the number of bankrupt and non-bankrupt banks in the validation sample data, 9 bankrupt banks compared to 100 non-bankrupt banks. Therefore, if a bank has a probability above 0.09 (prob> 0.09), then the bank is predicted to be classified as a bankrupt bank. Conversely, if a bank has a probability below 0.09 (prob <0.09), then the bank is predicted to be classified as a bankrupt bank. The accuracy of the classification results measures the performance of the model formed. Furthermore, the results of testing of the equation produced in each prediction model at the validation level obtained the following results:

Table 3. Prediction Models of Bankruptcy of Rural Credit Banks in Indonesia at the Validation Level (Validation Sample = 109)

Description	MP 3	MP 6	MP 12	MP 24
Sample design :				
Bankrupt bank	9	9	9	9
The bank is not bankrupt	100	100	100	100
Cut-off Point	0,09	0,09	0,09	0,09
Correct Estimates (%)	88,9	3,67	13,76	33,03

Discussion

Financial Risk Factors That Can Distinguish Rural Banks in Indonesia in the Bankrupt and Non-Bankrupt Groups

The results of the factor analysis show that of the 14 variables analyzed to produce a grouping of factors that still carry important information from the original variable. Based on the results of testing with this factor analysis, it answers the problem formulation of what financial risk factors can distinguish the Rural Credit Banks in Indonesia, which are categorized as bankrupt and not bankrupt. The analyzed data also shows the data adequacy requirements to be able to do factor analysis. The results of the factor analysis show different financial risks in each prediction model.

In the MP3 prediction model, 4 financial risk variables are able to distinguish the Rural Credit Banks in Indonesia, which are classified as bankrupt and non-bankrupt, namely ROA, LPS, NIM, and BIRATE. In the MP6 prediction model, 4 financial risk variables are able to distinguish the Rural Credit Banks in Indonesia, which are classified as bankrupt and non-bankrupt, namely LPS, APYD, IER, and NPL. In the MP12 prediction model, 5 financial risk variables are able to differentiate the opportunities for Rural Credit Banks in Indonesia, which are classified as bankrupt and non-bankrupt, namely LPS, BOPO, LDR, IRRR, and IER. In the MP24 prediction model, 4 financial risk variables are able to distinguish the opportunities for Rural Credit Banks in Indonesia, which are classified as bankrupt and non-bankrupt, namely NPL, BIRATE, IRRR, and NIM. If recapitulated in the four prediction models, the financial risk factors that can distinguish the opportunities for

Rural Credit Banks in Indonesia that are classified as bankrupt and not bankrupt are ROA, LPS, NIM, BIRATE, APYD, IER, NPL, BOPO, LDR, and IRRR.

Financial risk factors that can differentiate the opportunities for Rural Credit Banks in Indonesia, which are categorized as bankrupt and non-bankrupt, are classified into internal and external factors, therefore the bank's internal factors consist of ROA, NIM, APYD, IER, NPL, BOPO, LDR, and IRRR. While bank external factors consist of LPS and BIRATE. ROA, NIM, and BOPO financial risks are profitability (earnings), APYD, and NPL financial risks are asset quality risks, LDR financial risks are liquidity risks, and IER and IRRR financial risks are market risks. This risk is consistent with almost all previous studies in terms of the use of ratios to predict bankruptcy. The use of risk rentability is consistent with research (Martin 1977; Petterson & Scot 1985; Pantalone & Platt 1987; Qurriyani 2000; Nursel et al 2008; Dandapani & Lawrence 2008; Cleary & Hebb 2011; Adeyeye et al 2012; Wurim 2013; Taha 2013; Ncube 2014; Hilman 2014). The use of asset quality risk is consistent with the research (Sinkey 1975; Martin 1977; Pantalone & Platt 1987; Mongid 2000; Wilopo 2001; Hilman 2014). The use of market risk or interest rate risk is consistent with the research (Santoso 1996; Indah & Marita 2010). For the overall use of financial risk, this study is consistent with the research (Hadad et al. 2004; Sukarno 2004). But this study is not consistent with the results of research (Young 1999; Adeyeye 2012; Nafis 2013; Hilman 2014) whose findings are capital risk as a predictor of bankruptcy and research results (Qurriyani 2000; Mongid 2000; Adeyeye et al. 2012; Pradhan 2014) whose findings are risks liquidity as a predictor of bankruptcy.

Prediction Models of BPR Bankruptcy in Indonesia that Are Eligible to Use

The results of forming prediction models obtained different models between predictive models MP3, MP6, MP12, and MP24 before bankruptcy. However, the four prediction models produced proved to be feasible after being tested with Hosmer and Lemeshow. The MP3 prediction model is formed from internal and external financial risks consisting of ROA, LPS, and NIM. From the results of the goodness of fit test measured by the Hosmer and Lemeshow test shows that the MP3 equation is expressed as a fit or feasible regression model, meaning that the bankrupt and non-bankrupt bank predictions based on the MP3 are not significantly different from the bankrupt and non-bankrupt bank classifications observed. (observation). Meanwhile, measured by the value of R2 Cox and Snell and R2Nagelkerke, the MP3 has a model good of 100%. Based on the overall significance test Overall Model Fit, which is used to determine whether all independent variables in the prediction model simultaneously affect the dependent variable, gives the result that all the independent variables in the MP3 prediction model simultaneously affect the dependent variable. However, from the individual significance test used to find out whether all the independent variables in the prediction model individually affect the dependent variable, it is obtained that ROA, LPS, and NIM individually do not affect the dependent variable.

Then as stated in the previous chapter, several studies of bankruptcy in Indonesia based on logistic regression have been carried out (Santoso 1996; Mongid 2000; Qurriyani 2000; Wilopo 2001; Haryati 2001; Sukarno 2004; Hadad et al. 2004;

Hilman 2014) whereas a study on bankruptcy of banks outside Indonesia based on logistic regression has been conducted (Martin 1977; Estrella & Peristiani 2000). Furthermore, the grouping of a bank is determined based on its probability value, and the accuracy of its classification results measures the performance of the model formed. Empirically this research has the advantage of accuracy over previous bankruptcy studies. At the level of modeling, the accuracy of this research classification for MP3s reaches 100% for a cut off of 0.2. While the range of classification accuracy in previous studies between 63.6% to 99.97%. The difference between this study and previous research is the use of different cut-off points. In this study, using a cut-off based on a comparison between bankrupt and non-bankrupt bank samples, while some previous studies using a cut-off in general, namely 0.5. A high cut-off allows bankrupt bank classifications to be higher.

An Accurate Prediction Model for BPR Bankruptcy in Indonesia

Assessment of the performance of predictive models is a prerequisite if the objective of the study is to predict an event, namely by conducting empirical comparisons (Beaver, Rennely and Voss, 1968). If the purpose of the study is to predict an event, the logic of the resulting model must be assessed for its ability to predict group membership. Rencher (1995: 334) states that to assess the ability of classification procedures in predicting group membership, the probability of misclassification is called the error rate. This error rate can be known through a validation test, which includes a comparison with the actual data. This consideration is trying to be emphasized in this study. The results of testing the accuracy of the model are done by testing the prediction models generated from the design sample tested with the actual data obtained from the validation sample. By using a 0.09 cut-off point, which is the proportion between bankrupt and non-bankrupt banks in the validation sample, different results are obtained for the level of accuracy in the four prediction models. MP3 has an accuracy rate of 88.99%, MP6 has an accuracy rate of 3.67%, MP12 has an accuracy rate of 13.76%, and MP24 has an accuracy rate of 33.03%.

Furthermore, it is known that as the dominant predictor of bankruptcy and non-bankruptcy opportunities on MP3s is the LPS deposit guarantee interest rate with a coefficient that has a negative sign meaning the greater the LPS guarantee interest rate, the smaller the chance for Rural Credit Banks to go bankrupt and vice versa the smaller the LPS guarantee interest rate, the greater the chance Bank Perkreditan Rakyat for bankruptcy. The results of this study about the dominant predictors derived from external factors, namely the interest of the LPS guarantee, are interesting to study. In previous studies rarely examined external factors as predictors of bankruptcy. The strengths of this study are that including external factors of inflation, the BI Rate, and LPS guarantee interest as a predictor of bankruptcy, and interestingly the LPS guarantee interest, which is still a relatively new variable, was found to be a dominant predictor capable of predicting Bankruptcy in Rural Banks. The LPS guaranteed interest rate was relatively new applied in Indonesia on September 22, 2005, with the legal basis of the Republic of Indonesia Law No. 24 concerning the Deposit Insurance Agency approved by the President of the Republic

of Indonesia where the LPS interest rate was determined to guarantee deposit customers at a certain level.

Conclusions and recommendations

Based on the explanation in the discussion, some conclusions can be drawn as an answer to the formulation of the problem in this study that the prediction model for Bankruptcy of Credit Banks in Indonesia was formed based on the time variation of 3 months before bankruptcy (MP3), 6 months before bankruptcy (MP6), 12 months before bankruptcy (MP12) and 24 months before bankruptcy (MP24) are proven to be used to predict the bankruptcy of Rural Credit Banks in Indonesia. This sample design data by using a 0.2 Cut-off Point also resulted in the ability to classify bankrupt and non-bankrupt banks on MP3 by 100%, MP6 by 91.7%, MP12 by 92.5%, and MP24 by 83.3%. By using a 0.09 cut-off point on the validation sample, different results were obtained for the accuracy of the four prediction models. MP3 has an accuracy rate of 88.99%, MP6 has an accuracy rate of 3.67%, MP12 has an accuracy rate of 13.76%, and MP24 has an accuracy rate of 33.03%. Based on the ability to classify banks at both the modeling and validation levels, MP3 is the most appropriate and accurate prediction model for Bank Credit in Indonesia, with the dominant predictor variable being the LPS guarantee interest. The results of this study are expected to provide benefits to various parties, are expected to be an early warning signal well before bankruptcy occurs. Long enough time to find out the opportunity for bankruptcy should be utilized by the management of the BPR to improve so that the BPR it manages is not truly to experience a worse financial condition that can lead to bankruptcy.

For further research interested in researching with the same theme, it is suggested to be able to conduct research other than financial risk factors, including being able to examine operational and management aspects related to the overall bank business processes and their potential impact on compliance with bank policies and procedures, systems and technology internal, information security, mismanagement and fraud, and business continuity problems, environmental aspects risks associated with the bank's business environment, including legal and regulatory factors, and the overall financial sector infrastructure and payment system in which the bank operates. Besides that, further research is also expected to research Islamic Credit Banks with Islamic principles because, with different principles, it is possible to produce different prediction models for Rural Credit Banks in Indonesia.

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