

ADVERSE SELECTION IN CREDIT ANALYSIS OF THE COMMUNITY CREDIT BANK (CCB)

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Abstract. Asymmetric information in credit market arises when the bank is not able to identify borrower based on the probability of repayment. This situation can cause credit defaults. The high of nonperforming loan in CCB credit market refers to the high of credit defaults which indicate the existence of asymmetric information in CCB credit analysis. One of manifestation of asymmetric information problem is adverse selection. Adverse selection arises when borrower has hidden characteristics that are unknown by the bank. As screening device, high interest rate may only attract borrower with low probability of repayment, so adverse selection arises because bank refuses borrower whom cannot afford the high interest rate. This research identifies adverse selection problem in CCB credit analysis. The objective of this research is examining the relationship of credit interest rate to quality of borrower credit collectability and the hypothesis is that credit interest rate has negative relationship with the quality of borrower credit collectability.

Keywords: asymmetric information, adverse selection, credit analysis, CCB, quality of borrower credit collectability.

Survey is conducted randomly to 36 of CCB in 6 provinces in Java Island that represent incorporate CCB which member of Indonesian CCB association. Unit analysis of the research is 2.268 borrower bundle credit accounts. Frequency and cross tabulation statistics are used to do descriptive analysis, since binary logistic regression is used to do the verification analysis.

The results or the research state that each unit increase in interest rates will reduce the odds of good quality of borrower credit collectability to 100%. It means that credit interest rate has negative relationship with the quality of borrower credit collectability. The policy to increase the interest rate for the sake of increasing bank's return on the contrary will decrease the bank's return. In the situation that demand of credit exceeds supply of credit, bank cannot increase the interest rate, and otherwise bank will suffer lost because borrower cannot pay their credit. In those circumstances, bank has to ration credit that limiting the number of credit unit the bank will make. The interest rate is a function of the magnitude value of the credit. The larger the value of credit application, the higher the interest rate is.

Introduction

Adverse selection arises when one party to a transaction has hidden characteristics that are not known by the other party. Each borrower tries to convince the bank that he would repay the credit, but the condition of asymmetric information makes difficulty for bank to know the characteristics of the borrower related with his credit repayment possibility. Adverse selection is one manifestation of asymmetric information situation, which is a situation that occurs when one party to a transaction has more information than the other party (Jehle and Reny, 2001; Baye, 2009; Pindyck and Rubinfeld, 2009).

Akerlof (1970) introduced a theoretical model of asymmetric information that causes a used car cannot be sold at the same price as a new car. Used cars in good condition have the same price with a used car with bad conditions ('lemon'). Asymmetric information that happens is that sellers know more than buyers about the

quality of cars being sold. This situation causes a used car in good condition out of the market or suffers loss by selling a low price. This concept became known as adverse selection.

Stiglitz and Weiss (1981, 1992) describe the adverse selection in credit markets as a result of asymmetric information problems. Banks do not have enough information about the level of risk the borrower to repay the loan. As compensation, the bank set interest rates high to ensure the bank's income from loans. Along with Stiglitz and Weiss, Bebzuck (2003) explain that asymmetric information will cause the banks suffer losses if the borrower cannot repay their loans. Therefore, the bank determines the total probability of repayment of principal loan borrowers with loan interest rate setting as a consequence. But high interest rates will encourage borrowers to perform high-risk activities as well. This situation creates pooling borrowers that have a high credit risk of failure as well. Thus, the bank's earnings will decline due to the increased failure probability credit borrowers. Thus, adverse selection causes the credit default increases.

The last five years, the development of credit in Indonesia is concentrated on SMEs and consumer credit loans. In this case, the existence of the CCB becomes very important considering the CCB is one of the types of banks in Indonesia that specializes in serving the community of micro finance. CCB has service procedures are simple, quick process, and credit schemes are more easily adjusted. In addition, CCB is also prioritizes personal approach, the office location close to the borrower, as well as better understand the economy and the local community. Performance of banks in disbursing credit funds can be seen from the ratio of Loan to Deposit Ratio (LDR), i.e. the ratio of lending to deposit the bank had collected. When compared with commercial banks, CCB has a number LDR better than the commercial banks. However, the ability of CCB in credit funds, accompanied by a Non Performing Loan (NPL) is also high. NPL is the determination of credit quality based on collectability. This fact encourages researchers to conduct research on adverse selection in credit analysis CCB. Is CCB credit default caused by adverse selection?

Stiglitz and Weiss (1981) explain that to overcome the problem of adverse selection, the interest rate used as a screening device of borrowers. Borrowers who are willing to pay high interest rates are high-risk borrowers or borrowers who feel a low probability of credit payments. Therefore, this research tested the adverse selection by looking at the relationship level of credit interest rate with loan collectability quality borrowers. This research identifies adverse selection problem in CCB credit analysis. The objective of this research is examining the relationship of credit interest rate to quality of borrower credit collectability and the hypothesis is that credit interest rate has negative relationship with the quality of borrower credit collectability.

Theoretical Background

Baye (2009) stated that adverse selection is a situation where every individual has a character that cannot be known by others. This situation led to the selection process produces a collection of individuals who are not expected because it has economic characteristics that are not expected.

Bebzuck (2003) explains that the bank suffered from adverse selection because it is not able to differentiate borrowers based on the risk they have. If the borrower a and b have a different probability of success, then the bank will set interest rates different to both.

$$r_{L,a} = \frac{(1+r)}{\alpha_s} - 1 \tag{1}$$

$$r_{L,b} = \frac{(1+r)}{\alpha_s} - 1 \tag{2}$$

$r_{L,a}$ and $r_{L,b}$ are interest rate for borrower a and b. Since $\alpha_{a,s} > \alpha_{b,s}$ then $r_{L,a} < r_{L,b}$. It means that in the case of asymmetric information does not occur, the bank will set interest rates different for each borrower. Thus, borrowers who have a lower probability of success will be charged interest rates higher to compensate the failure of its credit risk.

Jafee and Stiglitz (1990) states that the borrower should be classified based on the level of risk they have. This is the main function of the banking system. Based on the results of assessment of risk levels, banks may set appropriate interest rates. Stiglitz and Weiss (1981) also states that every borrower has a different probability of repayment. Thus the bank's expected profit depends on the borrower's repayment probability. However, Stiglitz and Weiss (1981) adds that asymmetric information causes the banks are not able to identify borrowers who have a high probability of repayment from the borrower who has a low probability of repayment. Bebzuck (2003) also stated that the bank has limitations to obtain complete information related to the level of risk borrowers. Banks only have information on average levels of risk borrowers so that borrowers view all identical. Therefore, the bank sets a single interest rate for both borrowers.

Bebzuck (2003) also breaks down if on the assumption that the average success probability of borrowers are among the success probability of borrowers a and b ($\alpha_{a,s} > P_s > \alpha_{b,s}$) then a single interest rate set by banks exist between the interest rate the borrower a and b ($r_{L,b} > r_L > r_{L,a}$). Thus b borrower will enjoy reduction of interest rates; otherwise the borrower receives a disadvantage because the interest rates higher than they should. Although a single interest rate is attractive to high-risk borrowers rather than low-risk borrowers, banks tend to do the adverse selection problem by denying that the borrower cannot meet the level of interest rates. Whereas Figure 1. shows that with a single interest rate, banks will earn more income from the borrower a (C + E) than from the borrower b (E). But from the borrower's income point of view, the borrower a has less income (D + F) compared with the borrower b (F + G). Thus, it is understood that the asymmetric information favorable to high-risk borrowers that caught his attention. If banks increase the single interest rate, low-risk borrowers will be out of the market leaves high-risk borrowers.

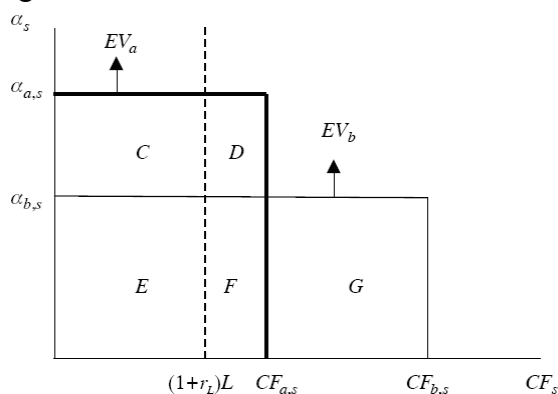


Figure 1. Distribution EV on Adverse Selection (Bebzuck, 2003)

Stiglitz and Weiss (1981) states that asymmetric information makes the bank has to use a credit interest rate as a screening device. Borrowers who are willing to pay high interest rates are high-risk borrowers or borrowers who have a low probability of credit payments. Therefore, if interest rates rise, the borrower's risk level also increases, thus resulting in decreased expected bank's revenue. Consistent with Baye (2009) that in this

case the interest rate can be used as a device to sort borrowers according to their risk characteristics.

Research Method

Object Design and Research

Object of this research is adverse selection problem in CCB credit analysis. Measurements conducted on a sample unit of analysis in the form of a credit account file at the research unit of CCB. Adverse selection is tested by analyzing relationship between interest rates and the quality of borrower credit collectability. Primary data that are needed in this study are indicators of credit analysis. Primary data was obtained by conducting surveys throughout the 36 CCB offices located in 6 provinces in Java island Indonesia.

Econometric Models and Data Analysis Techniques

Econometric model of this research are as follows.

$$\begin{aligned}
 Y_{DGood} = & \beta_0 + \beta_1 X_{Province} + \beta_2 X_{Age} + \beta_3 X_{Sex} + \beta_4 X_{Born Province} + \beta_5 X_{MaritalStatus} \\
 & + \beta_6 X_{MemberOfFamily} + \beta_7 X_{Occupation} + \beta_8 X_{ApplicationStatus} + \beta_9 X_{CreditPurpose} + \beta_{10} X_{Collateral} \\
 & + \beta_{11} X_{CollateralOwner} + \beta_{12} X_{Plafond / Collateral Price} + \beta_{13} X_{Plafond / PropCreditAmount} \\
 & + \beta_{14} X_{RealTenor / PropTenor} + \beta_{15} X_{InterestRate} + \beta_{16} X_{InterestRateAmount / Plafond} + \beta_{17} X_{Provision \& Admin / Plafond} \\
 & + \beta_{18} X_{Installment / Salary} + \beta_{19} X_{Admin Process} + \beta_{20} X_{Experience} + \beta_{21} X_{CompletenessOfFile}
 \end{aligned}$$

To conduct an analysis of econometric models above, it takes an analytical tool that can test whether the probability of occurrence of the dependent variable can be predicted by independent variables. In other words, it takes an analytical tool that can test whether the probability of the quality of credit collectability (good or default) can be predicted by independent variables. In this case, the dependent variable is categorical variables or binary variables with value 1 or 0 (success or failure, good credit or default).

Hair, Black, Babin, Anderson, and Tatham (2006) and Ghazali (2006) states that there are two analytical tools that can perform these tests, namely discriminant analysis and logistic regression. But in this case, discriminant analysis cannot be used as an appropriate analytical tool, because the discriminant analysis requires the fulfillment of the assumption of multivariate normal distribution. In the above model, the assumption would not be met because the independent variable is a mixture between a continuous variable (metric) and categorical variables (non-metric). Thus, this study used logistic regression because logistic regression does not require the assumption of multivariate normal distribution are met. Same with this research, Scott (2006), Saito (2006) and Bicakova (2007) used the same logistic regression to conduct their research on asymmetric information.

Logistic regression equation for this research is:

$$\begin{aligned}
 \ln odds_{Good} = & \beta_0 + \beta_1 X_{Province} + \beta_2 X_{Age} + \beta_3 X_{Sex} + \beta_4 X_{Born Province} + \beta_5 X_{MaritalStatus} \\
 & + \beta_6 X_{MemberOfFamily} + \beta_7 X_{Occupation} + \beta_8 X_{ApplicationStatus} + \beta_9 X_{CreditPurpose} + \beta_{10} X_{Collateral} \\
 & + \beta_{11} X_{CollateralOwner} + \beta_{12} X_{Plafond / Collateral Price} + \beta_{13} X_{Plafond / PropCreditAmount} \\
 & + \beta_{14} X_{RealTenor / PropTenor} + \beta_{15} X_{InterestRate} + \beta_{16} X_{InterestRateAmount / Plafond} + \beta_{17} X_{Provision \& Admin / Plafond} \\
 & + \beta_{18} X_{Installment / Salary} + \beta_{19} X_{Admin Process} + \beta_{20} X_{Experience} + \beta_{21} X_{CompletenessOfFile}
 \end{aligned}$$

Result and Discussion

Hypothesis of this research is credit interest rate has negative relationship with the quality of borrower credit collectability. This hypothesis was tested adverse selection by analyzing the relation interest rates with the quality of borrower credit collectability. The interest rate is used as a proxy of screening devices based on the borrower's credit payment probability level. The quality of borrower credit collectability is used as a proxy of adverse selection.

Test results show that the variable interest rate is significant at 0.05 alpha with a significance probability of 0.035. Table 1. indicates that the original coefficient variable interest rate is equal to -32.183 with logarithmic transformation of 0000. Percentage changes in quality of good credit collectability that caused by changes in each unit of interest rates is -100% $((0.000-1) \times 100\% = -100\%)$. Thus, in each unit increment of interest rates would make the odds of the quality of good credit collectability lower up to 100%.

Table 1. Result of Interest Rate Test

	B	S.E.	Wald	df	Sig.	Exp(B)
Interest Rate	-32.183	15.260	4.448	1	.035	.000

The test results stated that the interest rate offered by CCB has a negative relationship with the quality of borrower credit collectability. This means that if the CCB increase the interest rates, than the odds of the quality of the good credit collectability will go down smoothly. This indicates that the increment of interest rates will make the probability of borrower's credit repayment decrease.

Consistent with Stiglitz and Weiss (1981, 1992), there are two things that can explain this research, that high interest rates reduce the number of borrowers with high repayment probability and the high interest rates encouraged borrowers to perform high risk business activities. Both of these can be explained as follows.

High interest rates reduce the number of borrowers with high repayment probability.

Consistent with Jafee and Stiglitz (1990) and Bebzuck (2003), that the CCB's inability to access information related to the probability of borrower's mortgage payment, causing the CCB suffer adverse selection, so that the CCB look at all borrowers are identical. Baye (2009) stated that in the problem of adverse selection, the characteristics of each individual cannot be known by others, thus causing the selection process produces a collection of individuals that have economic characteristics that are not desirable. In this situation the CCB did not specify the interest rate varies based on the probability of repayment of credit borrowers, but the CCB sets a single interest rate that can save the banks from different income levels the probability of repayment of credit borrowers. Consistent with Bebzuck (2003), a single interest rate set by the CCB will benefit borrowers with low credit repayment probability level. The borrower enjoys an interest rate below the interest rate should be paid. By contrast, borrowers with high credit repayment probability will be harmed because they have to pay higher interest rates than they really are.

Adverse selection made by the CCB to reject borrowers who cannot meet the level of interest rates. Thus, borrowers with high probability of return will exit the market. Therefore, if the CCB raises interest rates, only borrowers with low credit repayment probability have willing to pay such interest. In such situations, CCB make adverse selection problem by refusing borrowers with high probability of repayment that cannot meet the level of interest rates. Thus, if the CCB raises interest rate, the number of borrowers with a low probability of repayment will increase. It will decrease the probability of good credit or reduce the quality of borrower credit collectability.

High interest rates encouraged borrowers to perform high risk business activities.

Consistent with Stiglitz and Weiss (1981, 1992); Bebzuck (2003) that interest rates will affect the borrower's business activities. The interest rate set by the CCB encourages borrowers to use loan funds to conduct high-risk business activities. This is done to obtain greater profits, in an effort to meet the repayment of high interest rates. Thus, if the CCB to raise interest rates, it will encourage borrowers to perform high-risk business activities, thereby reducing the probability of repayment or reduce the quality of borrower credit collectability.

The results of this study are consistent with the results of research conducted by Karlan and Zinman (2006), that the higher the interest rate is offered, the higher borrower's risk that will receive the credit offer. Edelberg (2004) states that higher interest rates will cause the risk of credit default are higher, too.

Conclusion

The negative relationship between interest rate and the quality of credit collectability also indicates that the CCB may not raise interest rates when credit demand increases. This will lead to decreased quality of credit collectability, which means losses for the CCB. According to Stiglitz and Weiss (1981, 1992), in this situation, CCB has to do credit rationing. Credit rationing is done by limiting the number of credit units which will be distributed but not the amount of credit per borrower. In this case the inability of the CCB identified borrowers based on the level of risk (adverse selection) is overcome by limiting the number of borrowers. Meanwhile, the interest rate is determined as a function of credit amount. This means that each borrower's interest rate is determined by the credit amount. The higher the credit amount, the higher interest rate is charged to borrower.

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