Adverse Selection and Moral Hazard: The Evidence on Business Lending of Micro and Small Enterprises in Banyumas and Purbalingga Working Areas

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Adverse Selection and Moral Hazard: The Evidence on Business Lending of Micro and Small Enterprises in Banyumas and Purbalingga Working Areas

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Abstract: This research aims to investigate the presence of asymmetric information within business lending process between bank and micro and small enterprises. The two common conditions arise from this case are adverse selection and moral hazard. The data were collected from banks and debtors-entrepreneurs by simple random sampling method in Banyumas and Purbalingga. Adverse selection was detected by setting specific questions to debtors about the possibility of mistakes within proposal screening. Moral hazard was analyzed by rating scale method. Hereafter, the effect of adverse selection on moral hazard was analyzed by regressions. This research finds that (1) adverse selection was indicated during proposal screening, (2) most of debtors have medium-high level of moral hazard, (3) adverse selection effects on moral hazard significantly.

Keywords: Adverse Selection; Moral Hazard; Micro and Small Enterprises; Debtors; Asymmetric Information

INTRODUCTION

Transactions in financial markets often involve uncertainty which lead the presence of transaction costs (Mishkin, 2016; Nicholson and Snyder, 2008). If one party has better information—private information—than others then asymmetric information is actually going on. In monetary and banking field, it can lead inefficiency and raise the risks associated with the value of money for which cash flow of funds is little bit stuck (Nicholson and Snyder, 2008).

In loanable fund market, the presence of asymmetric information appears the imbalance of information between bank and credit applicants/debtors. Actually, credit applicants/debtors have more information which is difficult to be explored by bank. In turn, it can lead adverse selection whereby bank have chosen and financed the improper project because the applicant has been keeping private information (Mishkin, 2016). Incomplete information is one consequence of private information which often complicate bank in appraising the project proposal. Usually, it is indicated by lack of hard information owned by micro and small enterprises (MSEs). Some experiences found that financing MSEs has more difficulties rather than the larger because of the lack of information and historical data(Muneli and Zaho, 2014; Rupeika-Apoga, 2014). De la Torre et al. (2010) and Uchida et al. (2012) suggested that obstacles in credit accessibility for MSEs could be reduced by producing soft information whereby bank officers build informal communication with potential, new, and old debtors based on mutually principles of partnership. Setting soft information is considerably needed to complete less hard information.

The presence of asymmetric information which causes adverse selection in financing MSEs can also induce the debtor action called as moral hazard (Grossman and Hart, 1983; Holmstrom, 1979; Mishkin, 2016; Nicholson and Snyder, 2008). It happens after credit contract offered by bank has been consciously signed by debtors. Moral hazard in this case means that debtors behave not to comply with the credit contract he has signed. This non-compliance action should be revealed by the presence of installment arrears. The reasons of economic fluctuation, marketing difficulties, inflation, negative growth of business, the lack of materials, natural disaster, etc are understandable circumstances hence not included in this case. Moral hazard is one source of major problems of installment arrears and that is difficult to

be anticipated because of within the debtor's character (Kasseeah and Thoplan, 2012; Mishkin, 2016; Niinimäki, 2009).

In this case, the early indicator which considerably has ability to detect the asymmetric information causing adverse selection and moral hazard is non-performing loan (NPL) which reflects installment arrears of more than three months revealing debtor's non-compliance with credit contract (Nicholson and Snyder 2008). Our research contributes to assess the indication of adverse selection possibility which then debtor's moral hazard of MSMEs. It becomes more important by the awareness that understanding the debtors' moral hazard is not just an empirical result but also the great challenge to fight against even less facing various characters in different backgrounds of the debtors.

LITERATURE REVIEW

Theories and concepts supporting this study are asymmetric information, moral hazard, principal-agent, and credit risk (Mishkin, 2016; Nicholson and Snyder, 2008). Mishkin (2013) states that asymmetric information is the unequal knowledge that each party to a transaction has about the other party. One party often doesn't know enough about the other party to make accurate decisions. In loanable fund market, the presence of asymmetric information can be found when a debtor who takes out a loan usually has better information about the potential returns and risks related to his business project for which the expected earning of the debtor are more profitable than that of the bank. In other words, Nicholson and Snyder (2008) state that asymmetric information is a situation in which an agent on one side of a transaction has information that the agent on the other side doesn't have. Therefore, asymmetric information is simply defined as a situation where one party has better information than others. This inequality can lead to inefficiency arising from transaction cost presence; cost of acquiring information.

Relevant studies on the presence of asymmetric information in financing MSMEs result the resemble findings. Rupeika-Apoga (2014) stated that there was the challenge to finance MSMEs in Baltic States because of less hard information. In other research, Zeneli and Zaho (2014) also found that lack of information is one of the main variables causing the difficulty for financing MSMEs in Albania. Previously, in Brazil, Zambaldi et al. (2011) also found that asymmetric information and collateral should influence significantly toward the credit accessibility for micro and small enterprises. Then, some studies propose to eliminate such asymmetric information. Uchida et al. (2012) argued that obstacles in accessing credit faced by micro enterprises could be diminished through constructing soft information explored by bank officers about all information of debtors as complete as possible. One way suggested was strengthening informal communication with debtors. In addition, De la Torre et al. (2010) proposed that the way to make easier for reducing difficulties in accessing credit was developing lending relationship based on awareness to apply mutually advantage principles in partnership.

One of asymmetric information impacts is moral hazard which is occurred after transaction or signing credit contract between debtor (borrower) and bank (lender). Moral hazard' debtor is the risk (hazard) that the debtor might engage in actions that are undesirable (immoral) or unobservable from the lender's point of view (Mishkin,

2016; Nicholson and Snyder, 2008). In other literature, moral hazard is commonly called as hidden action. This moral hazard lowers the probability that the loan will be repaid even actually makes the installments arrears. Several studies state that debtor's moral hazard as asymmetric information problem is often investigated using principal-agent model in which principal (lender/bank) offers a credit contract to an agent (borrower/debtor) who has private information. In a moral hazard model, the principal tries to induce the agent to take appropriate actions by tying the agent's payments to observable outcomes. The basic researches contributed by Holmstrom (1979) and Grossman and Hart (1983) have developed the moral hazard analysis with principal-agent approach to construct optimal incentive scheme. Furthermore, Mirrlees (1999) presented the optimum contract in insurance with considering the trade-off between premium and incentives. That contract was ordered by insurance company to minimize the moral hazard probability attributed to its customers.

According to Greuning and Bratanovic (2009) credit risk is clearly defined as the probability that debtor will not be able to repay the credit loan and its interest rate dealing with credit contract. Debtor's moral hazard is credit risk which can be anticipated by managing strategies with applying credit rationing and signaling (Stiglitz and Weiss, 1981). Credit rationing is dealing with up-and-down interest rate strategy as credit instrument while signaling is dealing with collateral requirement strategy as credit guarantee. Theoretically, both of them have negative correlation or there is a substitution function. If bank faces high risk debtor then the proper strategy should be applied is determining higher interest rate with lower collateral. Conversely, if bank determines lower interest rate for low risk debtor then the higher collateral would be required. Those strategies are proposed to eliminate credit risk, specifically debtor's moral hazard.

Relevant studies on the managing of credit risk show important results. Uchida et al. (2012) found that credit accessibility obstacles could be overcome with risk assessment viz. credit scoring as well as credit rating. Besides that, credit guarantee should be alternative solution to compensate the absence of collateral in order to ease credit accessibility to micro enterprises. Furthermore, Boschi et al. (2014) proposed credit guarantee, called coverage ratio, which is defined as the ratio of funds guaranteed and those of borrowed. This guarantee became the main instrument for minimizing credit risk through limiting moral hazard problem which is indicated after contract agreement.

METHODOLOGY

Population and Sample

This research focuses on two common occurrences arising from asymmetric information condition, i.e. adverse selection and moral hazard. The data used in this research were come from banks and debtors-entrepreneurs taken by using simple random sampling method in Banyumas and Purbalingga working areas. Adverse selection was detected by setting specific questions to debtors independently to explore the possibility of any mistakes within proposal screening process. Then, moral hazard was analyzed by rating scale method, i.e. measuring the moral hazard level of each debtor.

The method used to determine sample is expressed as Yamane formula (Singh and Masuku, 2013); $n=N/(1+Ne^2)$, where n=sample size; N=population; and e=level of precision. Using that formula, from140 debtors with NPL as population, and the sample size taken is 96 debtors as respondents. By proportionate random sampling technique the sample of each area can be determined (Lind, Marchal and Wathen, 2018; Sugiyono, 2011), shown in Table 1 below. The sample size of each working area using proportionate random sampling. The proportion of each population calculated by dividing NPL-debtors of each working area by those of all population (i.e. total population=140). Then, the sample size of each working area determined by multiplying proportion and total sample (i.e. total sample=96); 58 sample of Banyumas and 55 sample of Purbalingga.

Table 1: Sample size of each working area

Working Area	Population	Proportion	Sample
Banyumas	85	60.7	58
Purbalingga	55	39.3	38
Total	140	100	96

Data Analysis

By answering selected 24 questions the adverse selection possibility and NPL-debtors' moral hazard could be analyzed. Debtor's moral hazard as a main variable is explored by questionnaire method and completed by in depth interview of 96 respondents. By 24 questions which are selected through tight stages this study attempts to investigate the possibility of debtor's moral hazard. The tight stages consist of a set of tests to make sure that all questions are fit to explore moral hazard, i.e. validity and reliability tests. These questions are developed from 5 factors based on theory and concept. Those 5 factors are taken from legal concepts of credit regulation issued by Bank Indonesia, i.e. the compliance of credit payment, the availability and accurateness of financial information, the completeness of credit documents, the compliance of credit contract, the suitability of credit fund use. After that, a set of fitted questions are already distributed to respondents. Each question must be responded with choosing one of agreement level which ranges from 1 until 10. The higher agreement level chosen represents the higher moral hazard. Then, the calculation of total scores of all responses shows how high the moral hazard level is. This technique is called as rating scale method that is suitable with studying behavior, attitude, and perception of certain peoples about phenomena in social, cultural, psychological, and even economic fields (Sugiyono, 2011).

Then, this research attempts to investigate the relationship between those adverse selection and moral hazard; is there adverse selection effect on moral hazard? It would be then analyzed by multiple regression where some other variables determining moral hazard are also included into the model. The equation model should be expressed as follow:

$$ZD_i=c_1+c_2CH_i+c_3CC_i+c_4CP_i+c_5CD_i+c_6GK_i+c_7MK_i+c_8AS_i+c_9PB_i+e_i \quad (1)$$

Where, the dependent variable is debtor's moral hazard (ZD); explanatory variables attributed to debtor and his business are debtor's character (CH), capacity (CC).

Capital (CP), condition (CD); explanatory variables related to credit loan are instalment value (GK), monitoring (MK), adverse selection (AS), and perception of interest rate influence (PB).

That equation was used to analyze two condition, two working area, which although using the same variables but having different characteristic and condition between both of them thus finally different strategies must be applied for solving their each problem. Hence, there are two equations to explain different condition of two working areas.

RESULTS AND DISCUSSION

The first step was making sure that the questionnaire has quality to investigate adverse selection and moral hazard. Set of tests has been executed for convincing the questionnaire; valid and reliable. There are 24 selected questions was being valid and reliable then must be responded by the debtors.

The level of each debtor's moral hazard can be determined and then set as values of moral hazard variable (HZ). By processing the equations, there are 2 equations separated based on object working area; Banyumas and Purbalingga. Separately, each area has maybe different policy which should be executed based on cases (adverse selection and moral hazard).

Banyumas Working Area

Before interpreting the regression result, the equation must be ensured as a fit model by classical assumption tests; multicollinearity, autocorrelation, and heteroskedasticity. The multicollinearity was examined by variance inflation factor (VIF) analysis with the criterion is that value must be less than 10 (Hair et al., 1995). Then, the autocorrelation was examined by Breusch-Godfrey test, and the heteroskedasticity was examined by White test. The results of classical assumption tests can be seen in Table 2 until Table 4 below.

Table 2: Result of multicollinearity test: equation 1 (Banyumas)

Variable	Tolerance	VIF	Criterion	Remark
CH	0.701	1.426	<10	Passed
CC	0.818	1.223	<10	Passed
CP	0.930	1.076	<10	Passed
CD	0.825	1.212	<10	Passed
MK	0.876	1.141	<10	Passed
AS	0.758	1.320	<10	Passed
PB	0.767	1.303	<10	Passed
GK	0.888	1.126	<10	Passed

The result of multicollinearity test shows the VIF value of each explanatory variable is less than 10. It means that the equation 1 has been passed multicollinearity test. In other words, there is no multicollinearity or no correlation with among other explanatory/independent variables.

Thereafter, Table 3 shows the result of autocorrelation test (Breusch-Godfrey test) that the probability chi-square of obs*R-squared is 0.189 (more than 0.05 level). It means that there is no autocorrelation problem in equation 2.

In the Table 4 it can be seen the result of White test that the probability chi-square of obs*R-squared is 0.546 (more than 0.05 level). It implies that there is no heteroskedasticity problem in equation 2.

Table 3: Result of autocorrelation test: equation 1 (Banyumas)

Statistics	Value
F-statistic	1.431783
Obs*R-squared	3.330826
Prob. F(2,47)	0.2491
Prob. Chi-Square(2)	0.1891

Table 4: Result of heteroskedasticity test: equation 1 (Banyumas)

Statistics	Value
F-statistic	0.855899
Obs*R-squared	32.39567
Scaled explained SS	30.52458
Prob. F(34,23)	0.6666
Prob. Chi-Square(34)	0.5463
Prob. Chi-Square(34)	0.6387

From all results, it can be concluded that the equation 1 has been passed all of classical assumption tests. Therefore, this equation has been a fit model and ready to be interpreted. The further step is analyzing and interpreting the effect of explanatory variables, jointly and partially, on moral hazard. Jointly, the effect of all explanatory variables on moral hazard was examined by F-test. Besides that, the strength of relationship between all variance of explanatory variables and moral hazard (dependent variable) could be seen at Adj.R-squared value. Those values are shown in Table 5.

Table 5: F-statistic and Adj.R squared values: equation 1 (Banyumas)

Statistics	Value
F-statistic	7.05960
Adj.R-squared	0.53544
Prob. (F-statistic)	0.00000

F-statistic shows 7.0596 with the probability 0.00 ($p<0.0$). It means that all explanatory variables effect on moral hazard significantly. The value of Adj.R-squared is 0.5354 which means that variance of explanatory variables in the model can explain variance of moral hazard about 53.54%. Partially, the effect of each explanatory variable on moral hazard was examined by t-test. Table 6 reveals the regression result of equation 1 (Banyumas area). Findings presented in Table 6 clearly shows that adverse selection has significant sign in determining debtor's moral hazard ($p<0.001$). The result could be interpreted that there is significant difference between debtor's moral hazard indicated by adverse selection and moral hazard not indicated by adverse selection. Positive sign of regression coefficient shows that the debtor which is indicated adverse selection tends to higher moral

hazard. It means that if adverse selection occurred before contract then the probability of moral hazard action by that improper debtor might to be higher. Therefore, it is important to make tight credit proposal selection to minimize the adverse selection probability.

Table 6: Result of regression in working area 1: Banyumas

Variable	β	Std. Error	t	p-value
CH	-0.005	0.011	-0.480	0.634
CC	-0.066	0.022	-2.961	0.005**
CP	0.003	0.022	0.129	0.898
CD	0.008	0.015	0.506	0.615
MK	-0.018	0.010	-1.889	0.065
AS	0.049	0.011	4.440	0.000***
PB	-0.014	0.011	-1.216	0.230
GK	-2.0E-10	0.000	-0.337	0.738

Note: *significant at the 0.05 level; **significant at the 0.01 level; ***significant at the 0.001 level

Other variables determining debtor's moral hazard are capacity (p<0,001) and monitoring (p<0.10; low significant level). The significant and negative sign shows that the probability of good capacity of debtor tends to lower debtor's moral hazard. It means that the debtor with good capacity in managing his business and in turn repaying all the credit has the lower moral hazard probability. With the same result, monitoring is also has significant and negative sign in determining debtor's moral hazard. It implies the more the monitoring frequency the less the moral hazard probability. If bank often visits the debtor to observe business progress and debt then the debtor, psychologically, would stand on the right direction in fulfilment his responsibility.

Purbalingga Working Area

Hereafter, the condition in Purbalingga area might be different with that Banyumas area. All variables in equation 1 (Banyumas area) are the same with those in equation 2 (Purbalingga area). The difference is the sample size which shows the size in Banyumas area is more than in the Purbalingga one. As the equation 1, the same process of classical assumption tests also applied to equation 2. The result of classical assumption tests can be seen at Table 7 until Table 9.

The result of multicollinearity test shows the VIF value of each explanatory variable is less than 10. It means that the equation 2 has been passed multicollinearity test. In other words, there is no multicollinearity or no correlation with among other explanatory/independent variables. Thereafter, Table 8 shows the result of autocorrelation test (Breusch-Godfrey test) that the probability chi-square of obs*R-squared is 0.7522 (more than 0.05 level). It means that there is no autocorrelation problem in equation 2. In the Table 9 it can be seen the result of White test that the probability chi-square of obs*R-squared is 0.304 (more than 0.05 level). It implies that there is no heteroskedasticity problem in equation 2. From all results, it can be concluded that the equation 2 has been passed all of classical

assumption tests. Therefore, this equation has been a fit model and ready to be interpreted.

Table 7: Result of multicollinearity test: equation 2 (Purbalingga)

Variable	Tolerance	VIF	Criterion	Remark
CH	0.369	2.708	<10	Passed
CC	0.149	6.708	<10	Passed
CP	0.748	1.338	<10	Passed
CD	0.427	2.341	<10	Passed
GK	0.647	1.546	<10	Passed
MK	0.602	1.662	<10	Passed
AS	0.644	1.554	<10	Passed
PB	0.168	5.943	<10	Passed

Table 8: Result of autocorrelation test: equation 2 (Purbalingga)

Statistics	Value
F-statistic	0.205405
Obs*R-squared	0.569510
Prob. F(2,27)	0.8156
Prob. Chi-Square(2)	0.7522

Table 9: Result of heteroskedasticity test: equation 2 (Purbalingga)

Statistics	Value
F-statistic	1.195461
Obs*R-squared	9.471634
Scaled explained SS	8.924576
Prob. F(8,29)	0.3213
Prob. Chi-Square(8)	0.3041
Prob. Chi-Square(8)	0.3487

The further step is analyzing and interpreting the effect of explanatory variables, jointly and partially, on moral hazard. Jointly, the effect of all explanatory variables on moral hazard was examined by F-test. Besides that, the strength of relationship between all variance of explanatory variables and moral hazard (dependent variable) could be seen at Adj.R-squared value. Those values are shown in Table 10.

Table 10: F-statistic and Adj.R squared values: equation 2 (Purbalingga)

Statistics	Value
F-statistic	6.98537
Adj.R-squared	0.65835
Prob. (F-statistic)	0.00004

F-statistic shows 6.985 with the probability 0.00 ($p<0.0$). It means that all explanatory variables effect on moral hazard significantly. The value of Adj.R-squared is 0.6584 which means that variance of explanatory variables in the model can explain variance of moral hazard about 65.84%.

Partially, the effect of each explanatory variable on moral hazard was examined by t-test. The regression result of equation 2 which shows the result of t-test can be seen in Table 11.

Table 11: Result of regression in working area 2: Purbalingga

Variable	β	Std. Error	t	p-value
CH	-0.181	0.059	-3.040	0.005**
CC	-0.074	0.069	-1.067	0.295
CP	-0.031	0.075	-0.411	0.684
CD	0.034	0.041	0.829	0.414
GK	-2.89E-9	0.000	-0.797	0.432
MK	0.000	0.017	0.027	0.979
AS	0.071	0.031	2.265	0.031*
PB	0.066	0.058	1.132	0.267

Note: *significant at the 0.05 level; **significant at the 0.01 level; ***significant at the 0.001 level

Table 11 shows the regression result of the condition in Purbalingga area. In Table 3 it can be shown that adverse selection has significantly sign in determining debtor's moral hazard ($p<0.05$). It can be interpreted that there is significant difference between debtor's moral hazard indicated by adverse selection and moral hazard not indicated by adverse selection. Positive sign of regression coefficient shows that the debtor which is indicated adverse selection tends to higher moral hazard. It means that if adverse selection occurred before contract then the probability of moral hazard action by that improper debtor might to be higher. Therefore, the first important step is tightly credit proposal selection to ensure that the selected debtor is the proper one.

The only one variable determining debtor's moral hazard is debtor's character ($p<0.01$). The significant and negative sign shows that the probability of good character of debtor tends to lower debtor's moral hazard. It means that the debtor with good character has the lower moral hazard probability. It implies the more the good character the less the moral hazard probability. Good character means having responsibility to repay his credit loan, hence, especially in Purbalingga area that focusing to debtor's character is the most important rather than other determining variables related to debtor's attribute analysis.

CONCLUDING COMMENTS

From the both results, it can be concluded that either in Banyumas area or Purbalingga area shows the significant determinant of adverse selection toward debtor's moral hazard. It indicates that there are some problems in credit proposal selecting process in both of areas. It could be occurred because of at least two reasons. First, the credit applicant has kept some information (hidden information) in order can not to be explored by bank; bank difficulty to have complete information. Consequently, bank can make some wrong decisions in selecting process; improper debtor might be successful selected. Second, the bank officer qualification in credit proposal selection is questionable. If bank has low capacity

of account officer, especially in lending credit, then it is difficult to have convincing final report in selecting proposal although there is no hidden information by credit applicant.

Besides that, the results also show that in Banyumas are bank should manage the information about debtor's capacity because some mistakes in assessing the capacity can give significant impact on rising moral hazard. Conversely, comprehensive assessment about debtor's capacity can maintain the probability of rising debtor's moral hazard. Monitoring is also has significant and negative sign in determining debtor's moral hazard. It implies the more the monitoring frequency the less the moral hazard probability. If bank often visits the debtor to observe business progress and debt then the debtor, psychologically, would stand on the right direction in fulfilment his responsibility.

In Purbalingga area, character's debtor is the most important variable that must be focused in handling his moral hazard. Assessing debtor's character must be comprehensive because it shows the initial behavior which can also determine the high or low moral hazard level of debtor. Good character has high probability in minimizing his moral hazard. Conversely, bad character tends to bad behavior too which in this case that moral hazard is bad behavior that making inefficiency in loanable funds market.

LIMITATIONS OF THE RESEARCH

This research only investigates the economic variables and does not include the psychological variables. Research to analyze non-economic factors, i.e. psychology, culture, custom, ethnic, etc., influencing moral hazard needs to be conducted to ensure accurate result.

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