Economics Development Analysis Journal 7 (4) (2018)

Economics Development Analysis Journal

http://journal.unnes.ac.id/sju/index.php/edaj

Measuring Moral Hazard Behaviour and its Determinants Within Credit Installment

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Article Information

Hisrtory of Article
Received July 2018
Accepted September 2018
Pusblished November 2018

Keywords:
Moral hazard, non performing loan, debtors, bank monitoring, micro and small enterprises

Abstract

Non performing loans (NPL) is an indicator of debtor's inability in credit repayment which indicates the presence of asymmetric information that might cause moral hazard. This research aims to measure the level of moral hazard and its determinants of micro and small enterprises debtors of Bank Jateng which have NPL. The data were collected from 58 debtors who were selected using simple random sampling. Rating scale method was used to measure the level of moral hazard while regression was used to analyze variables determining moral hazard. The research found that (1) the level of debtor's moral hazard tends to be medium-to-high, (2) bank monitoring, debtor's age, and business size are significant variables determining moral hazard. Hence, the research suggests that (1) the bank needs to apply some specific treatments to debtors with high moral hazard, (2) bank monitoring needs to be increased thus debtors are not comfortable to carry out moral hazard, (3) young debtors tend to be more daring to do moral hazard hence it needs special attention and treatment to them, (4) the debtors with larger scale business have the potential to do moral hazard therefore treatment needs to be differentiated with the smaller ones.

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ISSN 2252-6965

INTRODUCTION

Low accessibility is one of major obstacles faced by micro and small enterprises (MSEs) for obtaining loans from formal financial institutions in Indonesia. This was reported by The World Bank and Bank Indonesia, separately, in 2012 (Bank Indonesia, 2013). Following this condition, Bank Indonesia's policy of encouraging the development of MSEs in 2013 has focused on increasing loans access to them to minimize the imbalance of information between banks and MSEs that are still a constraint (Bank Indonesia, 2013). This imbalance of information is often referred to as asymmetric information (Agostino & Trivieri 2014).

Asymmetric information is such disturbance of equilibrium which theories could not work properly. In economic field, it often occures in monetary and banking system which appears value of money and uncertainty. Particularly, it has been happened in credit financing for business sectors that might cause one of/both of adverse selection and moral hazard done by bank or debtors or both parties. The complexity of this problem makes sure that is so hard to identify who the doer is. Some experiences found that financing micro and small enterprises has more difficulties than the larger because of the lack of information and historical data of their business hence the presence of asymmetric information is totally convinced. If such information and data relate to the character and other things attributed to debtors then moral hazard behaviour should probably appear later after signing credit contract, of course if bank approval was happened. In this case, asymmetric information in financing micro and small enterprises induces the presence of moral hazard attributed to debtors (Holmstrom 1979; Grossman & Hart 1983).

Theories and concepts supporting this study are asymmetric information, moral hazard, and credit risk (Nicholson & Snyder, 2012; Greuning & Bratanovic, 2000). Rupeika-Apoga (2014) concluded that there was the challenge to finance micro and small enterprises in Baltik States. Zeneli & Zaho (2014) that research which finding that lack of information is one of the main variables causing the difficulty for funding micro and small enterprises in Albania. Moreover, Uchida et al. (2012) explained that obstacles to credit accessibility for micro enterprises could be reduced through producing soft information about new and old debtors explored by loan officer, for example strengthening informal communication with debtors. In this case, hard information could be used as control variable. In line with that strategy, de la Torre et al. (2010) also concluded that the way to make easier for reducing funding difficulties was constructing relationship lending based on mutually advantage principle as partnership.

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. In previous research, Mirrlees (1999) analyzed 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. Far before, (Holmstrom 1979; Grossman & Hart 1983) have developed the moral hazard analysis with principal-agent approach to construct optimal incentive scheme.

Formally, Uchida et al. (2012) found that credit accessibility obstacles could be overcome with risk assessment viz. credit scoring as well as credit rating. Beside that, credit guarantee should be alternative solution to compensate the absence of collateral in order to ease credit accessibility to micro enterprises. As like as that finding research experienced by Boschi et al. (2014) suggested to apply 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 probably appeared after contract agreement.

Non performing loan (NPL) is such indicator to detect the asymmetric information signal, especially in debtors side, because this indicator shows debitor noncompliance of credit contract which should be observed by postponed installment payments or even credit loss. This debtor action might be induced by moral hazard behaviour where the debitor attempts wilfully to avoid from some clauses noted in credit contract (Nicholson & Snyder, 2012).

Based on bank classification, Local Development Bank or Bank Pembangunan Daerah had higher NPL than other banks happened in quarter I 2016 in term of credit financing for micro and small enterprises (Bank Indonesia, 2016). It could be happened because of less experiences and technical skills and knowledges of this bank in financing productive or business credit, especially for micro and small enterprises, where thus far it has lended more credits to consumption sectors as much as 66 percents of its total credits (Damayanti & Adam 2015). Bank Jateng, one of Bank Pembangunan Daerah which is authorized in Central Java, is as representation of that condition even has higher consumptive credit ratio than this of Bank Pembangunan Daerah which shows as 72,78 percents of total credits (Bank Jateng, 2017). Therefore, Bank Jateng has issued the policy that credit financing to productive sectors, particularly micro and small enterprises, should be more proportion come into force early 2017.

For reducing NPL of debtors, of course anticipating credit default, banks usually implement strategies called as credit rationing (Stiglitz & Weiss 1981; Agostino et al. 2008) and signalling (Zambaldi et al. 2011; Agostino & Trivieri 2014). Credit rationing is dealing with up and down interest rate strategy while signalling is about collateral requirement. (Agostino et al. 2008) concluded that credit rationing strategy could minimize credit risks because the debtors would consider their decision to take or no for credit offered with high interest rate. The risk lover debtors often take this offer bravely therefor banks have to pay more attention to them—high risk to moral hazard action. Agostino & Trivieri (2014) proposed that signalling or collateral strategy whatever the circumstances is still applied as main requirement because collateral is the last resource for covering the lost.

However, the opposite findings gave evidence that in reality, especially in micro and small enterprises cases, those two strategies even work improperly. Zambaldi et al. (2011) explained that in Brazil, offering credit to micro and small enterprises often faced any obstacles, i.e high costs and collateral difficulty. Finding from Damayanti & Adam (2015) with National Team of Poverty Alleviation (TNP2K) also concluded that lowering interest rate of productive credit to micro and small enterprises, for example *Kredit Usaha Rakyat* (KUR) which the interest rate is subsidized by government, in fact could not assure that NPL moved down, even rose up. Hence, for all findings, it can be noted that the failure of some strategies applied by banks in minimizing the credit default might be caused by debtor's moral hazard which quite difficult to be observed by banks.

Based on that fact, this study focuses on Bank Jateng which takes micro and small enterprises debtors as respondent samples. High NPL might be the indication of the presence of such debtors moral hazard. Then, the credit scheme choosen is Productive Business Loan/ *Kredit Usaha Produktif* (KUP) because of its highest NPL, i.e 7,01, rather than other schemes (KUMK, *Kridakop*, etc.). Hence, the research problem issued in this study is the asymmetric information signal which has been indicated with high NPL thus could probably cause moral hazard behaviour of debtors after signing credit contract. Therefore, this study aims to analyze the moral hazard which attempts to answer these questions: (1) how high is the debtors' moral hazard? (2) how do variables influence the moral hazard?

RESEARCH METHODS

Samples determining are based on population of Bank Jateng KUP debtors who stay in working area of Branch Purwokerto.

Based on NPL data of KUP scheme that Bank Jateng Branch Purwokerto has the highest NPL which reaches 14.35 (far from the upper limit, NPL=5). The population of debtors amounts 85 so that the number of samples is taken at 58 as a result of simple random sampling technique.

Debtors' moral hazard as a main variable is explored by questionnaire method and completed by in depth interview. By 24 questions which are chosen through tight stages this study attempts to examine the possibility of moral hazard attributed to the debtors. That 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 determined before 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 examined to respondents. Each question must be responded with choosing one of agreement level which ranges from 1 until 10. The higher the agreement level the higher the moral hazard possibility level. Then, the calculation of total scores of all respons shows how high the moral hazard level is. This technique is called as rating scale method that might be suited to analyze behavior, attitude, and perception of certain peoples about phenomena in social, cultural, psychological, and even economic.

After having the moral hazard's level then put it in the empirical model for analyzing its determinant variables. Therefore, it is used multiple regression method. The data collected from respondents are cross section type. Variables chosen as independent ones are interest rate of credit (Bk), installment volume (Gk), monitoring frequency (Mk), time of credit period (Wk), sex (Jd), age of debtor (Ud), education level of debitor (Ed), age of business (Tu), firm size (Zu), and profit (Lu). Later, the equation can be expressed as follow:

$$Hz = b_0 + b_1 Bk + b_2 Gk + b_3 Mk + b_4 Wk + b_5 Jd + b_6 Ud + b_7 Ed + b_8 Tu + b_9 Zu + b_{10} Lu + u \quad \text{.....(1)}$$

Before, the data must be passed the classical assumption test consisting of multicollinearity, autocorrelation, and heteroscedasticity. Then, the influence of those variables toward moral hazard can be estimated, both jointly and partially.

RESULTS AND DISCUSSION

First, it must be examined the quality of questionnaire whether each question has been fit as inseparable part of whole exploring efforts to explain what the moral hazard is, in case of this study. Those tests must be executed are validity and reliability.

For judging the validity all questions have to be matched with empirical data. Using factor analysis the data can be examined by one of two kinds, exploratory factor analysis (EFA) or confirmatory factor analysis (CFA). EFA is purely exploring the objects without strong concept and theory so it is used to new object or variabel. Meanwhile, CFA refers to clearly concept and theory underlying all about object behaviour.

In this research, there are 5 components measuring moral hazard based on Bank Indonesia regulation about feasible credit principles (PBI No.14/15/2012), i.e the compliance of credit repayment, the availability and accurateness of financial information, the completeness of credit documents, the compliance of credit contract, and the suitable of credit fund use. Therefore, the construct validity used in this research is CFA.

CFA measures validity with a set of tests must be passed, i.e Kaisar-Meyer-Olkin (KMO) and Bartlett's test, Measures of Sampling Adequacy (MSA) test, Coummunalities test, and Total Variance Explained test. CFA must be fulfilled by several conditions, first, the

intercorrelation matrix must be non-identity and that must be fit to measure the factor analysis. This condition can be examine by Kaisar-Meyer-Olkin (KMO) and Bartlett's test. The criterion of KMO value must be more than 0.7 or at least 0.5 and the value of Bartlett significancy must be less than 0.05. The result of Kaisar-Meyer-Olkin (KMO) and Bartlett's test can be seen at *Table 1*.

Table. 1. KMO and Bartlett's Test Result

Tests	Value
KMO Measure	0.805
Barlett's Test:	
Chi-Square	1392.711
df	276.000
Significancy	0.000

Table 1 shows that KMO value is 0.805 where is more than 0.7 and the significancy Bartlett is 0.000 where is less than 0.05. Therefore, it can be said that analyzed data has been passed thus fulfill the first condition that intercorrelation matrix is non-identity and fit to measure factor analysis.

Table 2. Communality Test Result

Question	Extraction	Question	Extraction
1	0.695	13	0.882
2	0.711	14	0.858
3	0.755	15	0.752
4	0.829	16	0.795
5	0.855	17	0.734
6	0.556	18	0.929
7	0.638	19	0.819
8	0.779	20	0.864
9	0.813	21	0.877
10	0.86	22	0.662
11	0.731	23	0.685
12	0.73	24	0.831

Second condition must be fulfilled is sample adequacy. It can be examined by MSA test. The criterion of this test is the values must be more than equal to 0.5. Based on analysis output that all of MSA show values which are more than 0.5. It can be concluded that the samples taken has been adequate. After those 2 conditions have been passed then the analysis moves to comunnality test that measures the abilities of each question to measure moral hazard variabel. The qualified question must have the communality value at more than 0.5. The result of this test can be seen at *Table 2*.

Table 2 shows that all of questions have communality values at more than 0.5. It means that each question has ability partially to measure moral hazard variable and all questions as a whole have qualification to measure moral hazard variabel, in case of this study. Then, the following test is Total Variance Explained which measures the ability of 5 factors to explain moral hazard variable shown in explanatory percentage. In *Table 3* the result of this test can be seen.

Table. 3. Total Variance Explained Test Result

Rotation Sums of Squared Loadings			
Factor	Total	Variance (%)	Cumulative (%)
1	6.770	28.208	28.208
2	4.653	19.386	47.595
3	2.935	12.229	59.823
4	2.840	11.831	71.655
5	1.443	6.014	77.669

Table 3 shows that there are 5 factors ability to explain moral hazard variable. In this table it can be known that factor 1, 2, 3, 4, and 5 contribute respectively 28.208%, 19.386%, 12.229%, 11.831%, and 6.014% in explaining moral hazard variable. As a whole, moral hazard variable can be explained by all those factors as much as 77.669%, the rest could be explained by other factors. This percentage is high enough for explaining a variable.

Furthermore, it must be examined reliability test by Cronbach's Alpha method. The criterion to be passed this test is the Cronbach's Alpha values at more than 0.6. Based on the result that the alpha values at 0.898 which is higher than 0.6 thus it can be

concluded that this questionnaire has been reliable in measuring moral hazard variable.

Therefore, based on the calculation of total scores of all respons by rating scale technique it is known that the average of total scores is 77.81. Then, this value should be categorized into one of 5 moral hazard levels, i.e very low, low, medium, high, and very high (Azwar, 2014) (see *Table 4*).

Table. 4. The Levels of Moral Hazard

No	Range	Level
1	$\mu \leq 38.04$	Very low
2	$38.04 < \mu \leq 54.36$	Low
3	$54.36 < \mu \leq 79.72$	Medium
4	$79.72 < \mu \leq 105.08$	High
5	$105.08 < \mu$	Very high

In *Table 4* there are 5 moral hazard levels based on the calculation of each category. The average of moral hazard score is shown as μ=77.81 and σ is standard deviation which values at 25.36 (based on calculation). Then, the result of calculation can be concluded that moral hazard level leads to medium close to high. Therefore, it can be said that debitor's moral hazard is categorized in medium-high level thus it needs much more attention from Bank Jateng to apply appropriate treatment for those debitors.

The following step is running regression of the model. Now, moral hazard's variable has the sets of value showing each respondent moral hazard so that is ready to be input. Multiple regression running shows the results. First, based on classical assumption test, it could be passed all tests of multicollinearity (All VIF>5), autocorrelation (DW=1.63), and heteroscedasticity (spread scatterplot). Second, the variation of moral hazard's variabel can be explained by the variation of independent variables about 39,9 percent, i.e. R^2 =0,399. This value doesn't matter because of using cross-sectional data. Third, jointly, all independent variables as a model influence significantly toward moral hazard, i.e F-stat=3.118,sig.=0.004. Forth, partially, there are 3 variables influencing moral hazard, viz. monitoring frequency (t-stat=-2.292,sig.=0.026), age of debitor (t-stat=-2.151,sig.=0.037), and business size (t-stat=3.801, sig.=0.000). Clearly, it can be seen at *Table 5.*

Table 5. Regression Result

Variable	Coefficient	t-stat	Sig.
(Constant)	21.025	0.994	0.325
Gk	1.148E-7	0.482	0.632
Bk	-0.115	-0.103	0.919
Wk	0.029	0.793	0.432
Mk	-0.370	-2.292	0.026*
Jd	2.472	0.884	0.381
Ud	-0.411	-2.151	0.037*
Ed	0.472	0.568	0.572
Tu	0.337	1.322	0.193
Zu	20.675	3.801	0.000*
Lu	4.505E-7	0.996	0.324

Fifth, the coefficient sign of each significant variables shows right direction suitable with theory. Monitoring frequency has negatif sign which means that the higher the monitoring frequency the lower the moral hazard. From this finding it might be suggested that Bank Jateng should raise monitoring frequency in order to reduce debtors' moral hazard. This finding supports the research by Repullo & Suarez (2000) which concluded that bank monitoring was needed to minimize the moral hazard's problem in financing micro and small medium enterprises.

Research by Piskorski & Westerfield (2016) also concluded that bank monitoring could reduce costs of stopping contract caused by debtor's moral hazard. This finding is important because several banks give less attention for monitoring or even as just job formality. Even tough, one important thing for successful credit repaying is relationship lending as stated by de la Torre et al. (2010) where both parties, debtors and banks, are mutually relationship so that banks regard the debtors and their enterprises as partners in prospective and profitable business.

Age of debtor has also negatif sign which means that the older the debtor the lower the moral hazard. Based on this finding it migh suggest that Bank Jateng should be alert to younger debtor because of their braveness for taking risk. This finding is important and interesting and even less attention. Nguyen & Luu (2013) suggested that age of debtor would influence its character dealing with managing business and gaining credit. The olders tends to be better in character hence eliminating for gaining credit and the youngers shows clearly their risk for managing credit therefor they usually face difficulty to have formal loans.

Then, different with those 2 variables, firm size has positive sign which means that the larger the business scale the higher the moral hazard. This finding might imply that the larger business has more experiences than the smaller so the larger has more possibilities and strategies not to obey a part or even a whole credit contract which has been signed. Therefore, Bank Jateng must pay more attention to debtors of small enterprise rather than those of micro enterprise in case of moral hazard possibility. This finding is important because the larger enterprise relatively has stronger stability and consistency in all business process. Hempel and Simonson (1999) stated that the larger enterprise tends to be stable hence easier to gain credit than the smaller. Hendrawan (2012) also found that the larger enterprise would have better capacity and easier possibility to get loans from bank. However, the largers, in many cases, often utilize their experiences in business and loans to make some hidden actions—moral hazard—for avoiding the contract.

Besides those three significant variables, the model could not explain the significant influences of six other variables, i.e installment volume (Gk), interest rate of credit (Bk), time of credit period (Wk), sex (Jd), education level of debtor (Ed), age of business (Tu), and profit (Lu). However, statistically, this result doesn't matter because all procedures have been passed. Those procedures consist of (1) passing classical assumption test, i.e multicollinearity (All VIF>5), autocorrelation (DW=1.63), and heteroscedasticity (spread scatterplot); (2) having sufficient determination coefficient, i.e. R^2 =0,399 (low but sufficient); and (3) having significant value of jointly influence, i.e F-stat=3.118, sig.=0.004. First, classical assumption test has to be passed to make sure that there are no basic problems in data used. Second, theoretically and practically Wooldridge (2013) states that low R-squared in regression equation with especially cross-sectional data in social sciences is not uncommon. It means that the result is still good estimation and useful to be analyze. Theoretically, the natural characteristic of cross-sectional data spreads out among sections, i.e person, place, etc., hence in one variable there are many characteristics of sectional data which are hard to be generalized. Practically, in reality, low R-squared indicates that it is so very difficult to predict the behaviours of many economic agents in social life. Therefore, low R-squared doesn't matter in cross-sectional data. Third, using F-test is for consideration that the model with all variables inside, the dependent and independents, is inseparable which means that, in this research, the insignificant variables, though more than the significant ones, are parts of the model can't be separated. Therefore, both of significant and insignificant variables can be analyzed why influence and not influence toward dependent variable—moral hazard.

Installment volume is amounts of credit repayment that must be paid off per month. This variable is not significant in influencing moral hazard. It means that debtors' moral hazard can not be affected by much or little money must be paid in installment. Perhaps, they have to provide lots of money each month for installment but they still in good behaviour to obey the rule. Otherwise, they may have light arrears but they behave stubborn not to repay off with unacceptable reasons. Much or litte money must be provided can not effect their behaviour. Their actions don't represent the logically relationship between installment volume and moral hazard.

Interest rate should always be a main instrument in funding and lending funds in

financial market. In this research, interest rate of credit is also including in the model. The higher interest rate is such signal from bank that there is high risk while the lower shows that it will be easier in repaying off. In this research, interest rate is not significant to influence moral hazard. It means that, the higher or lower of interest rate can't affect debtors' moral hazard. They perhaps still behave moral hazard though in the condition of lower interest rate which is often charged to MSEs' debtors. Another condition is that in higher interest rate the debtors don't automatically behave to avoid repayment, even conversely, they obey the rule. Therefore, it means that moral hazard, whether actioned or not, is not always depended on the higher or lower of interest rate of credit. Noted that the moral hazard is more representative of psichological behaviour not just physically appearance.

Time of credit period (Wk) is the period of time provided to debtors to repay off all arrears of credit so it is devided into short-term and long-term credits. This research finds that there is no effect time of credit period on moral hazard. It means that debtors still act or no act moral hazard in the condition of whether long-term or shor-term. One more time, that discussing moral hazard is about behaviour approach so moral hazard is often not be affected by technical circumstances.

Then, sex (Jd) and education level of debtor (Ed) are variables attributed to debtors. Those variables are not significant to effect debtor's moral hazard. In this research, the difference of sex has no effect on moral hazard which means that man or woman has the same opportunities to act moral hazard whether in the high or the low level.

The same result with sex, the education level of debtor can not also influence moral hazard which means that the debtor either with higher or lower level of education can act moral hazard in the same probability. Related to this result, the more factor influencing moral hazard is experiences in having and managing credit funds, not exactly depends on the education level.

Other variables having no influence to moral hazard are age of business (Tu) and profit (Lu) which are included in business attributes. It means that either older or younger enterprise has the same chances and probabilities to act moral hazard.

The older may behave moral hazard with utilizing its experiences to avoid the rule and the younger also can behave it but with its recklessness and less experiences. Also, the profit, though as the main factor of business performance, is not a variable significantly influencing moral hazard.

The reason is that moral hazard is not just depended on statistically progress of business performance but more determined by the characteristic and behaviour of the business owner as debtor. Although having higher profit—great capabiliy to repay off—the debtor with moral hazard probability can hold up repayment or even against the contract, but others can be as obedient debtors. Also, otherwise, debtor with lower business profit can stick to the rules for repaying on time while the rests of them behave otherwise—moral hazard. Therefore, it is clearly proven that business profit can not influence the behaviour of moral hazard.

From all findings, there are at least two novelties. First, in many researches, bank monitoring should usually be proxied by how many times bank officers visit to debtors for collecting credit repayments. In this research, bank monitoring explores not only visiting frequency but also how banks build the relationship lending to debtors. Actually, this approach is much better because this case is connected with the character and behaviour which must be examined properly with behavioral approach too.

Second, in previous researches, firm size or business scale represented three levels, i.e small, medium, and large. This research focuses in the first level (i.e small) but it is still separated into two sub level, i.e micro and small. So, the firm size here represents micro and small enterprises, separately, which actually give evidence that there are different effects come

from their behaviour hence both of them have absolutely to be separated in research analysis.

CONCLUSION

This study aims to analyze moral hazard possibility attributed to micro and small enterprise debtors. The results show that Bank Jateng KUP debtors in Purwokerto have medium-high moral hazard level. This first finding is important for Bank Jateng to set appropriate treatment to those debtors in order to lower their moral hazard. The second finding shows that there are 3 variables influencing significantly toward moral hazard's debtors, i.e. monitoring frequency, age of debtor, and business size. The intensity of monitoring frequency must be increased to make those debitors uncomfortable for doing moral hazard, of course with building better relationship. Then, age of debtor is one of character components attributed to debtor. The younger debtor has more possibility to do moral hazard because of their braveness for taking risk. The last but not least, the larger business, that is small rather than micro enterprise, has more influence toward debtor's moral hazard so that is important for Bank Jateng to pay more attention to debtors of small enterprise rather than those of micro one in case of moral hazard possibility.

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