Micro Credit Risks Model Research

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Abstract: The objective of the study is to propose a model for micro-credit risk assessment in Vietnam. To accomplish the research objectives, we conduct a synthesis of related studies. In-depth interview with experts, businesses and banks in Vietnam to propose models and methods of analysis and evaluation

Keywords: Micro credit risk (MCR)

1. Introduction

In the world, behavioral economics has been developing at a rapid rate and has proven its positive impact on many fields and industries in an economy including economic fields, as well as the social realm. Many scientists have simulated human behavior experiments to apply those research results to decision-making and decision-making on socio-economic issues in many fields of social life, including that of an individual, a business or an organization. An individual's decision on an issue can affect not only themselves but also an organization or even a society. In the banking sector, microfinance has been formed and developed for a long time in the world and through researches of economists has shown and demonstrated its role and impact on economic development, in general and for poverty alleviation in particular. Microfinance in Vietnam has only recently developed. Statistics of the State Bank of Vietnam by the end of 2018 have 16 financial companies with 6 companies being subsidiaries of major banks, including: Fccom of Maritime Bank, Fe Credit of VP Bank, HD Saison of HD Bank, SHB Finance of SHB, MCredit of MB Bank and Post and Finance of SEA Bank. Currently, the establishment of financial companies is booming in Vietnam to exploit the consumer loan segment which has great potential and has not met the needs of the market in Vietnam. According to a report by the State Bank of Vietnam, by the end of 2018, the total outstanding loans of the whole economy are about 7.2 million billion VND, of which the total outstanding loans of informal credit accounts for more than 20%. However, the source of formal credit cannot meet the needs of the people, especially small and small loans or borrowers do not have collateral to mortgage to formal lenders. leading to an outbreak of "black credit" everywhere in the form of consumer lending finance companies, adversely affecting the socio-economic situation in many localities. Therefore, studying the issue of risks in microfinance activities, the impact of risks in microfinance activities on microfinance activities is an urgent and important issue for Vietnam today. Thereby, it helps the Government, SBV, credit institutions as well as microfinance organizations to have appropriate institutions, policies, regulations or products to meet the needs of the people as well as partially limit the problem "black credit", creating conditions for people to access official loans in accordance with their actual conditions.

So far, apart from credit institutions including Agribank, VBSP and other credit institutions that provide microfinance lending services, the semi-formal and informal microfinance institutions have performed quite well, continuing to contribute a part of the capital loan of MCR is effective, supporting and assisting the poor in remote rural and extremely difficult areas, reducing poverty and stabilizing their lives. In addition, many programs of NGOs and social organizations also make positive contributions to the poor in remote rural areas and especially for poor women. Research by Nguyen Duc Hai (2012), Pham Bich Lien (2016), Nguyen Quynh Phuong (2017) gave an overview on the development of microfinance in Vietnam with subjects as formal and semi-formal microfinance organizations in Vietnam. Male. Through it, the authors propose solutions and policy recommendations to develop microfinance organizations in Vietnam.
In an economy, microfinance is a direct credit activity to customers with small loans, so credit risk and risk management are a big challenge for credit institutions with operations. Microfinance activities, microfinance organizations as well as with the society. One can rely on a person's attitude and behavior towards risk to predict their economic behavior, decision-making and it has a direct impact on the person's behavior. Borrowing capital to risks such as investment, production, consumption and behavior towards risks. There have been many studies on microfinance and theoretical frameworks in the world that have a great influence on decision making in risky situations, which is expected utility theory by Neumann and Morgenstern (1944), given. Prospect theory by Tversky and Kahnerman (1979) has shown that people often look for risks in the direction of losing and avoiding risks in the direction of losing. From this theory, Tversky and Kahnerman proposed prospect theory, with the value function definition of prospect theory determined by the profit and loss points relative to the reference point. Wen et al. (2014) concluded that risk preference is related to risk attitude in investors' decision-making. Thus, it can be seen that risk preference is the direction of risky decisions of individuals, investors towards assets in order to obtain the highest return. Ackert and Deaves (2013) argue that the implementation of decisions focuses mainly on the gain and the loss. Handa (1971) argued that risk preference is the choice between a high-risk asset over a low-risk asset so that the investor can receive a higher rate of return.

Risky decision-making is a common problem, and the degree to which people are willing to take risks constitutes risky preferences. For economic analysis or policy regulation, it is especially important to assess and measure individuals' risk preferences. Research by Charness et al. (2013), Eckel, Dave et al. (2010) concludes that economics can consider and focus on evocative methods when analyzing risk preferences and suggested likes can be influenced and influenced by the metrics used.

2. Literature review

2.1. Risk preference

According to Stiglitz and Weiss (1981), borrowers are motivated and tend to invest more in risky projects. This means that borrowers with bad debts are willing to accept high interest rates on their loans (high risk tolerance). The experiment of Zeballos et al. (2014) in Bolivia showed that borrowers without bad debt looked at more risk than borrowers with bad debts. This result contradicts the hypothesis of Stiglitz and Weiss (1981): People who invest in less risky projects than people with bad debt. The poor are unable to repay their loan because they do not dare to accept the risk thus rendering the loan ineffective and as a result they cannot repay their loan (Zeballos et al., 2014). .

In Vietnam, the study by Vieider et al (2013) on risk preference concludes that in general, Vietnamese farmers are average risk neutral. At the same time, the study results also showed that income is negatively correlated with risk avoidance, however, the correlation with its wealth is not significant. Also in Vietnam, Tanaka et al. (2010) suggest that the poor are less patient than those with high middle income.

Also through the review process, in terms of risk preference assessment and assessment, the author found that there have been many studies on risk preference related to many subjects and fields such as securities, MCR, production, consumption, entertainment, health, education, gambling ... In terms of space, it includes many areas, both urban and rural areas. The results also show that there are many differences between study subjects, locations as well as different fields. However, there is no specific or detailed study to compare the differences between urban and rural areas. Subjects are students with studies of Eckel and Dave (2010), Eckel and Grossman (2008). Farmer and rural area studies have studies of Start (2013), Binswanger (1980), Banerjee and Mullainathan (2010), Stiglitz and Weiss (1981). Research on suburban and subtropical regions with studies by Giné et al (2010); Research by Vieider et al. (2015) in upland areas in Ethiopia. Binswanger (1980) studies semi-tropical India (SAT) to evaluate the impact of risk and risk aversion on agriculture between rich and poor, young and old.
In Vietnam, there are studies by Nguyen et al (2016), Tanaka et al (2010) in northern and southern villages that study the effects of risk attitudes and risk preferences on time, trust and trust, risk aversion and time preference. In this study, the author also wants to consider the difference in risk preference between urban and rural areas. What factors and behavioral characteristics of the MCR borrower, then, have an impact on the risks in TDM lending activities? This is the void and the problem that I am interested in studying.

2.2. Social capital and risks in SME lending activities.

Until now, social capital (social capital) has also been studied a lot and is also considered as a type of capital and thus also greatly affects the risks in microfinance lending activities. Trust and trust are two important issues within personal social capital. Social capital is a social network of sustainability, understanding and interaction among members of society (Bourdieu, 1986; Fukuyama, 2001-2002; Coleman, 1988; Portes, 1998; etc ... ). According to Karlan (2005), social capital is the ability and social relationships of an individual to allow them to overcome or limit and overcome weaknesses in information imperfections and forms of engagement. Other.

In other words, the research elements and objectives of social capital may include social capital and social networks; social capital and resources; social capital, social capital investment and the pursuit of benefits; social capital and trust and trust and reciprocity; social capital and public goods, etc. Glaeser et al. (2000) argued that human behavior in the game of belief is correlated with the participants' previous culture and interaction. The more trusted people are, the more trustworthy they are in the game of trust. Researchers believe that trust is recognized as an important factor of social capital. Many scientists and economists approach and research on global capitalization of the financial market to adapt to difficulties and problems with traditional models.

Ngo Thi Phuong Lan (2011) studies on risk reduction behavior and application of social capital in the Mekong Delta to restructuring in agriculture from rice cultivation to shrimp farming. The author studies the impact of farmers' economic behavior and their social relationships in the transition from rice to shrimp farming. Social capital has a great impact on farmers' activities in social relationships such as capital assistance, technical assistance, market information, labor ... It is thanks to social capital that has minimized there are many risks from the shift from rice cultivation to shrimp farming. The focus of the study is to analyze risk reduction thinking, patterns of social relations and the role of social relations in farmers' economic performance through a shrimp farming case study. ; Learn about mutual assistance in production but lack focus on conflicts of interest among farmers in the West. The study addresses production conflicts and conflicts especially about water resources and theft in the community.

2.3. Social capital and credit activities.

Karlan (2005) found that the higher the social capital, the better the ability to repay debt and to have savings. Wenner (1995) studies credit programs in Costa Rica found that groups that protect, monitor members and use local information have lower NPLs than unattended groups. Greiner and Wang (2009) studied the problem of direct lending P2P (people-to-people) ie personal loans without going through banks, the results showed that there is information asymmetry between the lenders. and the borrower.

Mwangi and Ouma (2012) study the role of social capital in households' access to credit in rural Kenya. The results have a positive relationship between social capital and access to credit. At the same time, it is also recommended that credit institutions should include social capital factors in their lending products and must have all relevant information about borrowers. Cassar et al. (2010) simulated 1,554 participants in 259 experimental loan groups with group loans. The results show that social trust has a positive and significant effect on the contribution rate of group lending to the creation of social capital.
Basargekar (2010) surveyed a sample of 217 members participating in the urban area micro-program in India to evaluate the impact of social capital on social empowerment. The results show that the microfinance programs implemented by the organizations have created a social capital that has the impact of empowering the participants. The study also noted that social capital is not automatically generated, but organizations must create and nurture it appropriately by implementing specific policies.

In credit operations, the poor are often considered too risky and impatient for traditional banking services (Banerjee and Mullainathan, 2010). The borrower fails to repay the loan due to risky investment decisions and less patience for the future (Binswanger, 1980).

The credit market is an imperfect market, there is always an asymmetry between the borrower and the lender. Stiglitz and Weiss (1981) conclude that credit market failure is due to debtor's tendency to want to invest in risky jobs and projects and this is also a "mismatch" (disincentive) in making investment decisions. That means borrowers with bad debt are willing to take the risk to borrow high-interest loans, even though they know the risk. However, an experiment by Zeballos et al. (2014) in Bolivia showed that borrowers without bad debts look for more risk than borrowers with bad debts. This result is contrary to the hypothesis of Stiglitz and Weiss (1981). This means that borrowers with bad debt are unlikely to be the ones they invest in in less risky projects. The poor are unable to repay their loans because they do not fully assess the possibilities of the risk, thus rendering the loan ineffective and as a result unable to repay their loan (Zeballos et al, 2014).

Zeballos et al. (2014) used a field experiment to test whether adventurers prefer using, spending all of their profits or investing in a risky investment. As a result, they found no evidence that risky borrowers preferred to invest more heavily, but instead found that they would use their loans for purposes other than investing in an investment. safety project. Eckel and Grossman (2008) experiment with simple game options to measure response to risk and use this measurement to test differences in attitudes towards risk among male and female students. University. As a result, female students are significantly more risk averse than male students.

Giné et al. (2010) study suburbs in Peru discover that group lending has a higher risk than personal lending. Group borrowing increases risk tolerance especially for risk aversion borrowers. Borrowers benefit but with insurance that avoids the risk of loss, but costs also arise from other borrowers, especially those with the most risk aversion.

Binswanger (1980) studied in the semi-tropical region of India (SAT) to evaluate the impact of risk and risk aversion on agriculture. The result is no difference in risk versus size of investment, nor is there a significant difference in risk aversion between rich and poor. People in more risky areas are more risk averse than those in less risky areas, progressive farmers are less risk averse than ordinary farmers, and women are more risk averse than men.

Vieider et al. (2015) studied 504 households in 36 villages (selected from 110 villages by the Ethiopian Institute for Development Studies-EDRI) in 3 highlands in Ethiopia, with an average age of 42.13 of which Men account for 89.9%, 91% work in agriculture, 45% have elementary education and 38% are illiterate, conclude that unmarried people (9% of the sample) are less risk aversion and older women and older people are more afraid to take risks.

Harrison and Rustrom (2018) in laboratory studies found that subjects appear to be risk aversion: Some tend to be neutral and a few exhibit risk-averse behavior but levels of fear the risk is not great.

The study of risk preference in rural areas in Vietnam by Vieider et al. (2013) found that poor farmers are average risk neutral. Vieider's experimental results also show that risk avoidance is inversely correlated with income. Farmers in rural northern and southern Vietnam, according to an experimental study by Tanaka et al.
(2010) on risk appetite and patience, the results show that people with high middle income are patient and are more concerned about the future than the poor.

Akram and Routray (2013) investigate the causal relationship between social capital and microfinance in Pakistan. The results have shown that the social capital index has a negligible effect on microfinance participation. Social capital can be used in the design and delivery of microfinance programs as well as other rural development activities. The results of the study also encourage policymakers to invest in either social capital generation either directly or by providing a supportive environment for its birth. Confidence as a measure of the cognitive dimension of social capital has proven the highest role in facilitating group loans based on microfinance programs. Poor households can use and replace their social capital as collateral to access credit. The limitation of this study only applies to group lending, not to individual loans.

Karlan (2005) found that the higher the social capital, the better the ability to repay debt and to have savings. He also found that in a high social capital environment, team members are more able to distinguish between bad debt due to misleading motives and bad debt due to negative personal shocks. Wydick (1999) studies data from Guatemala that peer surveillance has a significant effect on group lending through promotion of group insurance participation. Group pressure has a minor effect on preventing moral hazard, while the effect of social relationships among members is statistically insignificant.

Wenner (1995) studies credit programs in Costa Rica found that groups that protect, monitor members and use local information have lower NPLs than unattended groups. However, less than half of the groups have a firm interest rate, and the group loan proposal can improve the flow of information but is an internal and sensitive outline.

Greiner and Wang (2009) studied the issue of direct lending P2P (people-to-people) ie personal loans not through credit institutions. The results show that there is information asymmetry between the lenders and the borrower. Lenders have less information about the borrower's ability to repay. The benefit of social capital is access and exchange of information among group members. Groups can share their experiences and knowledge within their team. Group members can attract group knowledge. Social capital lowers interest rates and positively affects borrowers' receiving and repaying loans.

Robert, Thönia, Erik (2010) designed an experiment of two games about community contribution via the Internet in Denmark, the results showed that trust is related to a preference for cooperation but not to trust about cooperation. Justice is related to cooperative behavior. Both trust and equity are positively related to cooperative behavior.

3. Research method

Research method in the thesis is implemented in the following order: Firstly, the author examines the documents related to the research topic to find the gaps and gaps of the problem as well as the acute of the actual problem in the area for which the experimental survey is expected, thereby identifying the research issues. Next, based on relevant theoretical framework as well as the results of previous studies to propose research hypotheses.

The author uses the method of regression analysis with the binary variable Binary Logistic as well as the Probit model analysis method to test the robustness of the implemented Logit regression results.

4. Result

Proposing hypotheses in the analytical model.

4.1. Hypothesis of behavior in Risk Game:
As for the behavior of the Risk Game experiment participants, those with a higher risk choice indicated that the person was less likely to have a bad debt; while risk-averse people are more likely to have bad debt. This is explained as follows: People with bad debt are those who often suffer from considerable financial pressure to pay off debt. Therefore, they will tend to be afraid of risky options to ensure they are able to meet the financial requirements when due. In contrast, those with risky options are less likely to suffer from bad debt as they will not be under financial pressure to meet repayment requirements when they are due. Therefore, the first hypothesis is as follows:

H1: The higher risk seekers are, the less likely they are to have bad debt, while those who are more risk averse are more likely to suffer from bad debt.

4.2. Hypotheses about behavior in community contributions:

For the behavior of the test participants on the Public Goods Game, those who are willing to contribute to a better community are those who are less likely to suffer from bad debt; while those who do not contribute to the community are more likely to have bad debt. This is explained as follows: People with bad debt are often under considerable financial pressure to repay their debts, so they tend to think for themselves more, they will limit their spending. Conversely, people who do not have bad debt will often be more liberal in their spending matters, they will often think of communities and want better communities. So, the second hypothesis is as follows:

H2: Community contributors are less likely to have bad debt, while those who don't contribute to the community are more likely to have bad debt.

4.3. Theory of behavior in Game Trust:

As for the participants' behavior of the Trust Game experiment, the higher the percentage of money a game participant gives to his or her other players, the less likely the participant is to have a bad debt. Conversely, the lower the percentage of money a participant gave to a partner, the more likely that person would have bad debt. This is explained as follows: Those who suffer from bad debt under considerable financial pressure in debt repayment will tend to be tighter in their spending and investment. Conversely, those who are generous in spending and investing will be the ones who face less financial pressure. So, the third research hypothesis is as follows:

H3: The larger the percentage of money a participant gives to his partner, the less likely that person will have a bad debt, on the contrary, the smaller the percentage of money a participant gives to his partner, the less likely that person will be. have higher bad debt.

4.4. Regression method.

In his thesis, with the dependent variable being a binary variable (with two options of 0 - corresponding to no bad debt (qualified debt); 1 - corresponding to the case of bad debt), The author will use regression analysis methods with binary variables to consider the impact of the experiments and demographic factors on the behavior and risk of insolvency of customers when participating. The main method used in regression analysis with binary variables is the Binary Logistic method. In addition, the author will perform more Probit model analysis to verify the stability of the implemented Logit regression results.

4.5. Binary Logistic model.

According to Hoang Trong and Chu Nguyen Mong Ngoc (2008), the Binary Logistic regression (also called Logit regression) is used to analyze when the dependent variable represents a probable event or is not. The dependent variable Y will take two values of 0 and 1; in which the value is 0 when there is no event that the
A researcher is interested in, the value is 1 when there is information about that event. From this binary dependent variable, an estimation method will be used to predict the probability of an event occurring according to the rule: If the predicted probability is greater than 50%, the predicted result is that the event will occur; otherwise the event will not happen.

In the simplest case there is only 1 independent variable X, the regression function will be as follows:

\[
E(Y/X) = \frac{e^{(\beta_0 + \beta_1 X)}}{1 + e^{(\beta_0 + \beta_1 X)}}
\]

Where \( E(Y/X) \) is the probability that \( Y = 1 \) (i.e., the probability for the event to occur) when the independent variable \( X \) has a specific value \( X_i \). Set the notation \( z = \beta_0 + \beta_1 X \), we rewrite the Logit regression model as follows:

\[
E(Y/X) = \frac{e^z}{1 + e^z}
\]

Then, the probability of not happening will be calculated as follows:

\[
P(Y = 0) = 1 - P(Y = 1) = 1 - \frac{e^z}{1 + e^z}
\]

Then, the ratio of difference between the probability of the event happening and the probability of not happening will be:

\[
\frac{P(Y = 1)}{P(Y = 0)} = \frac{e^z}{1 + e^z}
\]

Taking log of base e on two sides and transforming on right side, we get:

\[
\log_e \left[ \frac{P(Y = 1)}{P(Y = 0)} \right] = \log_e e^z = z = \beta_0 + \beta_1 X
\]

Test with \( n \) variables \( X \), we have:

\[
\log_e \left[ \frac{P(Y = 1)}{P(Y = 0)} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n
\]

Then, the marginal effect of the coefficients will be calculated as follows:

\[
\frac{P(Y = 1)}{P(Y = 0)} = e^{(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n)}
\]

**4.6. Hypothesis tests on the general suitability of the model.**

This is a test of the linear combination of all coefficients in the model (except for constants) to see if the coefficients are really meaningful in explaining the dependent variable or not.

This regression uses the Chi-squared statistical test with the hypothesis:

- \( H_0: \beta_1 = \beta_2 = \ldots = \beta_n = 0 \)
- \( H_1: \) There exists a coefficient \( \beta_j \) other than 0.
Test results in SPSS are given in the Omnibus Tests of Model Coefficients table.

In addition, there are some tests on the appropriateness of other models as follows:

- Measure -2LL (-2 log likelihood) and R2: Used to test the appropriateness of the model. In which, the smaller the -2LL value, the better the model; the larger the ruler R2, the better the model. The test results in SPSS are shown in the Model Summary table.

- The classification table (Classification Table) is an indicator to predict the appropriateness of the model. This table compares the actual values and the predicted (estimated) values for each expression, thereby showing the ratio of the correct prediction of the model to actual values for this event.

- In addition, the Hosmer and Lemeshow Test test on the difference between the actual and the predicted values is also an indicator to see if the model is suitable for:

Hypothesis: H0: There is no difference in actual value and forecast value.
H1: There is a difference in the actual value and the forecast value.

Meaning of the coefficients.

Use the Wald test with the Chi Square distribution to test statistical significance for the regression coefficients. Wald Chi Square value is calculated by taking the estimate of the regression coefficient of the independent variable in the regression model divided by the standard error of the estimation of this regression coefficient, then squaring up by the formula:

\[ \text{Wald Chi – Square} = \left( \frac{\hat{\beta}}{se(\hat{\beta})} \right)^2 = \left( \frac{\beta}{se(\beta)} \right)^2 \]

5. Conclusion

The previous studies in Vietnam mainly research and analyze the reality of microfinance operations of formal and semi-formal MFIs and the timing and data are not continuous. There is not yet a comprehensive and systematic study of factors affecting behavior, risk preferences, social capital, gender, age of microfinance borrowers on the development of microfinance institutions or MCR loan in Vietnam. Risk is common in decision making and risk preference is measured by an individual's level of risk tolerance. Therefore, in economic performance analysis or policy setting, the elicitation, measurement and assessment of risk preferences is particularly important and has a great influence. At the same time, to maintain standards and norms in social life, the elicitation and measurement of elements of social capital as well as social preferences will have positive effects and contributions. Currently, in Vietnam as well as many countries around the world, microfinance is recognized as an effective tool in the process of supporting and helping the poor in disadvantaged areas to improve their lives. There are many studies on factors affecting the efficiency, access to microfinance services of the people and analysis and evaluation of microfinance activities of MFIs. However, there are few studies on the characteristics and behavior of MCR borrowers, especially borrowers with bad debts. Generally speaking, in the behavioral characteristics with risk appetite, factors related to social capital, gender, age, social relations, personal reputation ... of the borrower MCR

References


