Chapter 6

Overdue Debt of Village and Urban Community Funds in Thailand

Empirical studies have shown the influence of individual and group attributes on repayment of the microcredit program. In contrast, the purpose of this chapter is to investigate the impact of physical characteristics and other features of the community on the overdue debt of the MVC that is based on the long history of rural Thai database, otherwise known as the National Rural Development (NRD) database.

The NRD database is the community-level information that shows general features and problems of Thai communities, which had been conducted by the Community Development Department since 1982. Households' information are combined to create information of community-level. The NRD data indicates the development level of each community by providing the indicators of the problem. It can be used in planning for improving the quality of life of the people in the village.

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ABSTRACT

This study analyzes the determinants of overdue debt of microcredit for villages and urban communities in Thailand. The data are from the Village Funds Report 2011 and The National Rural Development 2011 (NRD54). Heckman Selection model was used to deal with possible selection bias problem. Empirical results suggest that peer monitoring, degree of joint liability and social ties are associated with overdue debt of microcredit program. Additionally, we find evidence of the basic information of Thai village indicators influence on repayment performance. The community with higher development level of economic and natural resource dimensions has less overdue debt problems.

Keywords: microcredit, village funds, overdue debt, repayment performance, Thai's community

JEL classification: G21, R51, O12

6.1 Introduction

The principle of microcredit is to provide small loans to the poor in order to overcome the financial constraint which is called outreach performance. At the same time, microfinance institutions (MFIs) try to minimize its overdue debt for financial sustainability performance. High overdue accounts are associated with high risk for the MFI. It reduces the chance of lending to one another and reduces the credibility of institutions. Table 6.1 shows portfolio at risk[1] and loan write-offs of

[1] According to CGAP, portfolio at risk is a standard international measure of portfolio quality that measure the portion of a portfolio is deemed at risk because payments are overdue. Portfolio at risk at 30 days (PAR30) means the portion of the portfolio whose payment are more than 30 days past due. PAR30 above 5% or 10% is a sign of trouble in microfinance.

1,368 MFIs throughout the world. Africa has a highest risk in the sense of portfolio at risk. Latin America and the Caribbean have the highest loan write-offs at 3.21%. Reducing the risk will improve financial performance of MFIs. Some evidence shows that lending to women have lower portfolio risk and fewer write-offs (D'Espallier, Guérin, & Mersland, 2011).

Table 6.1: Microfinance Information by Regions in 2009

Regions	Number of MFIs	Portfolio at risk - 30 days	Portfolio at risk - 90 days	Loan write-offs
Africa	269	10.45%	6.10%	2.90%
East Asia and the Pacific	157	7.62%	5.21%	1.25%
Eastern Europe and Central Asia	258	7.89%	5.38%	1.65%
Latin America and the Caribbean	392	8.22%	5.72%	3.21%
Middle East and North Africa	70	5.56%	3.45%	2.81%
South Asia	222	7.69%	6.63%	2.12%
All regions	1,368	8.19%	5.69%	2.44%

Source: The MIX market database (www.mixmarket.org)

Previous studies investigated the influence of individual and loan characteristics for lending to individual, while group lending is more focused on social capital within the group. Joint liability group lending becomes a strategy to encourage repayment in the literature because it helps to overcome information asymmetries within the group. Peer screening, peer monitoring, group pursuer and social ties are associated with repayment of group lending (Ahlin & Townsend, 2007; Al-Azzam, Carter Hill, & Sarangi, 2012; Dufhues, Buchenrieder, Quoc, & Munkung, 2011; Godquin, 2004; Huerta, 2010). However, there are only a few empirical studies investigating the factors that enhance the repayment performance of microcredit in Thailand.

This study aims to examine the overdue debt of microcredit for village and urban community funds or the village fund, the largest government microcredit

program in Thailand[2]. The government has set the central regulation such as ceiling of loan, ceiling of interest rate, repayment period, and requirement of personal guarantee. At the community level, the local committee plays an important role of establishing village regulations subject to the approval of the majority within the community. The close relationship between the local committee and members, who have lived in the village, reduce information asymmetries because they are highly familiar with each other. The local committee will be able to identify the risks and ability to repay the loan in a preliminary. Both committee and members will be responsible for the funding provided by the government. Therefore, each fund is a joint responsibility of the group. Huerta (2010) argued that during the interviews, committee members commonly say that

"*the village fund belongs to the community; that it was their only affordable source of credit; and that they were aware that if the fund failed they were not going to receive any further assistance from the Thai government.*" Huerta (2010; pp. 26)

In contrast, most existing literatures show evidences of the impact of individual and group attributes on repayment. Our aim is to investigate the impact of physical characteristics and other features of the community. The study investigates whether or not the repayment performance depends on the features of the community. Better infrastructure, economic, health, education, strong sense of community and natural resources of the community might help people have better chance to earn money and finally repay the loans. In terms of econometric modeling, this study treats selection bias problem which may occur from the self-selection in having overdue account. The contribution of this study is to improve the financial performance of the village fund.

The study is organized as followed: Section 2 reviews the empirical literature and Section 3 presents research methodologies. Section 4 reports the results of the study and section 5 contains the discussion. Last section provides the conclusion of this study.

[2] Government allocated one million Baht per village throughout the country that has been operating since 2001.

6.2 Literature Review

Most of the studies introduce borrower characteristics, household characteristics and loan characteristics as factors determine repayment or default behavior of borrower. Bhatt and Tang (2002) investigated determinants of repayment from microcredit in the United States. The results indicated that a higher education of the borrower and borrowers whose businesses were located closer to the lending agency had a higher chance of repayment. Roslan and Karim (2009) used data from 2,630 borrowers of Agro Bank in Malaysia to investigate the determinants of defaults and found that the probability of defaults was influence by the gender of the borrower, type of business, training in their business, loan size, and the repayment period.

Another aspect, lending to joint-liability groups use to demonstrate the success of microcredit in providing small loans to the poor. A large number of literatures have shown that there is a relationship between a set of group lending features; screening, peer monitoring, pressure or penalty, social ties and the repayment performance (Besley & Coate, 1995; Dufhues, Buchenrieder, Quoc, & Munkung, 2011; Feroze, Chauhan, Malhotra, & Kadian, 2011; Godquin, 2004). For example, Feroze et al. (2011) analyzed factors influencing the repayment performance of the self-help groups in India and found that group size have a positive influence on repayment. Small group size has a better flow of information across members. An increase in the group size, monitoring and enforcing become more costly and less effective. Godquin (2004) examined determinant of microfinance innovations such as the use of non-financial services (including the access to basic literacy and access to primary health provided by the MFIs), group lending, and dynamic incentives on repayment performance. The results indicated that the access to basic literacy and access to primary health has a positive impact on microfinance repayment performance. However, group homogeneity and social ties among group members are not always able to show a better repayment performance. Although some studies have found that social ties within Group homogeneity can reduce information asymmetries (Besley & Coates, 1995) as they have effective peer selection of group members. Dufhues et al. (2011) concluded from the mix results of literature that:

"when credit group schemes are employed, credit institutions must find a balance. Ties must be close enough to allow for credible social sanctions and peer

pressure – but not too close to avoid collusion or impede social sanction." (Dufhues, Buchenrieder, Quoc, & Munkung, 2011; pp. 10)

Group lending is widely used to explain the repayment behavior. However, there are few empirical studies that have investigated the importance of physical characteristics and other features of the community in the repayment performance of group lending. Godquin (2004) found that accesses to basic literacy and health services have a positive and significant sign. They might be able to gain access to more profitable projects and be equipped to prevent health shocks. Khandker et al. (1995) studied the performance and sustainability of Grameen Bank in Bangladesh. They showed a positive correlation between low default rate with the benefits received from branch managers, staff and member training, rural electrification, road length, education infrastructure and commercial branch density. The evidences have shown that it is systematically influenced by area characteristics on local production and hence, repayment ability. Al-Azzam et al. (2012) studied the repayment performance of 160 urban borrowing groups in Jordan. Apart from the effect of screening, peer monitoring, group pressure and social ties on group lending, they introduced the impact of religion and communication technology, the use of phone, to investigate the repayment behavior. Their results confirmed upon evidence that group pressure and social ties reduce the number of days of late repayment after the due date was expected. However, distance and cooperation among all group members have increased delinquency. The results show two interesting evidences that improve repayment performance: they are religiousness and the percentage of members having phones. They argue that phones can have better access to information as well as coordinating within group; which in turn improves repayment.

Few literatures in Thailand, Ahlin and Townsend (2007) examined group lending of the Bank for Agriculture and Agricultural Cooperative (BAAC) in Thailand and found that cooperation and the degree of joint liability are negatively associated with repayment. Ahlin and Townsend (2007) used the percent of group living in the same village and the percent of group members having a close relative in the group as a proxy for cost of monitoring. They found some evidence that percentage of group living in village, contrast with the percentage of members with a

relative in the group is negatively associated with repayment positively predicting repayment.

Huerta (2010) studies the repayment performance of the Village Fund program using the Townsend Thai Data. Huerta's study was conducted on the village fund as group lending and focused on the role of cooperation, penalties for defaults, peer monitoring and degree of joint liability. The researcher also included two policies which are compulsory saving and training on basic financial concept to predict repayment. Information about terms of loan contract, community level and individual level are included as control variables. Empirical evidence showed that those two policies had an increase in repayment. The amount of saving can be used as collateral in case of defaults. Information from training brought result in better management of the loan or an increase return from investment. In addition, repayment increases with cooperative and penalties but decreases with degree of joint liability. Finally, peer monitoring variable is not significantly different from zero.

6.3 Research Methodology

6.3.1 The Models

The model consists of two equations, the selection equation and outcome equation. The selection equation examines the probability to have overdue debt account. It explains why some funds are censored which means they do not have an overdue account. The outcome equation will estimate the amount of overdue debt. The selection model used in this study considers the possibility of selection bias; observations with positive amount of overdue debt are not randomly selected from the population, by allowing for possible dependence in the two equations. The model is based on a bivariate normality assumption (Wooldridge, 2002) and defined as the following:

Selection equation:

$$y_{1i}^{*} = X_i\beta + \varepsilon_{1i}$$

$$y_{1i} = 1 \quad if \quad y_{1i}^{*} > \theta \qquad (6.1)$$

$$y_{1i} = 0 \quad if \quad y_{1i}^{*} \le \theta$$

Outcome equation (amount of overdue debts):

$$y_{2i} = X_i\beta + \varepsilon_{2i} \quad if \quad y_{1i} = 1$$
$$y_{2i} = not\ observable\ if \quad y_{1i} = 0 \tag{6.2}$$

The probability to have overdue debt account, y_{1i}^{*}, is unobserved or latent. It depends on the fund characteristics and village characteristics, X_i. The error term, ε_{1i}, collects unobserved characteristics which affect the probability to have overdue debt account. The variable y_{2i} in the outcome equation is the amount of overdue debt over 12 months which is observed only when y_{1i} equals to 1. Some observations of variable y_{2i} are censored when the fund have not overdue debt account. The outcome equation depends on the fund characteristics and village characteristics, X_i, which are the same as selection equation. The error term, ε_{2i}, presents unobserved characteristics which affect the amount of overdue debts.

6.3.2 Data Collection

The data in this study are from two databases, Village Funds Report 2011 and The National Rural Development 2011 (NRD54), which was developed by the Department of Community Development, Ministry of Interior. This study tries to match those two databases at community level to determine overdue debt of the Village funds. By combining those two databases, we can take advantage of the strengths of each. Village Funds' database includes 61,558 of village and urban community funds. It provides information of overdue debt account at the community level, whether it is the village fund or urban community fund, number of committees, number of members and capital of funds.

The National Rural Development 2011 (NRD54) database includes 71,137 villages. NRD data indicates the development level of each community by providing the general features and the problems of Thai communities. It includes 6 dimensions (31 indicators) are infrastructure, economic, health, education, strong sense of community, and natural resources (see more detail in Appendix C). Each indicator has four levels of score. Score 0 refers to an indicator does not play an

important role in a community[3]. Score 1 refers to an indicator that has a severe problem (below the threshold[4]). Score 2 refers to an indicator that has some problem (at the threshold) and score 3 refers to an indicator that has a few or no problems (above the threshold). Total of 31 indicators have maximum score of 93. These scores indicate development level of each village, thus more score mean a high level of development.

6.3.3 Data Description

After dropping observations with missing data, the sample consists of 41,618 village and urban community funds. Out of a total of 2,312, the funds have shown an overdue debt of over 12 months. Summary statistics for all variables using the Heckman selection model are presented in Table 6.2.

Table 6.2: Statistical Summary of Variables Using in the Model

Variables	Observations	Mean	Std. Dev.	Min	Max
The fund has account of overdue debt over 12 months (1 = yes, 0 = otherwise)	41,618	0.0556	0.229	0	1
Natural logarithm value of overdue debt over one year (THB 1,000)	2,312	4.7661	1.367	0	8
Village fund in rural area (1 = yes, 0 = Urban Fund)	41,618	0.9969	0.055	0	1
Number of committees	41,618	11.0969	2.374	1	30
Number of members	41,618	116.9015	62.434	10	997
Capital of funds (Million Baht)	41,618	1.4917	0.566	1	11
Regions					
Central (1 = yes, 0 = otherwise)	41,618	0.2101	0.407	0	1
North (1 = yes, 0 = otherwise)	41,618	0.2586	0.438	0	1
Northeast (1 = yes, 0 = otherwise)	41,618	0.4057	0.491	0	1
South (1 = yes, 0 = otherwise)	41,618	0.1257	0.331	0	1
Basic information of Thai villages indicators					
Infrastructure	41,618	18.3068	1.420	10	21
Economic	41,618	6.3487	2.632	1	21

[3] For example, Indicator 13th is not calculated when a community has households business less than 30 percent of total households

[4] Detail of indicators and the threshold of each indicator is shown in Appendix C

Table 6.2 (Continued)

Variables	Observations	Mean	Std. Dev.	Min	Max
Health	41,618	10.3013	0.951	4	12
Education	41,618	7.8784	1.606	2	9
Strong sense of community	41,618	12.8297	1.686	5	15
Natural resources	41,618	8.8066	2.171	2	15

The village fund is a joint responsibility of the group, thus it is considered as a group lending in the current study. Peer monitoring and degree of joint liability are examined to describe the probability of having overdue account and intensity of overdue debt at community level. Peer monitoring is proxy using the number of committees because it captures the ability to obtain information within group. There are more number of committees with more information in community because, according to the regulation, the committee must have been living in the area for at least two years. The hypothesis is that 'the more number of committees decreases the probability of having overdue account and the amount of overdue debt'. In addition, the village fund members (demand side) and capital of funds (supply side) are used as proxy variables for the degree of joint liability. The hypothesis is that the higher numbers of members and higher capital of funds increase the likelihood of overdue debt and the amount of overdue debt.

Basic information of Thai villages indicators are considered with the 6 dimensions of the NRD; they are the infrastructure, economic, health, education, strong sense of community and natural resources. A higher score indicates the higher development level of the community. The strong sense of community implies strong social ties. The hypothesis is that 'higher scores and higher ability to repay thus lower probability of having overdue debt and the amount of overdue debt'.

6.4 Results

Table 6.3 presents the results from the Heckman selection model. The result shows that *rho* equal -0.030 with 95% confidence interval [-0.077, 0.017]. The likelihood-ratio test has a *p*-value of 0.21. It shows that the estimated correlation

between the errors is not significantly different from zero, thus the hypothesis that the two equations are independent cannot be rejected.

Selection equation indicates that number of committees, capital of funds, regions, infrastructure, strong sense of community and natural resources are statistically significant determinants of overdue probability. High number of committees can control the probability of not making repayment, thus decreasing the probability of having an overdue debt account. The village funds with a high amount of capitals had a higher probability of having overdue debt account. Dummy variables for regions concluded that north and northeast regions were less likely to have overdue debt account when compared with the central region. Only the southern region tended to have an overdue debt that is more than the central region. Surprisingly, a good infrastructure cannot raise the probability of repayment. However, a high score of strong sense of community and natural resources indicators show that there is a lower probability of having an overdue debt account.

Outcome equation shows that capital of funds, regions, economic, and strong sense of community indicators are statistically significant determinants of intensity of overdue debt. The coefficient of capital of funds in the outcome equation has a different sign in the selection equation. It implies that the fund which has a larger capital tends to have an overdue debt account, however, those amounts tend to be smaller. The northeast region tends to have a small amount of overdue debt compared to the central region. The effects of economic and strong sense of community indicators show that the amount of overdue debt tends to be small when those score are increasing.

Table 6.3: Heckman Selection Estimation for Determinants of Overdue Debt

Variables	Selection equation		Outcome equation	
	Coef.	Robust Std. Err.	Coef.	Robust Std. Err.
Village fund in rural area	0.2946	0.212	-0.6775	0.498
Number of committees	-0.0366***	0.005	0.0104	0.013
Number of members	0.0002	0.000	0.0003	0.001
Capital of funds (Million Baht)	0.0440**	0.018	-0.2686***	0.064
Regions				

Table 6.3 (Continued)

Variables	Selection equation		Outcome equation	
	Coef.	Robust Std. Err.	Coef.	Robust Std. Err.
North	-0.7273***	0.038	-0.0972	0.124
Northeast	-0.2954***	0.027	-0.3680***	0.079
South	0.4710***	0.029	0.3717***	0.069
Basic information of Thai villages indicators				
Infrastructure	0.0180**	0.008	-0.0196	0.020
Economic	-0.0013	0.004	-0.0318***	0.012
Health	0.0010	0.011	0.0185	0.029
Education	0.0024	0.007	-0.0260	0.017
Strong sense of community	-0.0198***	0.007	-0.0490***	0.016
Natural resources	-0.0269***	0.005	-0.0049	0.013
Constant	-1.2996***	0.285	6.9729***	0.697
Log pseudo likelihood	-12,084.69			
Wald chi2(13)	161.99***			
Total observations	41,618			
censored observations	39,306			
uncensored observations	2,312			

Notes: ***, ** and * represent level of significance at 99%, 95% and 90%.

Table 6.4 shows the marginal effects for the expected value of the amount of overdue debt conditional on being observed. There is a marginal effect after the Heckman selection model which provides the effect of explanatory variables on the overdue debt. For example, the marginal effect of the capital of funds indicates that an additional capital of funds (million baht) would decrease the amount of overdue debt by 26.70% on average. Basic information of Thai villages indicators indicate that an additional score of economic and strong sense of social would decrease the amount of overdue debt by 3.18% and 4.97%, respectively, on average.

Table 6.4: Marginal Effect after Heckman Selection Model

Variables	dy/dx	Std. Err.
Village fund in rural area[a]	-0.6672	0.498
Number of committees	0.0092	0.013
Number of members	0.0003	0.001
Capital of funds (Million Baht)	-0.2670***	0.064
Regions		
North[a]	-0.1226	0.123
Northeast[a]	-0.3783***	0.078
South[a]	0.3877***	0.068
Basic information of Thai villages indicators		
Infrastructure	-0.0190	0.020
Economic	-0.0318***	0.012
Health	0.0186	0.029
Education	-0.0259	0.017
Strong sense of community	-0.0497***	0.016
Natural resources	-0.0058	0.013

Notes: ***, ** and * represent level of significance at 99%, 95% and 90%.
dy/dx is for discrete change of dummy variable from 0 to 1

6.5 Discussion

Empirical evidences have shown that the indicators of basic information of Thai village are associated with the overdue debt of microcredit for village and urban community in Thailand. The Heckman selection model shows that the selection and outcome equations are independent. The Townsend Thai data show that borrowers in urban areas are more likely to default than borrowers in rural areas (Huerta, 2010). However, the results in this study show that the Village Fund in the rural sector are statistically insignificant. It implies that there are no differences in the repayment performance between the rural and urban areas in terms of the overdue debt account. The northeast regions have a lesser probability of having an overdue debt account when it is compared with the central region, which is the base case in the model.

This study has provided some strong evidences to demonstrate that peer monitoring, and the number of committees have a negative correlation with the probability of having overdue debt as expected. Local committee evaluates the loan applications of members and decides who should receive the loans. The purpose of borrowing, loan sizes and ability to repay are considered. Their responsibility is to find the ways to force borrowers to repay the loan. These results are not in line with previous results by Ahlin and Townsend (2007), who found mixed results, and Huerta (2010) who found that peer monitoring variable is not significantly different from zero.

Empirical results confirm that repayment is affected negatively by the degree of joint liability. This study the capital of funds is used as a proxy variable for the degree of joint liability. The village fund with higher capital increases the likelihood of overdue debt. This result is consistent with Ahlin and Townsend (2007) and Huerta (2010). Both of them used the landless fraction of members in the fund as a proxy for the degree of joint liability. However, the degree of joint liability reduced intensity of overdue debt.

Strong senses of community dimension include five indicators; learning community, obtaining social protection, participation rate, integration of the community and accessibility to capital. In this study, overall strong sense of community is the sense of strong social ties. Our results showed that a strong sense of community has significantly negative on overdue debt in both equations. It implies that strong social ties have positive effect on repayment performance of group lending. The marginal effect results indicted that the influence of strong sense of community on the overdue debt is stronger than the impact of economic. This result is consistent with Huerta (2010) and concluded that joint liability prosper in areas which social ties are strong enough to enforce agreements.

Unexpected results of infrastructure indicated that a better infrastructure has an influence on higher probability of having overdue debt account. The reason explained by previous studies are that better infrastructures, such as road and communication, may have a better social networking that provides them with more outside credit sources. Hureta (2010) argued that having more outside options makes small loans from the village fund relatively less attractive because borrowers rely

more on commercial bank. Vogelgesang (2003) analyzed repayment behavior in Bolivia and found that borrowers with access to other sources of loans are more likely to default than others. Wenner (1995) studied groups lending in Costa Rica and found that groups who are located in remote areas have lesser opportunity to access other sources of credit. They rely on group lending and have more incentives to repay for maintaining relationship with a funding source that is convenient for them.

Economic dimension, including employment rate, productivity of the farm and benefit form business and tourism sector, was used to indicate the wealth of the community and was able to predict higher repayment rates. The results indicated that economic indicator has a negative effect on amount of overdue debt as expected. However, it was not significant in the selection equation. These results are consistent with Huerta (2010), who found that the diversification of loan by lending to different economic activities contribute to a beneficial of the fund. Moreover Godquin (2004) concluded that the value of the productive assets of the household, self-employment in agriculture, and the number of landed relatives have a positive impact on the on-time repayment performance. This can be explained by more productive assets which can access to projects with higher returns or safer projects. It is also likely that the rich has a stronger ability to cope with greater shocks than the poor.

Education had an expected positive impact on repayment performance but this impact was not significant in the current study. Previous results by Huerta (2010) showed that education and training help borrowers to increase their loan productivity result in increase repayment rates. However, the average schooling level in the community shows a significantly positive correlation with repayment only in the rural communities.

The natural resources dimension represents the abundance of the community. Better quality of soil and water expected to increase farm productivity and return. Our results show that natural resource significantly negative on probability of having overdue debt account.

6.6 Conclusion

This study matched two databases, Village funds report 2011 and The National Rural Development 2011 (NRD54), at community level to determine

overdue debt of the Village funds. This study treats the selection bias by using the Heckman selection model. The empirical evidences in Thailand showed that peer monitoring, degree of joint liability and social ties are associated with overdue debt of microcredit program. The Heckman selection model provides evidences of peer monitoring influence negatively on overdue account. The degree of joint liability provide mixed results which influence positively on overdue account but negatively on the intensity of overdue debt. Strong social ties have a positive effect on repayment performance by reducing the overdue account of group lending.

Overall results of the basic information of Thai village indicators show that a community with higher development level has less overdue debt problems. Unexpected results of infrastructure indicator show that a better infrastructure has an influence on the higher probability of having overdue debt account. Economic and natural resources indicators report that there is a negative correlation with overdue debt. In other words, a strong economy and an abundance of resources have a positive effect on repayment performance of the village fund.

Finally, the results in this study were based on a bivariate normality assumption. Future research is needed to assess the joint distribution by applying the copula approach to sample selection model.