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Is the repayment performance of farmers better than that of non-farmers ? A case study of borrowers of formal bank credit in the Mekong Delta, Vietnam

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Abstract

This paper compares the repayment performance of farmers and non-farmers who borrow credit in individual and group-based schemes from formal banks in the Mekong Delta (MD) in Vietnam. The data used in this paper were collected from three provinces of the MD, and a double hurdle approach and an instrumental variable probit model were applied to analyze the determinants of repayment performance of borrowers. Scheduled repayment was analyzed with loan size instrumented by a tobit model. Results show that, among the borrowers, farmers have a statistically significant higher repayment performance than non-farmers. Repayment in group schemes seems to be positively affected by educational level and by loans to farmers, and negatively by the loan amount, while repayment by independent borrowers is positively affected by the loan amount, farmers as borrowers, and the gender of borrowers.

JEL: E5, G21, O2, R5

Key words: Repayment, microfinance, credit, individual credit, group-based lending schemes

1. Introduction

Microfinance has been recognized as playing a potentially significant role in reducing household poverty levels (Lashley 2004, Chowdhury et al. 2005, Brau and Woller 2004, Ahmad 2002, Navajas et al. 2000). This is because it addresses the lack of credit that poor households experience as pointed out by e.g. (Camilleri 2006). As a result, households' welfare assessed by income, expenditure, asset levels or empowerment were found to be affected by credit provision (Khandker 2001). Amongst others, Robinson (2001) confirmed the importance of microfinance for poverty alleviation, as it would improve households' productivity levels, and hence have a smoothening effect on income and consumption flows.

Yet, credit provision in rural areas is a risky business for a lender as it may be negatively affected by duplicitous and opportunistic behaviour of the borrowers (Jemal 2003), and it often suffers from lack of reliable information about the borrower and the use of the credit (more hazard due to asymmetric information). The lenders usually have little information on the investment projects that borrowers would like to undertake (Manove et al. 2001), while lenders need to be able to assess risk and potential repayment default. Repayment performance is of key importance for the lenders in order to be profitable. Hunte (1996) argued that default problems may adversely affect lending probability as repayment performance decreases, transforming lenders into welfare agencies instead of into viable financial institutions. In addition, loan default may lead to lenders denying new applicants credit as cash flow management problems augment in direct proportion to the increase in default problems (Hunte 1996). Higher repayment rates reflect the adequacy of the financial institutions' services to customers' need and restrict the need for cross subvention of the borrowers (Bhatt and Tang 2002).

In order to reduce or better spread the risk of default in the presence of asymmetric information between the lender and borrowers, financial institutions may make use of three different credit provision mechanisms. First, it issues individual loans to rural farmers and entrepreneurs, with collateral requirement. A land use right certificate is commonly used as collateral. Barslund and Tarp (2008) found that up to 70 percent of all formal loans in four provinces in Vietnam required collateral. Second, the financial institutions lend to individuals through joint liability groups especially in microfinance programs either to reduce the risk for default, to increase their coverage of rural households or to reduce transaction costs involved in making and collecting many small loans (Agribank 2004). Third, the financial institutions may use services of mass organizations or unions, in targeting borrowers unable to provide collateral. Mass organizations in Vietnam facilitating credit provision include the Vietnam Women's Union, the Vietnam Farmers' Union, the Vietnam Youth Union, or the Commune People's Committee. Under the patronage of these mass organizations, collateral is not required as the sponsoring mass organization provides

guarantees to the institutions for loan repayment. Furthermore, financial institutions can have strict borrower screening or/and control over credit use.

The performance of the financial institutions in Vietnam has been rather impressive since they were established. The repayment rate for loans from formal financial institutions was up to 100% in 2007 (Corpuz 2007) while it was about 90% in this study. Even though the default rate is “only” 10%, this may have a significant effect on the financial institutions, which need to strive for a zero percent default rate. This paper analyses the repayment performance of borrowers in the Mekong Delta of Vietnam. We study the possible effect of (a) the way credit provision is organized (by comparing repayment of individual and group-based lending) and (b) the major occupation of the borrower (by comparing farmers with non-farmers). Data on credit repayment were collected among 325 rural households in the MD in 2009 of which 219 took out credit from governmental banks as formal institutions.

Farmers are often considered to be 'bad’ clients because their activities are more risky than activities in non-farm businesses, hence both the problem of asymmetric information and the risk of production failure is greater. Fernaldo (2008) indicated that returns in agriculture are not only more volatile but also generally lower than those in most rural commercial and non-farm activities. Andrews (2006) suggested that microfinance’s antipathy to agriculture is due to the belief that agriculture is not only highly risky, but also that borrowers lack acceptable and usable collateral in particular when they do not have ownership over the land they use. Raghunathan et al. (2011) suggested that the loans for agriculture have poorer repayment rates because many loans are being provided for small businesses as opposed to agricultural purposes. Hence, increasing the repayment performance in rural credit programs is challenging.

Although repayment performances have been analysed by others (Afolabi 2010, Ugbomeh et al. 2008, Oladeebo and Oladeebo 2008, Oke et al. 2007, Hamza 2007), we attempt to add to the literature by combining both the effects of the loan delivery and the lending to farmer households. Furthermore, a double hurdle approach is used to address selection bias on lending. The first hurdle is taking out a loan, repayment is then the second hurdle. In addition, to check robustness of the results, an instrumental variable probit model is estimated which controls the potential endogeneity of the loan amount taken out.

The rest of the paper is built up as follows. Section 2 provides the background literature on repayment performance while section 3 elaborates on the research methodology used in the paper. The empirical results of the study are given in section 4. Finally, section 5 concludes the paper.

2. Background

Repayment generally takes the form of periodic payments that combine part of the principal sum and interest in each payment. The amount of each instalment is usually calculated as the principal sum and interest due, divided by the number of instalments. Alternatively, a lump sum with interest is repaid at maturity. In group-lending schemes, payments are generally collected in a group meeting with the help of loan officers. The personal and regular collection of instalments by bank staff is one of the key procedures of microfinance that is widely believed to reduce the risk of default in the absence of collateral and to make lending to the poor feasible. On the other hand, personal collection enables the drastic reduction of financial transaction costs and improves the matching of the loan size to the clients' needs and repayment ability (World Bank 2004).

Maturity periods are determined on the basis of how the loan is used and in some instances by the capacity of the borrowers to make repayments. In case of repayment failure, an appropriate penalty or rescheduling of the instalments is proposed by the financial institutions. A punishment interest of 30% or higher may be imposed on borrowers who are unable to pay back their loans within the maturity period (Izumida 2003). In case of unintentional repayment failure caused by natural disasters, fires, contagious disease, changes in state policy or fluctuations of the market price, the losses may be absorbed by the financial institutions' risk reserve fund and the debt will be frozen or rescheduled (Izumida 2003) .

As mentioned in the introduction, financial institutions will try to secure repayment by client selection, monitoring or requesting for collateral or joint liability. Derban et al. (2005) classified the causes of non-repayment into three main categories. First, the inherent characteristics of borrowers and their business that make it unlikely that the loan will be repaid. Second, the characteristics of the lending institution and the suitability of the loan product to the borrowers; and third, the systematic risks from external factors such as the economic, political and business environment that may influence the borrowers' operations and performance. In this study, we focus on the first set of influencing factors, and farmers are considered as a particular group of rural borrowers.

Previous studies have found that the loan repayment performance of farmers is mainly affected by farmers' characteristics such as years of farming experience and their level of education (Afolabi 2010, Oladeebo and Oladeebo 2008, Oke et al. 2007). Moreover, loan repayment is found to be influenced by social relations, responsibilities of the borrowers (Ugbomeh et al. 2008) as well as loan characteristics such as interest rates and the amount of money borrowed (Afolabi 2010, Ugbomeh et al. 2008). Furthermore, the level of livelihood diversification with the relative

importance of non-farm and off-farm income of farm households seems to be important for credit repayment by both poor and non-poor households (Hamza 2007). Brehanu and Fufa (2008) suggested that the loan repayment rate of the households was significantly affected by the agro-ecology, total land holding size, total livestock holding, experience in the use of agricultural extension services, contact with extension agents and income from off-farm activities. Finally, market characteristics, such as price stability of the agricultural commodities produced, are found to influence repayment (Ugbomeh et al. 2008). Generally, the repayment levels of farmers were lower compared to those of non-farmers.

This paper also tries to look at the way credit was obtained. Several studies suggested that repayment rates of group-based credit might be higher than those of individual borrowers, which is mainly explained by the fact that in group-based credit schemes the functions of monitoring, screening, and enforcement of loan repayment are to a large extent transferred from the bank's agent to the group of the credit taker (Ghatak 2000, Laffont and N'Guessan 2000). In group-based systems, borrowers have better information on each other, can monitor each other's investments and activities more easily, and may be able to impose powerful non-pecuniary social sanctions at low cost. Even if the loans are officially obtained individually by each member of the group, the risk of default by one member will be equally shared by the entire group (Ghatak 2000, Laffont and N'Guessan 2000).

A study on the repayment performance in case of individual lending to farmers by Koopahi and Bakhshi (2002) suggested that repayment was influenced by socio-economic characteristics of the borrower (i.e. income level, educational level, years of farming experience), and loan characteristics (i.e. transaction costs, amount of loan obtained, length of repayment period, bank supervision of credit use, the waiting time for loan reception). In addition, levels of physical capital (i.e. the use of machinery), and community characteristics (i.e. prevalence of natural disaster, seasonal and risky activities) were found to be significant (Koopahi and Bakhshi 2002). Finally, also characteristics of the lending institutions seem to affect the levels of repayment (Adams and Mehran 2003).

Al-Azzam et al. (2011) suggest that peer monitoring, group pressure, and social ties are likely to improve repayment performance of group-based credit. In addition, Rai and Sjostrom (2004) show that repayment performance of group-liability contracts depends on the truthful exposure of each group member to the success of the peers' projects. The repayment performance of group lending has been found to be affected by the weekly sales and distance between the members (Karlan 2007, Wydick 1999), cultural similarities and gender differences (Karlan 2007, Armendariz and Morduch 2005, Bhatt and Tang 2002, Kevane and Wydick 2001), the role of

group leaders, peer monitoring and social ties (Hermes et al., 2005), and group size (Madajewicz 2005). With respect to the latter, Impavido (1998) suggested that group size affects both the ability to impose punishments as well as the level of monitoring. Large groups are more difficult to manage than small ones. Yet, conversely, Madajewicz (2005) suggested that a credit institution benefits more from lending to larger groups even if these include a risk of low repayment rates. However, it is also argued that group liability and social collateral by borrowers are not a panacea to secure repayment.

In fact, Chowdhury (2005) has shown that joint liability alone cannot diminish an ex-ante moral hazard problem. Van Tassel (2004) used a household bargaining model to explain that a group member may invest credit in uncertain business projects beyond his or her ability to pay back the loan even though other members are also responsible for repaying the debts. The rationale of the borrower may be that he/she assumes that the other members would be willing to repay the loan in order to secure their future loans.

3. Methodology

3.1 Data

The data used in this paper were collected by the principal author and his colleagues from Can Tho University in three provinces of the Mekong River Delta, namely Can Tho, Soc Trang and Tra Vinh. These provinces were selected because they are considered to be representative for the different levels of rurality in the Delta (i.e. Can Tho having a larger commercial centre, while Soc Trang and Tra Vinh are the most rural). In each province, two districts were visited. In total, 325 respondents were randomly selected among whom 219 were borrowers and 106 non-borrowers who served as a control group. The sample was almost equally large in each province. Among the borrowers, 106 were borrowing individually while 113 were part of a group-based lending scheme. The survey captured individual, social and loan characteristics. The repayment performance was measured as whether or not the borrower succeeded in repaying the total loan amount by the time of loan maturity.

3.2 Repayment models

A number of econometric models have been used to analyze the determinants of repayment. Determinants of repayment performance have been analyzed in multiple regression models by Afolabi (2010) and Oke et al. (2007). In these models, the dependent variable for individual repayment was defined as the percentage of the loan repaid. A dummy variable for repayment performance was used in a study of Vigenina and Kritikos (2004) and used to estimate a probit model. The dummy variable reflected whether or not repayments of monthly instalments were

made according to schedule. Similarly, Kohansal and Mansoori (2009) used a logit model to examine whether farmers were delayed in repaying. Yet, all these studies have not addressed the potential endogeneity of the loan amount on repayment, nor have they accounted for the potential selection bias of borrowing. In this study we adopt two different models to address these problems. A first model is a double hurdle model, with the decision of taking out a loan considered as the first hurdle, while repaying is a second hurdle. In this model, loan amount (first hurdle) is instrumented in the repayment model (second hurdle). Second, an instrumented probit model is estimated. The latter has the advantage that two equations in the models are estimated simultaneously.

In this paper, the dependent variable is a dummy variable with a value of one if the borrower repaid the loan and interest within loan maturity and zero if otherwise. The choice of independent variables included in the model is based on the literature mentioned earlier, namely household characteristics including age, educational level, ethnic group, gender (all of the head of the household), family size, involvement in farming, and location as provincial dummies; loan characteristics comprise the predicted loan size, interest rate, and loan duration. Other studies confirmed that the loan size has an influence on repayment performance (Afolabi 2010, Ugbomeh et al. 2008). Yet, arguably this loan size is endogenous to repayment performance, as borrowers with good repayment performance (perhaps also in the past) may also borrow larger amounts. Hence, an expected loan amount resulting from a tobit model is added to the model together with household, community and program characteristics.

3.2.1 Double hurdle models

The double hurdle models in this paper consist of tobit and probit models. A tobit model is used for censored data (Tobin 1957). The loan size is considered to be censored to the left (zero loan amount for non-borrowers). Taking out a loan (loan amount > 0) is considered as the first hurdle. It is supposed that there is a latent (i.e. unobservable) variable Y_i* which linearly depends on X_i via parameters α_i. The observable variable y_i for borrower i is defined as follows (Barro and Lee 2005):

$$y_i^* = \alpha_i X_i + u_i \qquad (7.1)$$

The model errors u_i are assumed to be independent and normally distributed. The estimated loan amount is saved and introduced as an independent variable in the probit model of loan repayment, which is the second hurdle studied.

A probit model is used to analyze the repayment performance of the borrowers. A household's decision to repay the loan is assumed to be influenced by household, location, loan and economic characteristics. The probit model is defined as (Greene 2000):

$$Z_i^* = \beta_i L_i + \omega \hat{y_i} + v_i \qquad (7.2)$$

If Z_i* is a dummy that a household repays the loan, equation (7.2) measures the probability that household i has repaid the loan to the formal financial institution within loan maturity; L_i is a vector of exogenous household, location and loan variables that have an influence on Z_i*; $\hat{y_i}$ is the expected loan size calculated in the equation (1); β_i and ω are the corresponding parameters of L_i and $\hat{y_i}$; The variable Z_i* is not observed, but we observe if the household has repaid the instalments within maturity or not, whereby Z_i=1 if Z_i*>0 and Z_i=0 if Z_i*≤0.

3.2.2 Instrumental variable probit (IVP)

Following Newey (1987), IVP is a maximum-likelihood estimation alternative that fits models with dichotomous dependent variables and endogenous explanatory variables. Consider a linear statistical model in which the continuous dependent variable will be called Z^*_{1t} but it is not directly observed. Escalante et al. (2009) defines the model as follows:

$$Z^*_{1i} = \alpha_i Z_{2i} + \beta_i W_i + u_t \quad (7.3)$$

$$Z^*_{2i} = \varphi_1 W_i + \varphi_2 V_i + v_i \quad (7.4)$$

where i=1,2,3…n; Z_{1i}^* is a dichotomous dependent variable; Z_{2i}^* is a vector of endogenous variables; W_i is a vector of exogenous variables; V_i is the vector of instruments that satisfy conditions of instrumental erogeneity and relevance; α_i and β_i are vectors of structural parameters; and φ_1 and φ_2 are matrices of reduced form parameters. The Z^*_{2i} equation is written in reduced form and both equations are estimated simultaneously using maximum-likelihood alternatives. As a discrete choice model, Z^*_{1i} is not observed because the model instead fits Z_{1i} for Z^*_{1i}> 0 and Z_{1i}=0 for Z^*_{1i}< 0.

In this analysis, adapted from Escalante et al. (2009), the IVP model is formulated under the assumption that loan repayment decisions may be made at the same time when the loan size is obtained. Thus the expected loan size variable is included in the estimating equation as an instrumented variable. Specifically, the model is estimated as follows:

$$Z^*_{1i} = \alpha_0 + \alpha \ln(loansize_i) + \beta W_i + u_t \quad (7.5)$$

$$\ln(loansize_i) = \varphi_1 W_i + \varphi_2 V_i + v_i \quad (7.6)$$

where Z^*_{1i} is the same binary dependent variable as in equation (7.5); ln(loansize$_i$) the instrumental variable (Z^*_{2i}) in this model, is the log transformation of the loan amount variable; W_i is the set of variables comprising household, location, and loan characteristics as introduced above; V_i is the set of variables related to socio-economic characteristics of households.

In particular, the variables of community involvement and total land size have been considered as instrumental variables of the IVP model since they are likely to have an effect on the loan amount obtained by the households but not on the loan repayment performance. Land is a collateral for

credit and community involvement may increase access to information on access and facilitate membership of group schemes.

4. Results

4.1 Farming systems in the Mekong Delta (MD)

In the Mekong Delta, farming systems can be found with varying combinations of crops, livestock and fish production and degrees of market integration (Yasunobu et al. 2000, Sanh et al. 1998). Rice, fish and crustaceans constitute a significant part of the diet of households in the MD of Vietnam (Berg 2002). An integration of aquaculture and agriculture has become a very common farming system in the Delta (Prein 2002, Luu 1992). Such systems are promoted to improve the nutritional standards and incomes of smallholder households and to reduce the dependency on rice monoculture (Luu et al. 2002). Apart from the intensification of rice production (Berg 2002), commercial crops such as cash crops and fruit trees, livestock and fish have been integrated in the farming systems (Tanaka 1995). As a result, the MD contributes about 18 percent to the gross domestic product, 90 percent of the rice exports and nearly 70 percent of the aquaculture exports (GSO 2007).

In the rural MD, farmers can borrow from the Vietnam Bank of Agriculture and Rural Development (VBARD) and the Vietnam Bank Social Policy (VBSP). These are both government-run institutions and deliver short-term loan contracts (with a loan duration of less than one year). Loans are repaid in quarterly or semi-annual instalments or alternatively, the principal sum is repaid at the end of the loan contract. But it is difficult for households to pay a large amount of money at once at the end of the loan contract. Debt rescheduling is not uncommon, but a higher interest rate will apply. Repayments of VBSP credit are made monthly or quarterly, depending on negotiations between the bank and borrowers either at the group meeting or at VBSP offices. VBARD credit repayment can also be made as a lump sum or through regular instalments (World Bank 2003) and will be done at the VBARD offices or branches.

The collateral required by these formal lenders is usually physical collateral in the form of land and valuable assets certificates. However, the lenders often face enormous difficulties in imposing pledges and mortgages (Riedel and Phuc 2001). Although land use certificates have been issued and the land is given as collateral for the loans, the banks are not usually permitted to seize land from defaulting borrowers. Only a few cases are known where land has been liquidated in the event of a borrower's failure to repay the loan (Duong and Izumida 2002). In particular, VBARD still requests land ownership certificates as collateral but it essentially counts on the emotional pressure on the borrowers associated with the possibility of losing land. Hence,

it is widely accepted that rescheduling of the loan is the only possibility for the lenders to reduce default risk because the liquidation of collateral is almost impossible in practice. As a result, loans by VBARD and VBSP are very often rescheduled (Izumida and Duong 2001). Besides, VBSP has group lending schemes with joint liability contracts.

4.2 Descriptive statistics related to the lending process

As mentioned above, households have mixed income portfolios. Households are considered to be “farmers” when their income obtained from farming activities accounts for at least 60 percent of their total income. Tables 1 and 2 compare the characteristics of farmer and non-famers in the survey. As expected, farmers have on average more land than non-farmers. Heads of farming households were relatively older than those of non-farmer households. Head of non-farmer households had on average a lower educational level. Yet, farmers and non-farmers are still similar in educational level. Halve of the respondents were from Vietnamese ethnicity. It is furthermore hypothesized that if the household head has any social and/or political position in the village, he or she has a high probability of receiving formal credit; only 19 and 15 percent of the farmer and non-farmer households respectively were involved in village work. Total land owned is an important determinant of access to credit (Zeller et al. 2001, Okurut 2006, Vu 2001). Apart from its role as collateral, it is hypothesized that households with more land are more likely to have an interest to expand production and they have a higher probability of borrowing.

Important determinants for taking out the loan and repayment performance are the indicators of the economic situation of the households. The factors considered in our study are total land, yearly income, and yearly expenditure. Farmers and non-farmers did not differ much in these aspects. Regarding loan characteristics, the interest rates charged are relatively higher for the farmers than for the non-farmers, but fewer farmers reported having received training than non-farmers. Also transaction costs are considered. These include all costs incurred to open a credit account, including document and application fees.

Table 1: Household determinants compared between farmers and non-farmers

	Pooled	Farmer	Non-farmer	t-stat
n	325	207	118	
Age of household (years)	45.90 (0.63)	45.88 (0.79)	45.95 (1.04)	0.05
Educational level (years)	9.51 (0.19)	9.65 (0.24)	9.26 (0.34)	-0.97
Family size (persons)	4.91 (0.09)	4.89 (0.11)	4.97 (0.15)	0.45
Dependency ratio (%)	0.29 (0.02)	0.27 (0.02)	0.31 (0.02)	1.38
Distance to the banks (m)	932 (33.83)	935 (42.40)	928 (56.35)	-0.09
Total land (1,000 m2)	11.04 (0.63)	14.03 (0.86)	5.79 (0.58)	-6.79***
Yearly expenses (1,000 dongs)	67,022 (3,352)	67,797 (2,985)	65,663 (7,626)	-0.31
Yearly income (1,000 dongs)	82,911 (4,405)	80,841 (4,043)	86,541 (9,867)	0.62
Estimated value of total assets (1,000 dongs)	475,869 (32,118)	569,668 (44,401)	311,325 (37,622)	-3.95***
Estimated value of building value (1,000 dongs)	45,939 (4,625)	42,200 (4,318)	52,555 (10,285)	1.08
Loan size (1,000 dongs)	14,382 (860)	13,981 (856)	15,068 (1,822)	0.61
Interest rates (%/year)	10.82 (0.19)	11.07 (0.25)	10.38 (0.28)	-1.75***
Loan duration (months)	19.88 (0.98)	19.00 (1.12)	21.37 (1.83)	1.17
Transaction costs (1,000 dongs)	84.54 (6.98)	91.79 (10.69)	72.39 (5.11)	-1.34

Notes: Standard deviation in parentheses
*: Significant at 10%; **: Significant at 5%; ***: Significant at 1%.

Table 2: Household determinants for farmer or non-farmer status (percentage)

	Pooled	Farmer	Non-farmer	Chi²
n	325	207	118	
Gender (male)	63.08	66.20	57.63	2.36*
Married (yes)	95.08	94.69	95.76	0.18
Vietnamese ethnicity (yes)	52.70	52.17	50.90	0.05
At least one religion (yes)	64.00	64.70	62.70	0.14
Village work (yes)	17.90	19.30	15.30	0.85
Red certificate (yes)	90.15	95.20	81.40	16.15***
Training information (yes)	26.50	21.30	35.60	7.94***
Can Tho (yes)	33.23	35.27	29.70	1.06
Soc Trang (yes)	33.54	34.30	32.20	0.15
Tra Vinh (yes)	33.23	30.43	38.14	2.00**

Notes: *: Significant at 10%; **: Significant at 5%; ***: Significant at 1%.

Tables 3 and 4 compare the borrower characteristics of individual and group-based borrowers. The average loan size taken out by individual borrowers is higher than that of group-based borrowers. Individual loans are taken out at a higher interest rate and with higher transaction costs. The repayment period for group loans is longer than that for individual loans.

Table 3: Household determinants compared for individual and group-based borrowers

	Pooled	**Individual borrowers**	**Group-based borrowers**	**t-stat**
n	**219**	**106**	**113**	
Age of household (years)	46.60 (0.75)	47.64 (1.14)	45.61 (0.98)	-1.35
Educational level (years)	9.34 (0.23)	10.04 (0.33)	8.70 (0.29)	-3.04***
Family size (persons)	4.90 (0.11)	4.90 (0.14)	4.89 (0.15)	-0.04
Dependency ratio (%)	0.29 (0.01)	0.27 (0.02)	0.31 (0.02)	1.63
Distance to the banks (m)	699 (31.53)	833 (36.29)	577 (47.71)	-4.22***
Total land (1,000 m2)	10.72 (0.69)	15.48 (1.00)	6.37 (0.77)	-7.28***
Yearly expenses (1,000 dongs)	66,837 (3,875)	76,320 (4,811)	58,194 (5,873)	-2.36
Yearly income (1,000 dongs)	85,798 (5,051)	101,034 (7,188)	71,911 (6,864)	-2.93
Estimated value of total assets (1,000 dongs)	478,149 (40,684)	615,141 (49,270)	353,280 (61,372)	-3.29***
Estimated value of building (1,000 dongs)	41,976 (4,174)	50,752 (5,932)	33,977 (5,790)	-2.02***
Loan size (1,000 dongs)	14,356 (864)	18,970 (1,564)	10,150 (614)	-5.42***
Interest rates (%/year)	10.82 (0.19)	12.02 (0.29)	9.73 (0.21)	-6.57***
Loan duration (months)	19.91 (0.98)	16.17 (1.07)	23.33 (1.55)	3.73***
Transaction costs (1,000 dongs)	84.50 (7.02)	106.98 (13.47)	64.42 (4.50)	-3.09***

Notes: Standard deviation in parentheses
*: Significant at 10%; **: Significant at 5%; ***: Significant at 1%.

Table 4: Household determinants compared by type of households – continued (percentage)

	Average	Farmer	Non-farmer	Chi²
N	**325**	**207**	**118**	
Gender (male)	61.11	70.87	52.21	7.90***
Married (yes)	97.69	96.12	99.12	2.14**
Vietnamese ethnicity (yes)	47.22	42.72	51.33	1.60
At least one religion (yes)	65.28	68.93	61.95	1.15
Village work (yes)	18.06	16.50	19.47	0.32
Red certificate (yes)	89.81	98.06	82.30	14.62***
Training information (yes)	39.81	12.62	64.60	60.76***
Can Tho (yes)	31.02	27.18	34.51	1.35
Soc Trang (yes)	33.33	35.92	30.97	0.59
Tra Vinh (yes)	33.65	36.89	34.51	0.13

Notes: *: Significant at 10%; **: Significant at 5%; ***: Significant at 1%.

4.3 Credit repayment performance

Table 5 presents the repayment performance by type of households and borrowers in the study. The results show that the repayment performance of farmers is better than that of non-farmers as 95 percent of the loans taken out by farmers were repaid on time compared to 79 percent for non-farmers. The findings also show that individual borrowers have a relatively better repayment performance than group-based borrowers. Yet, this difference is not statistically significant.

Table 5: Repayment performance by household activity and type of borrowing contract (n)

	By household activity			By type of borrowing contract		
	Farmers	Non-farmers	Chi^2 Test	Individual	Group	Chi^2 Test
Repaid in time	130 (94.9%)	62 (78.5%)	13.66***	94 (91.3%)	98 (86.7%)	1.22
Not repaid in time	7 (5.1%)	17 (21.5%)		9 (8.7%)	15 (13.3%)	

Notes: *: Significant at 10%; **: Significant at 5%; ***: Significant at 1%.

The repayment performance is expected to be influenced by a set of household, location and credit program variables. The loan amount obtained by households is modelled by a tobit model and the repayment performance is estimated in the probit and IVP models. The results of the tobit models in table 6 show that the loan size is influenced by household characteristics (i.e. average age of household head, Vietnamese ethnicity, marital status of household head, and being a farmer), asset endowment (total land, building value), social capital (involvement in village work) and location of the household (Soctrang province versus Can Tho and Tra Vinh province).

Table 6: Determinants of loan amount obtained by Tobit model estimates

	(1)	(2)	(3)
Age (years)	183.3***	317.4**	126.9
	(2.04)	(1.96)	(1.46)
Gender (male=1)	448.2	-365.5	-1879.8
	(0.21)	(-0.09)	(-1.01)
Educational level (years)	253.8	658.1	-325.9
	(0.83)	(1.16)	(-1.20)
Married (yes=1)	11,860.2***	10,432.3	17,644.1***
	(2.38)	(1.26)	(3.11)
Vietnamese ethnicity (yes=1)	-3,464.6	-12,010.3*	-628.2
	(-1.26)	(-2.25)	(-0.26)
Family size (persons)	-889.7	-1,379.6	-532.7
	(-1.45)	(-1.15)	(-1.01)
Dependency ratio (ratio)	-1,647.9	-2,151.9	157.8
	(-0.36)	(-0.25)	(0.04)
Community involvement (yes=1)	2,432.1	-1,815.5	7,202.2***
	(0.95)	(-0.36)	(3.25)
Farmers (yes=1)	-2,702.7	311.7	-2,439.3
	(-1.28)	(0.07)	(-1.35)
Total land (1000 m2)	105.0	270.4	-169.3*
	(1.03)	(1.44)	(-1.75)
Land use certificate (yes=1)	-1,515.7	9,041.5	-2,104.5
	(-0.43)	(0.94)	(-0.81)
Building value (1000 dongs)	1,875.1***	4,352.7*	1,54.8
	(2.12)	(2.40)	(0.21)
Soc Trang (yes=1)	-5,628.9	-15,497.9*	1,533.6
	(-1.62)	(-2.33)	(0.50)
Tra Vinh (yes=1)	-2,713.1	-6,676.3	-3,44.5
	(-0.94)	(-1.16)	(-0.14)
Constants	-24,069.3***	-66,335.8**	-13,194.2
	(-2.19)	(-2.97)	(-1.28)
Sigma constants	15,714.9***	22,502.3***	10,741.2***
	(19.59)	(13.22)	(13.52)
n	325	212	221
LR chi2	26.60	26.67	36.51
Prob.	0.0217	0.0212	0.0009
Pseudo R2	0.0053	0.0103	0.0140
Log likelihood	-2,515.997	-1,282.107	-1,289.412

Notes: (1) Pooled samples; (2) Individual borrowers; (3): Group-based borrowers.
t statistics in parentheses
*: Significant at 10%; **: Significant at 5%; ***: Significant at 1%.

Table 7 estimates the coefficients of the determinants of repayment performance by type of borrowers as calculated by a probit model (double hurdle model) and an instrumental variable probit model. In general, the probability that borrowers repay their loans on time is significantly

affected by the educational level of the borrowers, gender, farmer borrowers, and expected loan amount obtained by the households. While educational level, expected loan size for individual borrowers and farmer borrowers have positive effects on the probability to repay on time, being male borrowers and expected loan size from group borrowers negatively influence the expected repayment performance.

Table 7: Determinants of repayment estimated by probit and instrumental variable probit models

	Probit (double hurdle models)			Instrumental variableprobit		
Repayment	(1)	(2)	(3)	(1)	(2)	(3)
Expected loan size (1000 dongs)	-0.0176	2.871***	-0.0002**	-0.387	1.6690***	-0.7540*
	(-0.50)	(2.76)	(-1.77)	(-0.80)	(10.75)	(-1.65)
Age (years)	0.0186	0.0106	0.0512	0.0146	0.0079	0.0155
	(1.17)	(0.51)	(1.59)	(1.14)	(0.69)	(0.78)
Gender (male=1)	-0.0337	-0.925*	0.103	-0.0459	-0.4210	0.3630
	(-0.12)	(-1.65)	(0.21)	(-0.17)	(-1.39)	(0.97)
Vietnamese ethnicity (yes=1)	0.2000	-0.698	-0.722	0.376	-0.4060	-0.0450
	(0.69)	(-1.08)	(-1.38)	(1.31)	(-1.20)	(-0.11)
Educational level (years)	0.1080***	0.0641	0.167*	0.0957*	0.0219	0.0960
	(2.26)	(1.01)	(1.71)	(2.34)	(0.54)	(1.31)
Family size (persons)	0.0171	0.107	0.199	0.0048	0.0769	0.144
	(0.20)	(0.72)	(1.22)	(0.06)	(0.89)	(1.20)
Distance to market centre (m)	-0.0002	-0.0001	-0.0001	-0.0001	-0.0006	-0.0002
	(-0.62)	(-0.09)	(-0.16)	(-0.32)	(-1.62)	(-0.56)
Farmers (yes=1)	1.088***	1.691***	1.290**	0.992***	0.5810*	1.2870***
	(3.56)	(2.84)	(1.97)	(2.90)	(1.67)	(2.31)
Interest rate (%)	-0.0011	-0.0688	0.0908	-0.0118	-0.0352	0.0916
	(-0.02)	(-0.93)	(0.75)	(-0.25)	(-0.81)	(1.03)
Loan duration (months)	-0.0016	0.0011	-0.0166	0.0013	-0.0103	-0.0103
	(-0.16)	(0.04)	(-1.12)	(0.14)	(-0.76)	(-0.95)
Being trained (yes=1)	0.380	0.636	0.110	-0.1330	-0.1760	0.0133
	(1.18)	(1.17)	(0.27)	(-0.28)	(-0.60)	(0.04)
Group borrowers (yes=1)	0.143	.	.	0.3980	.	.
	(0.39)	.	.	(1.31)	.	.
Soc Trang (yes=1)	0.0962	0.3690	0.3830	0.2080	0.0989	0.5800
	(0.30)	(0.77)	(0.62)	(0.66)	(0.32)	(1.21)
Constants	-1.285	-27.26***	-3.3000	2.5390	-15.35***	4.402
	(-1.12)	(-2.75)	(-1.59)	(0.54)	(-8.51)	(1.06)
Rho				0.4225*	-0.9641	0.7696***
				(1.69)	(-2.63)	(3.12)
Sigma				0.5468***	0.5794***	0.3862***
				(-12.60)	(-7.68)	(-14.21)
n	219	106	113	219	106	113
LR chi2/Wald chi2	28.08	22.69	30.10	30.16	20.40	16.55
Prob>chi2	0.0088	0.0305	0.0027	0.0045	0.0000	0.0672
Log likelihood	-67.739	-26.092	-29.196	-2396.119	-1169.783	-1144.591
Pseudo R2	0.1717	0.3030	0.3402	-	-	-

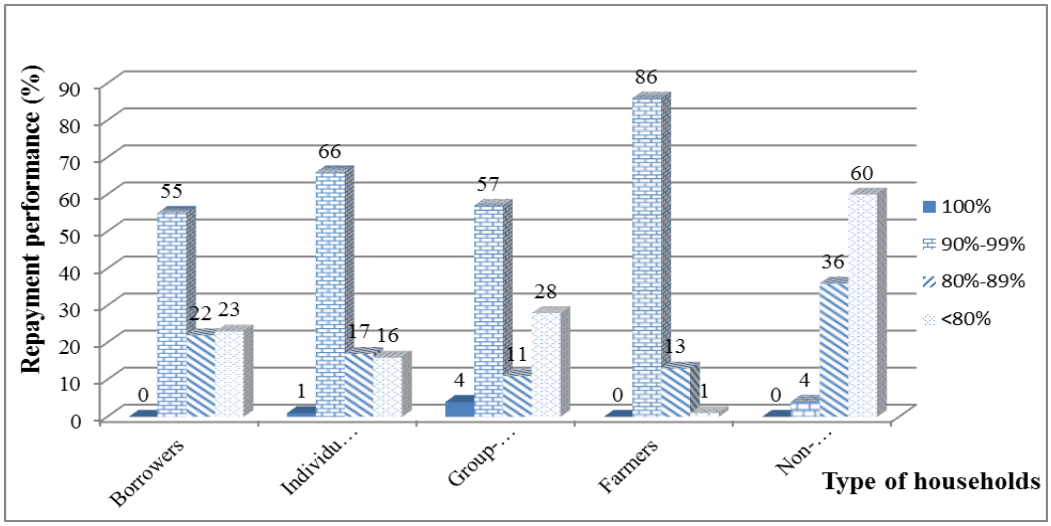
Notes: (1) Pooled samples; (2) Individual borrowers; (3): Group-based borrowers.
t statistics in parentheses
*: Significant at 10%; **: Significant at 5%; ***: Significant at 1%.

The contract (individual or group-based) for the loan taken out seems to influence repayment performance. The probability of timely repayment of individual loans is higher with larger loans and for female borrowers who are involved in farming. The probability of timely repayment of group-based loans is higher for better-educated household heads who are involved in farming and lower for borrowers with large loans. Table 8 and Figure 1 confirm that the estimated probabilities of timely repayment are highest for farmer borrowers as compared to non-farmers, and for individual borrowers as compared to non-borrowers. The model is more pessimistic than the real repayment performance as the estimated probabilities are rather low.

Table 8: Expected repayment as calculated by the probit models

Repayment	Borrowers		Individual borrowers		Group borrowers		Farmers		Non-farmers	
	n	%	n	%	n	%	n	%	n	%
100%	0	0	1	1	5	4	0	0	0	0
90%-99%	121	55	70	66	64	57	118	86	3	4
80%-89%	48	22	18	17	12	11	18	13	30	36
<80%	50	23	17	16	32	28	1	1	49	60
Total	219	100	106	100	113	100	137	100	82	100

Figure 1: Expected repayment by households activities and borrowing contracts



In short, the findings suggest that the household characteristics (educational level of the borrowers, female borrowers, and farmer borrowers), and loan characteristics (expected loan size) are significant factors affecting repayment performance. It has been suggested that borrowers with higher educational levels may either increase the capacity to use and repay the loan in time, or increase the probability to know each other in group-lending schemes, which

results in better screening, monitoring and enforcement within the group. This concurs with the results of Eze and Ibekwe (2007) and Bhatt and Tang (2002).

Second, the results confirm that women are “better” in repaying loans than men, as is also shown in Roslan and Mohd Zaini (2009) and Sharma and Zeller (1997). Women are generally considered to be better borrowers because they are less likely to spend the loans on non-productive expenditure (e.g. cigarettes or alcohol), they tend to be less mobile (e.g. risk to disappear with the money) and they are more likely to spend the money on the well-being of the households (e.g. food and education). Lending to women may open more opportunities for them to handle the household’s income-generating activities and lead to their economic empowerment. Farmers seem to have taken out relatively smaller loans, with a short duration and high interest rates. This would typically involve loans used to buy input such as seed, fertilizers, and pesticides; hence small investments of relatively low risk. Furthermore, for farmers but also for other households, good repayment performance is a guarantee to receive future loans (Desai and Mellor 1993).

Finally, loan size seems to affect repayment performance. Smaller loans are more likely to be repaid in time in group-based schemes. While larger loans are repaid in time by individual borrowers. This may be explained by the difference in the social-economic position of the borrowers in the different schemes. Group-based borrowers are poorer in line with the targeting of lending institutions. The repayment of small loans seems for them more easy than repaying large loans. Individual borrowers are relatively better endowed and have higher income levels. We assume that the larger loans are used for more expensive projects and that increases their probability to take out credit in the future.

5. Conclusions and policy implications

This paper studies the repayment performance among borrowers in the MD of Vietnam. The results from double hurdle and instrumental variable probit models are that farmer borrowers are performing better. Particularly, household characteristics (educational level of the borrowers and farmer borrowers), and loan characteristics (expected loan amount) significantly affect repayment performance. These findings confirm findings by Roslan and Mohd Zaini (2009), Eze and Ibekwe (2007), Bhatt and Tang (2002), Koopahi and Bakhshi (2002), and Sharma and Zeller (1997).

The likelihood of repayment by individual borrowers seems to be higher for farmer households, for borrowers that have taken out larger loans, and female borrowers. The likelihood of repayment by group-based borrowers is higher for better-educated borrowers, farmer households, and a small expected loan amount.

To enhance repayment performance, it is significant for formal financial institutions to screen and select potential borrowers who have a high probability to repay. Firstly, as shown in our analysis, the educational level does illustrate a positive effect indicating that human capital is more important in shaping the success of formal financial institutions in the MD. Therefore, a continued investment in official education, training and business management should be encouraged. Such training could be a joint initiative between the financial institutions and the local government. As is clear from the survey, public services, namely public health care, education, and other social activities in the Mekong Delta, have been underdeveloped due to resource limitations in which financial support could play a significant role.

Secondly, in our analysis, loan characteristics play a role in repayment performance and larger loan levels tend to increase the repayment performance of individual borrowers and to decrease the repayment performance of group borrowers. Such findings provide the financial institutions with a good guideline for loan size determination for potential borrowers.

Thirdly, farmers and female borrowers seem not to be bad "clients" as claimed by some authors. In addition, some of the financial institutions require various documents of procedures and training before making a loan available to borrowers that may constrain the lending process. To increase outreach and sustainable objectives, in addition to reducing the lending procedures, the financial institutions could design effective and efficient credit programs for farming activities (farmers) taking into account the particularities of farming such as the duration of the loans. Finally, this paper has mainly focused on how borrower characteristics influence repayment performance. We have assumed that the procedures for loan recovery are similar for the lenders studied. However, a more detailed analysis would be needed to formulate more definitive conclusions.

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