Determinants Of Household Access To Formal Credit In The Rural Areas Of The Mekong Delta, Vietnam

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Abstract

This paper investigates the factors affecting the access of rural individual and group-based households to formal credit in the Mekong Delta (MD), Vietnam. Poverty levels in the Mekong Delta have declined significantly over the last decades, but in the rural areas they remain significant. If it is assumed that access to credit is a suitable vehicle for poverty alleviation, it is necessary to assess the way households decide on borrowing. This paper identifies the determinants of the decision to borrow and of the amount that is borrowed by using the double hurdle model and the Heckman selection model. Data used in this paper were obtained from a survey of 325 rural households, conducted between May and October 2009. The results indicate that household capital endowments, marital status, family size, distance to the market centre, and location affect both the probability and the amount of asking for credit.

Key-words: Formal credit, Double hurdle model, individual and group-based lending, rural households.

JEL: E5, G2, O2

1. Introduction

Vietnam has been transforming from a centrally–planned to a market–oriented economy since the *Doi Moi* (innovation) policy which was initiated in the late 1980s. The result of the policy has been a steady annual economic growth of 4.6 percent in the 1980s, 7.6 percent in the 1990s and 7 percent in 2008. This economic success may be considered as a good achievement in the light of surging inflation and global economic downturn. Yet, poverty levels remain relatively high in rural areas, with the inequality in development between rural and urban areas still being large. Moreover, the gap between rural and urban incomes is even increasing. Rural economies in Vietnam therefore deserve more attention and support if rural poverty is to be contained (Heltberg, 2003; Fritzen and Brassard, 2005).

The economic success in Vietnam can be partly attributed to the development of the financial system (Quach et al., 2003). In rural development programs, the government uses credit programs in an attempt to provide the rural poor with access to cheap credit in order to increase productivity and output in farm and rural non-farm sectors. Access to credit is considered to be an important tool for smoothly increasing consumption and promoting production, especially for poor households as confirmed in (Zeller et al., 1997; Robinson, 2001; Armendariz and Morduch, 2005; Conning and Udry, 2005; Swain et al., 2008). Armendariz and Morduch (2005), among others, argue that microfinance makes households wealthier, through an income effect that improves total consumption levels; and it also seems to have a positive impact on the demand for children's health care and education, as well as leisure.

Like other developing countries, the rural financial system in Vietnam as well as Mekong Delta includes a formal, semi-formal and an informal sector. The formal credit sector has followed the traditional approach (Ha, 2001) and it is estimated that it accounted for only one-third of credit demand in the 1990s (Cao, 1997). The importance of the formal sector has been increasing in recent years. Schipper (2002) reported that it was about 45%, using data from VLSS 2002. As a result, the share of credit supply of the informal sector has been decreasing from 73% in 1993 to 51% in 1998 (Nguyen, 2001).

Arguably, the success of credit provision for poverty reduction by governmental banks depends on the possible access by poor households to these institutions. This level of access depends on the relationship of the demand and supply for rural credit. The former depends on households' decisions on whether they want to borrow and how large the loans are, while the latter is an outcome of the credit rationing policy of the financial institutions. Obviously, households need credit when they lack financial assets for consumption and production, and this lack will depend on the household's characteristics and the intended use of that credit.

Several studies have investigated the determinants of households' demand for credit from different institutions using multinomial discrete choice models (Akoten et al., 2006; Pham and Lensink, 2007; Barslund and Tarp, 2008). In Pham and Lensink (2007), the model confirms that the supply of credit from formal, semi-formal and informal sources in Vietnam depends on the possible profits that can be made from the use of the loans. They add that credit supply may also increase if borrowers provide collateral, a guarantor and/or if credit is for business-related activities. In the case of Indonesia, Takahashi et al. (2010) found that access to credit is significantly affected by the relatively wealthier households but not by available collateral. The relation between gender and access to microcredit is discussed by Rahman et al. (2009).

In this article we build on the analysis of Pham and Lensink (2007) with a focus on microfinance programs from governmental banks. We analyse how household characteristics affect the uptake and amount of credit. Getting a better insight into the reasons for the gap between demand and supply of rural credit at household level is indispensable for evaluating the current outreach of the microfinance institutions and for improving credit accessibility in Vietnamese rural areas. Reportedly, very few empirical studies have so far dealt with the determinants of a household access to credit in the MD region (Putzeys, 2002; Ninh, 2003).

Our analysis focuses on the provision of microcredit by governmental banks. It is assumed that the availability of small loans without collateral requirement greatly increases the households' probability to borrow (Tsukada et al., 2010). It is important to note that our analysis is based on the borrower's characteristics. We acknowledge the importance of the lender and their need for credit rationing and careful client selection. Yet, arguably, it is the household that needs to file a request for credit to the lending institution, and the decision to do so determines the access to credit and ultimately also the amount borrowed.

This study is based on household data that were collected among a group of borrowers and non-borrowers in three provinces in the MD region in 2009 as shown in figure 1. A distinct contribution of this paper to the literature on microfinance in Vietnam is the comparison of two systems, individual and group-based lending. A double hurdle model and a Heckman selection model are used to calculate the probability of households to borrow and the loan amount taken out. Before discussing the methodology, a background on rural credit in Vietnam and its development is provided in the next section.

2. Research background

The Vietnamese rural financial system is composed of formal, semi-formal and informal credit providers. The formal institutions includes the Vietnam Bank for Agriculture and Rural Development (VBARD), the Vietnam Bank for Social Policy (VBSP), and the People Credit Funds (PCF) (WB, 2002). They are generally well-developed in the rural areas and there is little competition amongst these formal institutions. However, the formal institutions seem unable to respond adequately to all rural households' demand for credit; and the credit demand is also met by the semi-formal and informal sectors. Semi-formal credit is provided by the national and international programs targeting a selective range of borrowers and conforming to certain development targets (Pham and Lensink, 2007). The informal sector consists of private moneylenders, revolving credit associations (RCA), relatives, friends and other individuals. Duong and Izumida (2002), using data from a small household survey undertaken in 1995, found that the informal sector accounted for 17 percent of all loans. As in other developing countries, RCAs are common in Vietnam, where they are called *hui*. These RCAs are groups of people with pre-established social ties who pool a small sum of their savings periodically so that each can in turn receive one large sum.

Chart 1 shows the operational procedures of formal credit in Vietnam, such as applied by the VBARD bank. Most borrowers are individuals or private companies. As most of them do not

have accounting records, it is very difficult for them to communicate with the banks and also difficult for the banks to acquire information on them. These banks are mostly based in the large cities or provincial towns. They are therefore operating at a fair distance from the potential borrowers located in rural areas. One way for the banks to mitigate information problems is to ask for collateral, i.e. land use rights and other valuable assets.

>>>>> insert chart 1 about here

In programs oriented towards poor and vulnerable households, the Vietnamese Government has included credit provision through microfinance institutions (MFIs) in their anti-poverty programs for the rural areas (Commins et al., 2001). Some of the programs target women who are found to be more credit-constrained than men. These are programs focusing on female clients who often join in groups, providing small loans for them to invest in income-generating activities (Armendariz and Morduch, 2005). The expected outcome is that rural female entrepreneurs can cope more easily with emergencies such as unfavourable natural events or be protected from further impoverishment during economic stress (Rutherford, 2002). Women are also considered to be more reliable clients and to invest more in education and health care of their families (Armendariz and Morduch, 2005). The operation of the MFIs is shown in chart 2.

>>>>> insert chart 2 about here

In the case of informal lenders, the credit procedures are very simple and mainly based on personal relationships between lenders and borrowers. In fact, if an individual household facing an urgent problem would like to borrow from the moneylenders, he/she needs to just ask the lenders. The terms of the loan will depend on their relationship. If the borrower is well-known and has a good relation to the lender, the probability of borrowing and the size of

the loan will be bigger. The credit procedure in this case is very short. Darling (2005) wrote for the informal lender that: "*He is always accessible, even at night; dispenses with troublesome formalities, asks no inconvenient questions, advances promptly, and if interest is paid, does not press for repayment of principal. He keeps in close personal touch with his clients, and in many villages shares their occasions of weal or woe. With his intimate knowledge of those around him he is able, without serious risk, to finance those who would otherwise get no loan at all.*"

In the MD, there are mainly two types of lenders, namely formal (VBARD and VBSP) and informal lenders (private, friends, and relatives). The main differences between VBARD and VBSP versus informal lenders are summarized in table 1. The private banks are not operating in the study areas. The traditional approach to lending is compared to informal lending in table 2 with regards to the characteristics and behaviour of the lenders.

>>>>> insert table 1&2 about here

Although they are part of government programs, the formal institutions seem unable to respond adequately to the demand for credit by the households. First, not all households who would like or need to take out credit, are accepted as clients because they fail to provide a proof of sufficient collateral. Secondly, the terms of the loans may not be appropriate. Especially the limited length of the loan may be restrictive to farmers who need the loan for an investment early in the planting season while they can only repay at harvest time, which is too late for the bank. Thirdly, the administrative procedures could be a serious burden to the rural household. Potential borrowers need to hand in application forms, production plans, and guarantee evidence. And they get repayment plans and claims in return. These procedures may be too important a burden for little-educated rural households.

Individual and household characteristics such as age, gender, household size, education level, race and the household's wealth status (expenditure per capita) have been found to significantly affect a household's access to (formal) credit (Mohamed, 2003; Okurut, 2006). In addition, the composition of household assets is found to be much more important than the total value of household assets or landholding size as a determinant of household access to formal credit. Okurut (2006) finds that higher shares of land and livestock in the total value of household assets are positively correlated with access to formal credit. Okurut (2006) also shows that access to semi-formal credit in South Africa is positively and significantly affected by household size, per capita expenditure, provincial location and being coloured, while the negative and significant factors include being male, rural location, being poor and White.

Studies in Vietnam show that social characteristics of the household, level of household expenditure and asset levels have a significant effect on the probability of borrowing by rural households and on the size of the loan provided to them (Ha, 1999; Ha, 2001). The probability of borrowing increases with education and social responsibility of the household heads. Age negatively influences the probability of borrowing, but it has a positive effect on loan size. Household size has a negative effect on the probability to borrow as well as on the amount borrowed (Ha, 1999).

In this paper we test whether several of these characteristics are also important for credit uptake and loan amount in the Mekong Delta in Vietnam by using the Heckman selection and double hurdle approaches. Our results should facilitate the identification and targeting of potential borrowers which could contribute to credit deepening and widening and as such could close the gap between credit demand and supply. Financial organizations need to know who they can reach in order to broaden their clientele base; and on the other hand, it is

important to know how much money people borrow and by what this is determined in order to address the demand for credit in a better way.

3. Methodology

3.1 Sampling, research area and data collection

The data used in this paper were obtained by interviewing households in three provinces in the Mekong Delta namely: Can Tho, Soc Trang, and Tra Vinh. These provinces were chosen because their distinct socio-economic characteristics are representative for the Mekong Delta provinces. Can Tho city is the most important economic, cultural, scientific and technological centre of the Mekong Delta. Since we are particularly interested in rural credit, data were also collected from the more rural district of Thoi Lai, which has recently been divided into two new districts namely Thoi Lai and Co Do. These districts have traditionally supplied agricultural products and services to the urban areas of Can Tho. It hosts the headquarters of an agricultural research institute that supports rice production in the region. The second province, Soc Trang, is characterized by a greater ethnic diversity than Can Tho. Its economy is based on agriculture and the area is more prone to flooding. The district of Thanh Tri was chosen for this study because it has been found to be representative for the economic activities in the province. Finally, the province of Tra Vinh was chosen for its distinctive rural characteristics. Households were randomly selected in the Cau Ngang district. They were mainly employed in arable farming and the production of seafood. In total 325 households were interviewed, of which 219 (67 percent) had access to credit, and 106 (34 percent) did not. The distribution of the respondents over the provinces is shown in table 3.

The MD has experienced a considerable decline in the poverty rate since 1998. The poverty rate for MD in 2009 was 12.6%, lower than the overall country rate of 14.2% (GSO, 2010). The poverty rate has fallen over the last decades, but in the rural areas poverty remains

significant. The reasons are complex but the main causes are a high number of landless households and great land scarcity, lack of opportunities for stable non-farm employment, and lack of market participation (GSO, 2010).

>>>>> insert table 3 and figure 1 about here

3.2. Analytical method

Bias factors due to sample selection arise because it is often impossible to identify a perfectly random sample of the population of interest. Particularly when observations are selected in a process that is not perfectly independent of the outcome of interest, selection effects may lead to biased coefficients in regressions of the different outcomes (Heckman et al., 1998). This may result in inconsistent estimates. In order to avoid these problems, one of the most commonly used approaches in econometrical analyses is the Heckman selection model (Przeworski and Vreeland, 2000; Schaffner, 2002; Schafgans and Zinde-Walsh, 2002; Vreeland, 2002). The two-step method includes the estimation of a probit model for selection, followed by the addition of a correction factor which is the inverse Mill's ratio obtained from the probit model, into the second ordinary least square model of interest (Gujarati and Porter, 2009).

Factors assumed to influence the uptake of credit are usually categorized as either knowledge-based and poverty-based (Wiklund and Shepherd, 2003). Knowledge-based determinants include age and education (Zeller, 1994; Kimuyu and Omiti, 2000); family business history, entrepreneurial experience, industry specific know-how, training and social capital, (Lore, 2007). Property-based determinants are land size, livestock, and other assets. Determinants of borrowing tested in this paper include age, gender, educational level, religion, marital status, family size, ethnic group, community involvement, red certificate of land use right, building value, distance to the nearest market centre, and provincial dummy. In the second step, determinants of the loan size are explored. Determinants considered to

influence loan size are age, gender, educational level, religion, marital status, family size, ethnic group, community involvement, total land size, building value, and provincial dummy, the instrumental variable of participation is distance of households to the nearest market centre, and whether or not the households have property (red certificate of their land). The model estimations were done in Stata.

3.2.1. Double hurdle model (DHM)

This paper also uses a DHM as formulated by Cragg (1971) assuming that the individual (or households) make two decisions concerning the borrowing and the amount to borrow. Each decision stage is determined by a different set of factors. According to the behavioural content of this model, two separate hurdles must be passed before a positive loan size can be obtained. The first hurdle involves the decision about whether or not to take out credit from a formal bank (participation decision). It is reasonable to assume that the choice of access to credit is an economic decision and is influenced by social and demographic issues (Blaylock and Blisard, 1993). The second hurdle concerns the level of the loan obtained by the household. The two decisions can be regressed as dependent on or independent of each other. Following Lee and Maddala (1985) , the two decisions have been modelled as sequential in this paper. Formally, the double hurdle model can be specified as follows (Jones, 1989; Pudney, 1989):

Observed loan size: $Y = d.Y^{**}$ (1)

Loan participation: $W = \alpha'Z+u$ ($u \epsilon N(0,1)$) (2)

$d = 1$ if $W > 0$ and 0 otherwise.

Loan size equation: $Y^*=\beta'X+v$ ($v \epsilon N(0, \delta^2)$) (3)

$Y^{**} = Y^*$ if $Y^*>0$ and 0 otherwise

Where W is defined as whether the households decide to take out credit, Y* is a latent variable showing the households' loan amount obtained, Y is the observed dependent variable (the amount of money the household obtained), Z is a vector of variables explaining the credit participation decision, X is a vector of variables determining the credit amount taken out, u and v are the corresponding error terms assumed to be independent and distributed as $u \in N(0,1)$ and $v \in N(0,\delta^2)$. The independence of the error terms is a common assumption in these type of models (Jensen and Yen, 1996; Su and Yen, 1996).

Assuming that the error terms u and v are independent, the model can be assigned to follow Cragg's model (Cragg, 1971) in which a zero loan amount has a subscript and a positive loan amount is shown by a subscript +.

$L = \Pi_0[1 - p(v>- \alpha Z)p(u>- \beta X)] \Pi_+ p(u>- \beta' X)f(y|u>- \beta' X)$

The Cragg model is a two-step approach with a probit model for probability of participation in the first stage and truncated normal regression in the second stage.

An alternative assumption is to hypothesize that the error terms of the participation and loan amount equations are correlated, and that the participation decision dominates the loan amount equation. Jones (1989) refers to this case as a first hurdle dominance. The model implies that observed zero loan amounts are the result of participation decisions only and that once the first hurdle is passed censoring is no longer appropriate. This suggests that only individual households with a positive loan amount are included in the loan amount equation. The presence of first hurdle dominance results in a Heckman selection model, which is discussed next.

3.2.2. Heckman selection model

In the Heckman selection model, the household's decision to a loan is assumed to be influenced by a number of household characteristics, as shown in the following equation (Greene, 2000):

W* = α'Z+u

$$Z_i^* = a_i L_i + u_i \quad (4)$$

If Z_i* is a dummy that a household takes a loan, equation (1) measures the probability that a household i has access to formal credit; L_i is a vector of exogenous household variables that affect Z_i*. The variable Z_i* is not observed, but we observe if the household has access to credit or not, whereby Z_i=*1* if Z_i*>*0* and Z_i=*0* if Z_i*≤*0.*

Next, household characteristics are also assumed to influence the size of the loan the household takes out. Under the condition that Z_i =1, Y_i represents the log of the loan size expected to be received by each household, with the assumption that:

$$Y_i = b_i X_i + v_i \quad (5)$$

where X_i is the vector of variables determining the loan size. In equations (4) and (5), u_i and v_i have bivariate normal distributions with zero means, standard deviation δ_u and δ_v, and they are correlated with correlation coefficient ρ. It is assumed that Z_i and L_i are observed for a random sample of individual households, but Y_i is observed only when Z_i=1, that is, when the rural household i has taken out a loan. Modified from the equation by Heckman (1979), the expected loan size may be written as follows:

$$\begin{aligned} &E(Y_i \mid Z_i = 1) = E(Y_i \mid Z_i^* > 0) = E(Y_i \mid u_i > -a_i L_i) \\ &= b_i X_i + E(v_i \mid u_i > -a_i L_i) = b_i X_i + \beta \sigma_v \mu_i(\alpha_u) \end{aligned} \quad (6)$$

Where:

$$\mu_i(\alpha_u) = \frac{\varphi(\alpha_u)}{1-\phi(\alpha_u)} = \frac{\varphi(-\alpha_u)}{\phi(\alpha_u)} = \frac{\varphi(a_i L_i / \alpha_u)}{\phi(a_i L_i / \alpha_u)} \quad (7)$$

And φ and Ø are the normal density function and normal distribution function, respectively. The function $\mu_i(\alpha_u)$ is called the inverse Mill's ratio.

A least squares regression of Y_i on X_i, without the term $\mu_i(\alpha_u)$, would yield inconsistent estimators of b_i. If the expected value of the error was known, it could be included in the

regression as an extra explanatory variable, removing that part of the error correlated with the explanatory variables and avoiding inconsistency. Yet the error term cannot be estimated, and the inverse Mill's ratio needs to be calculated and added to the estimation of equation (5).

The first step of the Heckman model is a probit model (equation 4). The inverse Mill's ratio is calculated from the linear prediction of this model. In the second step model, *Y* is regressed on the explanatory variables *X* and the Inverse Mill's ratio, for all cases where the selection equation equals one, i.e. the household has access to formal credit. A highly significant Inverse Mill's Ratio indicates that selection bias is present. This model is solved in one procedure in Stata.

>>>>> Insert table 4 about here:

4. Empirical results

The following sections present the results of our analyses. We start by describing the credit institutions from which the households had taken out loans and we describe the major characteristics of these loans. Next, we give an overview of the household characteristics in the study area. We compare households by province and by whether or not they had borrowed money. The model results are given next.

4.1. Overview of financial institutions in the Mekong Delta

4.1.1. Credit institutions in the three provinces under study

The Vietnam Bank for Agriculture and Rural Development (VBARD) and the Vietnam Bank for Social Policies (VBSP) are the two main providers of formal credit to households in the rural areas in Vietnam. The former was established in 1998 at the time of the reform of the financial system and the reintroduction of commercial banks in Vietnam. As a representative of the state policy bank, VBARD has been responsible for directed lending to the agricultural

and rural sectors. It enjoys government subsidies and access to central bank credit. By the end of 2001, it had become the leading commercial bank in Vietnam, with the most extensive network of branches in rural areas. The bank has gradually expanded and it has 64 branch offices and 592 transaction offices in the provinces. At the end of 2009, the VBARD banks had 479,000 billion dongs in total assets, an increase of 22 percent compared with 2008; total funding resources reached 434,331 billion dongs, and total outstanding loans was 354,112 billion dongs, of which outstanding loans to agricultural and rural areas was 242,062 billion dongs (Agribank, 2009). VBSP is a smaller institution. By the end of 2008, total capital of VBSP reached 54,610 billion dongs, an increase of 51 percent compared with that of 2007; total outstanding loans reached 52,510 billion dongs (VBSP, 2008).

In our sample, 53 percent of the respondents borrowed from VBSP and 42 percent from VBARD; the rest of the loans (about 5 percent) were provided by other financial institutions such as the People Credit Fund (Figure 2). The VBSP provides credit in two forms (see also chart 2). People can borrow directly from its branches or via social economic unions. The most important unions for VBSP lending are the Farmer's Union, the Women's Union, the Youth's Union and the War Veterans' Union. In the sample, these social economic unions accounted for more than 94% of the share of the credit borrowed through VBSP, which indicates their importance in helping the poor to access credit. Following its objectives of poverty alleviation and social development, the VBSP does not require its clients who are poor households, charity households, or poor students to offer collateral for the loans. Most of the clients, however, need to have proof of collateral endorsed by the local government or other authorities related to the VBSP banks.

VBARD offers individual loans to rural farmers and entrepreneurs. A land use certificate may be used as collateral. Secondly, VBARD also accepts borrowers in organizations who are

unable to provide collateral. Loans are channelled through so-called guarantee groups composed of the members of women's unions, citizens' unions, and veterans' unions.

>>>>> Insert figure 2 about here

4.1.2. Loan characteristics

The loan characteristics by type of borrowing scheme and type of bank are compared in tables 5 and 6. Individual households had the largest average loans with 18,970 thousand dongs[1] while group-based households had on average loans of 10,150 thousand dongs. The interest rates charged per year to the households were 12 and 10 percent for individual and group-based lending, respectively. The average duration of the loans was about 20 months, but it tended to differ by type of borrowing scheme. Shorter loans were given to individual households (17 months), while the longer loans were provided to group-based households (24 months). The VBARD offers larger loan amounts (18,000 thousand dongs on average) than VBSP with 10,198 thousand dongs while VBARD charges higher interest rates (12 percent/year) than the VBSP with 10 percent/year.

>>>>> insert table 5&6 about here

Figure 3 shows that most of the borrowers have an average loan of 14,000 thousand dongs. Only seven households in the sample borrowed more than 40,000 thousand dongs. Overall,

[1] 1 USD = 19,500 dongs
Source: http://www.vietcombank.com.vn/en/exchange%20rate.asp

the credit supplied by the formal financial institutions in the rural areas of Mekong Delta is rather limited.

>>>>> Insert figure 3 here

4.2. Household characteristics of borrowers and non-borrowers

Tables 7 and 8 compare the household characteristics of borrowers and non-borrowers. Households having taken out credit were relatively older than those who had not. In terms of education, non-borrowers had on average a lower educational level than the individual borrowers, but a higher level than group-based borrowers. Most of the borrowers had completed at least nine years of schooling.

>>>>> insert table 7&8 about here

Among the borrowers, 46 percent were of Vietnamese origin compared to 61 percent among the non-borrowers. The average family size of both borrowers and non-borrowers was five persons. It is furthermore hypothesized that if the household head has any social and/or political position in the village proxy through village work, he or she will have a high probability of receiving formal credit and would be less likely to borrow from the informal sector. Yet, this could not be confirmed by the chi-squared analysis. About 18 percent of borrowers and non-borrowers were involved in village work.

Total landholding has been considered an important determinant of access to credit (Vu, 2001; Zeller, 2001; Okurut, 2006). It is hypothesized that households with more land are

more likely to have an interest to expand production and a higher probability of borrowing. Land can also be used as collateral for the loan. In the survey, the average total landholding of individual and group-based borrowers was about 15,490 m² and 6,380 m² respectively, while that of non-borrowers was about 11,660 m².

Another possible important determinant is the total income of households. The results show statistical differences in the total income between borrowers and non-borrowers. The total income of individual borrowers was statistically higher than the income of group-based borrowers and non-borrowers. On average, group-based borrowers were poorest.

5. Determinants of access to credit by rural households

Following the results of the probit model, access to credit was positively related to the marital status (being marred), not living far from the market centre, and living in Soc Trang or Tra Vinh province (table 9). Yet, the determinants of access to credit differed by borrowing scheme. The coefficients in table 9 show that the probability of individual access to credit is related to a higher value of building ownership and negatively to Vietnamese ethnicity and distance to the market centre. The access to credit by the group-based schemes is positively affected by the marital status and having a community work, but negatively affected by education, total land size, distance to the market centre, and being in Can Tho province. Clearly these group-based schemes target poorer households in the rural provinces which are socially involved in the village.

>>>>> insert table 9 about here

The determinants of the loan amount as calculated in the second step of the Heckman selection and double hurdle models are illustrated in table 10. The results show that the loan

amount in general is positively related to being a male borrower, married households, being involved in the community, asset level, and having a small family. Loan sizes in group-based schemes seem to be higher for married households with a lower dependency ratio, being involved in the community, having more land and a higher value of building, not being in the Can Tho province. The double hurdle model additionally suggest that households with Vietnamese ethnicity may take out larger loans.

For the individual borrowers, the loan size obtained by the households is positively affected by a smaller family size and having a job in the community. In addition, the double hurdle model predicts that households having at least one religion and being of Vietnamese ethnicity are likely to take out larger loans.

Selection bias could not be proven as the inverse Mill's ratio was not significant in the Heckman models. The findings confirmed that physical and social capital are significant determinants of access to credit and the loan amount for individual borrowers. In the group-based models, human and social capital, i.e. marital status and having a community work, seem to be important.

>>>>> Insert table 10 about here

6. Conclusions and implications

This paper investigates the determinants of demand for formal credit by rural households of the Mekong Delta in Vietnam. The findings indicate that a household's capital endowments are very important in the demand for formal credit as well as the loan amount. Other factors influencing the probability to borrow were marital status, distance to the market centre, and province. The findings are similar to those of previous studies (Bell et al., 1997; Ha, 1999; Ha, 2001; Mohamed, 2003). It is clear that both the household's available collateral, its

capability to search and process information on credit as well as its potential to make use of the credit, are important.

As indicated by Pham and Lensink (2007) the availability of collateral is important in formal lending. One of the major reasons why households are not borrowing is their lack of proof of collateral. Especially land ownership has been shown to be important. Having collateral, or an institutional arrangement that overcomes the need for collateral such as group lending or government insurances, is a first step towards closing the gap between demand and supply. Arguably, being relatively rich also makes it more easy to be selected or to enable self-selection in a group. Yet, as explained in Armendariz and Morduch (2005), this need for collateral even for small loans excludes the poorest of the poor, for whom the gap between demand and supply of credit seems to persist. VBSP issues loans without collateral, but they require group liability. In forming those lending groups, members may self-select themselves in or out. It is very probable that again the poorest of the poor are excluded.

Apart from collateral, households need to have the capacity to overcome other transaction costs in taking out a loan. Apart from the evident costs of applying for a loan (filing the paperwork, going to the bank's branch, and attending group meetings), potential borrowers are expected to search and process information on the lender, loan procedures, loan conditions, and loan interest rates. In addition, location and education seem to play a role. Furthermore, households with more social capital seemed to be more likely to borrow larger sums.

If the institutions want to increase their clientele base, especially in the rural areas of Soc Trang and Tra Vinh provinces, they could consider making more efforts in reaching the potential clients in a strategy of financial outreach. Our experiences in the field suggest that most of the households in the surveyed location have limited information on formal credit accessibility. Sometimes, the households are in need of credit, they would like to borrow

from the government banks but they don't know how to apply. Financial institutions in the Mekong Delta in general and in the three provinces studied, could make more efforts in exchanging and transferring information on credit procedures in the rural villages. This would arguably not only increase the potential interest of households, but also improve the compliance of the clients to the bank's rules and regulations.

Moreover, financial institutions need to innovate and upgrade their activities such as human resource management, encouragement policies as well as apply new technologies in bank transfers. These will enable the financial institutions to reach more clients more effectively and efficiently. Furthermore, diversifying the type of loans offered and loan products such as lending for project investments could help rural households to plan loan expenditures based on their production cycles. In addition, financial institutions could adapt the loan procedure to their rural clients' constraints. Finally, the institutions should consider the loan duration by focusing on medium and long-term loan contracts that could support agricultural and rural development. Developing specific proposals towards these types of credit widening and deepening for the Mekong Delta is an area for future research.

TABLES

Table 1: Comparison between VBARD and VBSP to informal lenders

	VBARD and VBSP	Informal lenders
Clients targets	In favour of a larger scale investment, special targeting of poor households and illiterate clientele	Small farmers in rural areas, and for lower income households and small scale enterprises in urban areas
Administrative procedures	Complex procedures	Simple and straightforward procedures that are widely understood
Collateral	Required land use certificate or other assets	Depending on the relationship between lenders and borrowers
Interest rate	Low	High
Loan size	Large	Small
Repayment rate	Low	High

Source: VBARD and VBSP report, 2010

Table 2: Comparison between traditional and informal approaches.

	Traditional approach	Informal lenders
Assumptions	Rural households in rural areas can save little from their income	Assumed to be loan exploiters
Interest rates	Supplying cheap credit to increase the income of clients	Supplying expensive credit to exploit own benefits
Collateral	Borrowers meet certain conditions such as credit worthiness, collateral, profitable production plans	Depending on the relationship between lenders and borrowers
Initial capital	State VBARD and VBSP	Personal financial assets
Risk for lenders	Low because of government owned capital	High but lowered by personal relationship

Table 3: Distribution of borrowers and non-borrowers in the sample

Province	Non-borrowers	Borrowers	Total
Can Tho	41	67	108 33.23%
Soc Trang	35	74	109 33.54%
Tra Vinh	30	78	108 33.23%
Total	106 32.62%	219 67.38%	325 100%

Table 4: Specification variables in the propensity score of models

Y_i	Whether households have access to credit which takes the value of 1 if the households take credit, 0 otherwise.
X_1	The age of the household head in years
X_2	Gender: 1 if the head is male, 0 otherwise
X_3	Educational level (years)
X_4	Religion: 1 at least one religion, 0 otherwise
X_5	Marital status: 1 if married, 0 otherwise
X_6	Vietnamese ethnicity: 1 for Vietnamese households, 0 otherwise
X_7	Family size (persons)
X_8	Dependency ratio in percent
X_9	Have a job in village: 1 having a job in village for community building, 0 otherwise
X_{10}	Total land in use (in 1,000 m^2)
X_{11}	Red certificate of land use right: 1 having a certificate, 0 otherwise
X_{12}	The value of building held by households (1,000 dongs)
X_{13}	The distance to the market centre of households (m)
X_{14}	Dummy location: 1 if the household is located in Can Tho, 0 otherwise[a]
X_{15}	Dummy location: 1 if the household is located in Soc Trang, 0 otherwise

[a] Note: The province of Tra Vinh is the base

Table 5: Characteristics of formal loans received by rural households in MD 2009

Items	Unit	Mean	Group-based borrowers	Individual borrowers	T-Statistic
Average loan size	1,000 dongs	14,356 (12,702)	10,150 (6,530)	19,000 (15,653)	5.52***
Interest rates	%/year	10.82 (2.80)	9.73 (2.18)	12.02 (2.92)	6.35***
Loan maturity	Month	19.91 (14.51)	23.33 (16.47)	16.16 (10.90)	-3.84***

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

Table 6: Loan characteristics by two banks (means and standard deviation in parentheses)

N	Average	VBARD 91	VBSP 102	T-statistic
Loan amount (1,000VND)	13,852 (9,547)	18,022 (10,987)	10,198 (6,006)	-6.19***
Interest rate (%)	10.62 (2.94)	11.98 (3.11)	9.42 (2.15)	-6.67***
Loan duration (months)	20.23 (15.34)	15.67 (11.36)	24.34 (17.19)	4.07***

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

Table 7: Household characteristics (continuous variables)

	(1)	(2)	(3)	**F-stat**
N	**106**	**106**	**113**	
Age of household (years)	44 (12)	48 (12)	46 (11)	1.99
Education level (years)	9.0 (3.8)	10 (3.4)	8.70 (3.16)	4.90***
Family size (persons)	4.9 (1.6)	5 (1.5)	4.9 (1.61)	1.01
Dependency ratio (%)	0.28 (0.21)	0.27 (0.22)	0.31 (0.22)	1.45
Total land size (ha)	11.78 (13.13)	15.25 (10.18)	6.38 (8.17)	8.16***
Value of assets (dongs)	478,373 (547,741)	604,051 (497,757)	353,286 (652,349)	5.64***
Distance to market center (m)	1,400 (603)	842 (368)	577 (507)	75.64***

Notes: (1): Non-borrowers; (2) Individual borrowers; (3): Group-based borrowers
Standard deviation in parentheses
*: Significant at 10%; **: Significant at 5%; ***: Significant at 1%.

Table 8: Household characteristics (categorical variables)

	(1)	(2)	(3)	X^2-Stat
N	106	106	113	
Gender (% male)	67	71	52	9.10^{***}
Married (% yes)	90	96	99	10.97^{***}
Red book certificate (yes)	92	97	82	13.94^{***}
Vietnamese (% yes)	62	41	51	9.15^{***}
Village Work (% yes)	18	19	18	0.44
At least one religion (yes)	61	69	62	2.69^{**}
Can Tho (%)	37	27	35	8.72^{**}
Soc Trang (%)	33	37	31	0.50
Tra Vinh (%)	28	37	35	1.85^{*}

Notes: (1): Non-borrowers; (2) Individual borrowers; (3): Group-based borrowers
*: Significant at 10%; **: Significant at 5%; ***: Significant at 1%.

Table 9: Factors affecting access to credit by rural households

	(1)	(2)	(3)
Age (years)	0.0104	0.0158*	0.0115
	(1.24)	(1.65)	(0.95)
Gender (male=1)	-0.158	-0.0826	-0.396
	(-0.79)	(-0.34)	(-1.52)
Education level (years)	-0.0129	0.0311	-0.0586*
	(-0.48)	(0.96)	(-1.68)
At least one religion (yes=1)	-0.124	0.0784	-0.359
	(-0.68)	(0.36)	(-1.51)
Marriage status (married=1)	1.011***	0.569	2.024***
	(2.77)	(1.40)	(3.27)
Vietnamese ethnic (yes=1)	-0.263	-0.776***	0.168
	(-1.06)	(-2.59)	(0.53)
Family size (persons)	-0.0150	-0.00614	-0.0386
	(-0.27)	(-0.09)	(-0.54)
Dependency ratio (%)	-0.0787	-0.115	-0.131
	(-0.19)	(-0.24)	(-0.23)
Community involvement (yes=1)	-0.0481	-0.288	0.417
	(-0.19)	(-0.98)	(1.25)
Total land (1000 m^2)	-0.00805	0.00871	-0.0428***
	(-0.96)	(0.91)	(-3.38)
Red certificate (yes=1)	0.0730	0.240	0.0702
	(0.23)	(0.51)	(0.19)
Building value (1,000 dongs)	0.0981	0.265***	-0.0394
	(1.26)	(2.63)	(-0.41)
Distance to market center (m)	-0.00147***	-0.00147***	-0.0017***
	(-8.61)	(-6.42)	(-7.73)
Can Tho province (yes=1)	-0.238	0.0417	-0.582*
	(-0.94)	(0.13)	(-1.80)
Soc Trang province (yes=1)	-0.251	-0.324	-0.0169
	(-0.97)	(-1.08)	(-0.05)
Constant	0.287	-2.364*	1.260
	(0.30)	(-1.94)	(0.97)
N	324	211	221
LR chi2	122.14	86.46	133.09
Prob> Chi2	0.0000	0.0000	0.0000
Pseudo > Chi2	0.2992	0.2956	0.4352
Log Likelihood	-143.019	-103.024	-86.369

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

Table 10: Factors affecting loan size by Heckman selection and double hurdle models

	Heckman selection models			Double hurdle models		
	(1)	(2)	(3)	(1)	(2)	(3)
Age (year)	0.007	0.004	0.004	0.005	0.001	0.003
	(1.58)	(0.53)	(0.85)	(1.34)	(0.15)	(0.66)
Gender (male=1)	0.128	0.005	0.076	0.152*	0.047	0.129
	(1.36)	(0.03)	(0.75)	(1.76)	(0.35)	(1.49)
Education level (year)	0.0177	0.014	-0.006	0.019	0.007	0.005
	(1.28)	(0.58)	(-0.35)	(1.43)	(0.34)	(0.35)
At least one religion (yes=1)	-0.104	-0.122	-0.093	-0.085	-0.149	-0.034
	(-1.11)	(-0.83)	(-0.88)	(-0.98)	(-1.12)	(-0.38)
Marital status (married=1)	0.0640	0.275	1.011*	-0.234	0.052	0.386
	(0.18)	(0.59)	(1.99)	(-0.88)	(0.15)	(0.91)
Vietnamese ethnic (yes=1)	0.113	0.109	0.229	0.167	0.325*	0.174
	(0.85)	(0.30)	(1.71)	(1.42)	(1.79)	(1.46)
Family size (person)	-0.05*	-0.120***	-0.0212	-0.042*	-0.105***	-0.0158
	(-1.67)	(-2.43)	(-0.73)	(-1.63)	(-2.54)	(-0.61)
Dependency ratio (%)	-0.249	-0.239	-0.461*	-0.225	-0.169	-0.426**
	(-1.24)	(-0.76)	(-2.02)	(-1.20)	(-0.62)	(-2.05)
Community involvement (yes=1)	0.315***	0.221	0.483***	0.333***	0.296*	0.397***
	(2.68)	(1.04)	(3.60)	(3.05)	(1.72)	(3.64)
Total land (1,000 m2)	0.012***	0.009	0.001	0.013***	0.008	0.010*
	(2.50)	(1.16)	(0.01)	(2.88)	(1.10)	(1.77)
Red certificate (yes=1)	-0.0848	0.758	-0.176	-0.104	0.505	-0.188
	(-0.54)	(1.26)	(-1.29)	(-0.71)	(1.07)	(-1.55)
Building value (1,000 dongs)	0.153***	0.153	0.0924*	0.131***	0.082	0.010***
	(3.57)	(1.25)	(2.35)	(3.55)	(1.32)	(2.80)
Distance to market (m)	-0.001	-0.001	-0.001	0.001*	0.001	-0.001
	(-0.57)	(-0.28)	(-1.59)	(1.73)	(1.56)	(-0.32)
Can Tho province (yes=1)	-0.151	0.221	-0.463**	-0.106	0.182	-0.347***
	(-1.09)	(0.95)	(-3.02)	(-0.85)	(0.85)	(-2.85)
Soc Trang province (yes=1)	-0.065	-0.133	0.124	-0.005	-0.048	0.163
	(-0.49)	(-0.60)	(0.90)	(-0.04)	(-0.28)	(1.32)
Constants	7.397***	7.040***	7.410***	7.811***	8.194***	7.739***
	(12.41)	(3.76)	(12.46)	(16.48)	(10.45)	(13.28)
Mills lambda/sigma	0.487	0.530	0.485	0.562***	0.580***	0.402***
	(1.16)	(0.68)	(1.65)	(20.67)	(14.31)	(14.99)
N	322	209	219	217	104	114
Censored obs./Pseudo R2	105	105	105	0.181	0.168	0.379
Uncensored obs./Log likelihood	217	104	114	-184.29	-91.45	-59.01
Wald chi2/LR chi2	82.77	34.33	84.82	81.53	37.02	72.19
Prob>Chi2	0.000	0.003	0.000	0.000	0.001	0.000

Notes: (I): Pooled sample; (II) Individual – non-borrowers; (III): Group – non-borrowers
t statistics in parentheses
*: Significant at 10%; **: Significant at 5%; ***: Significant at 1%.

FIGURES

Figure 1: Map of survey location

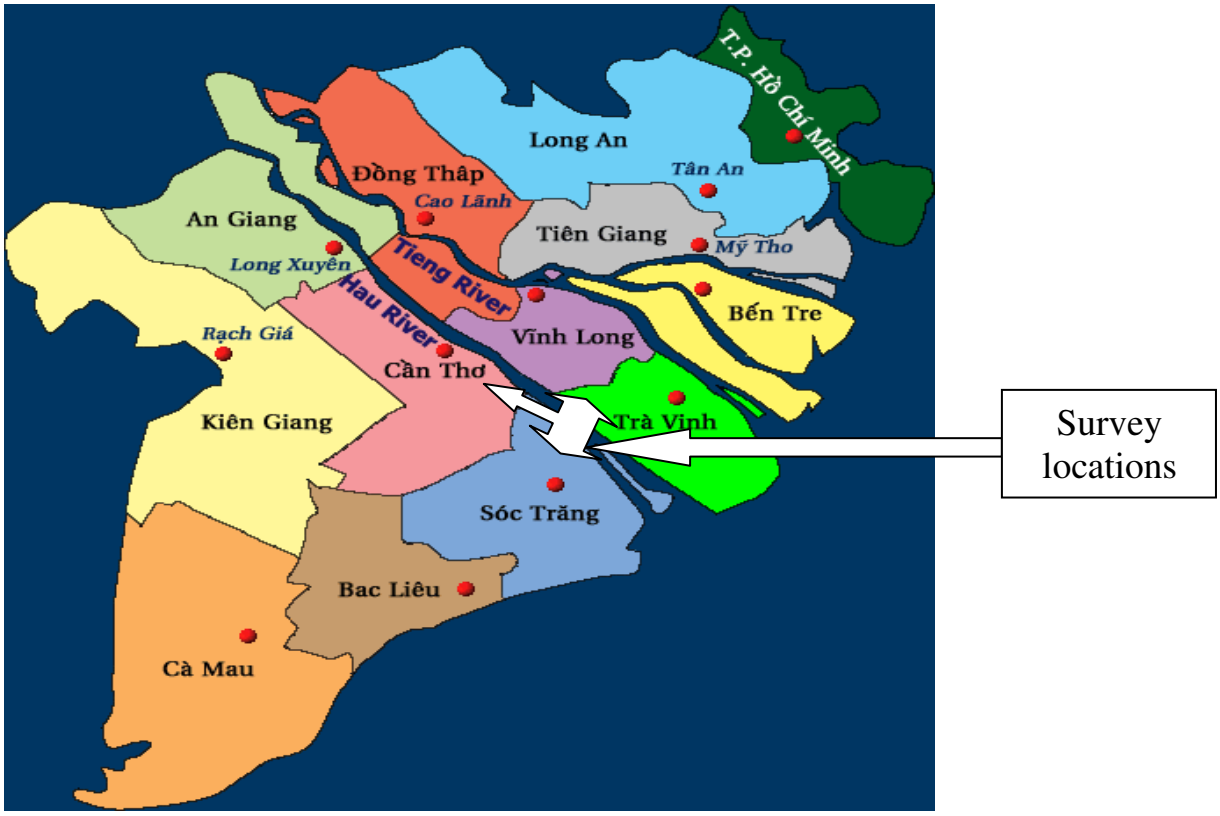


Figure 2: Share of credit institutions in the total number of borrowers of the three surveyed provinces

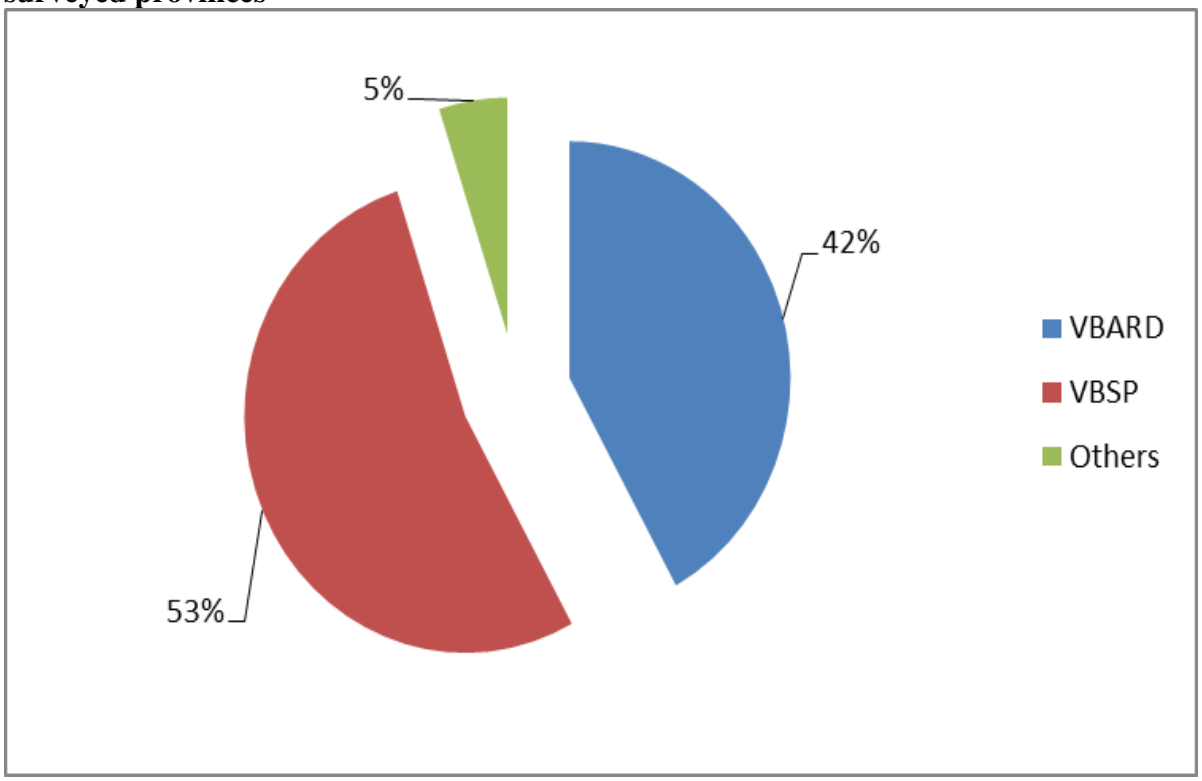


Figure 3: Distribution of loan amounts received by the rural households in the Mekong Delta

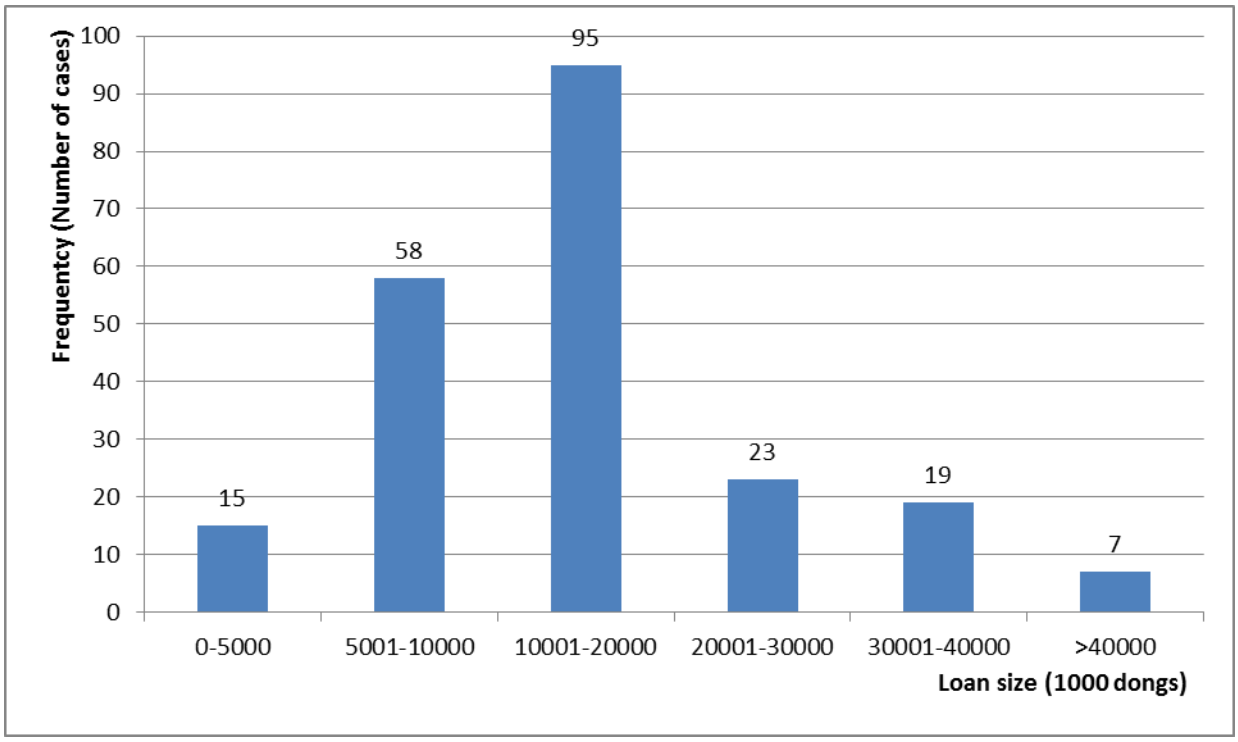
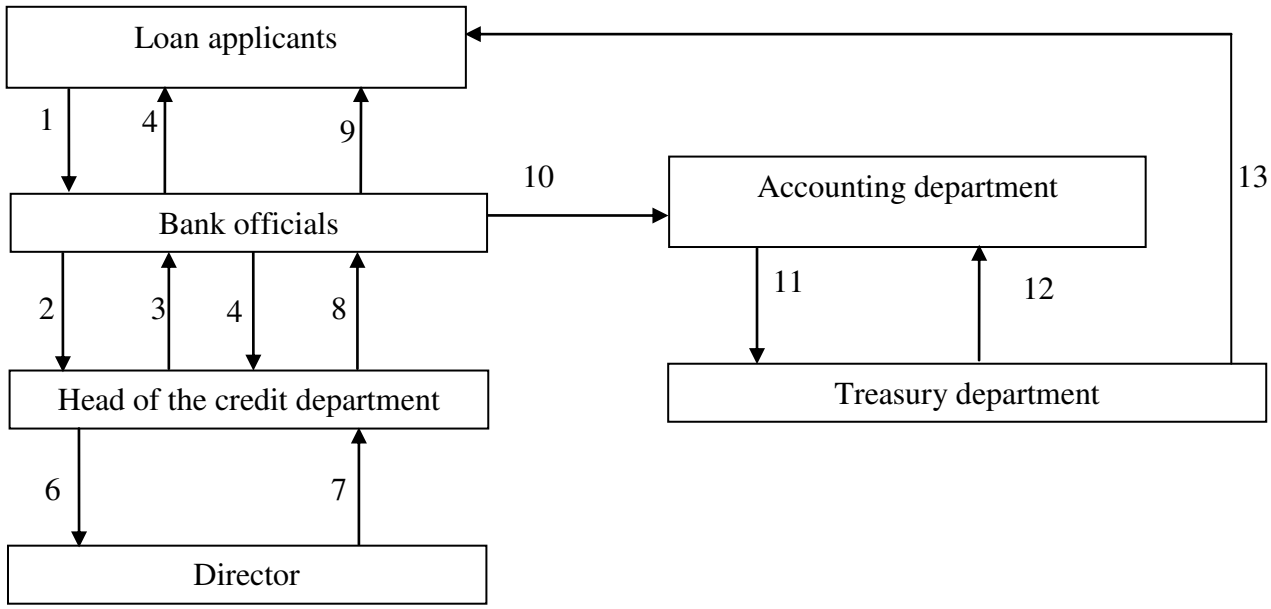


CHART:

Chart 1: Lending procedure by VBARD banks in Vietnam and Mekong Delta



Note: [**1**] Bank officials receive the loan application forms from the applicant;

[**2**] After receiving the loan application forms, bank officials report to the head of the credit department;

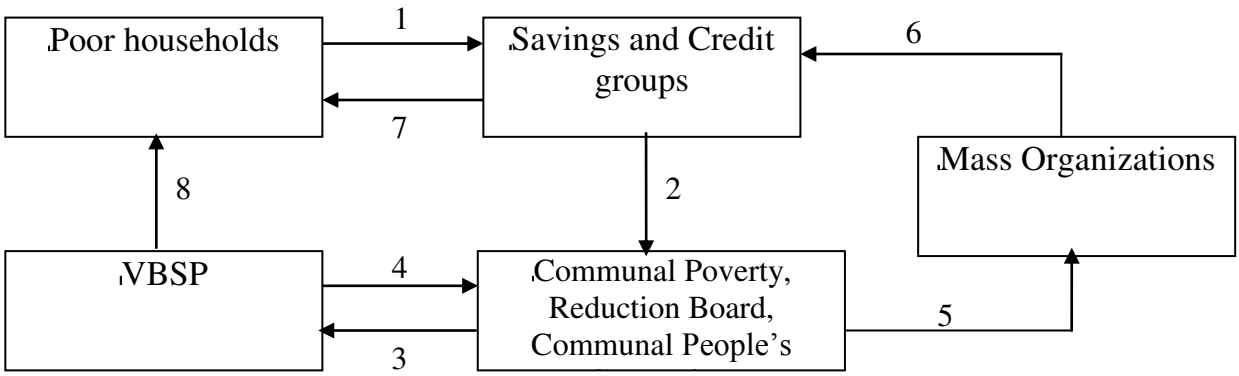
[**3**] The head of the credit department assigns a bank official to examine the loan application forms to see if they are filled in properly;

[**4**] The assigned bank official appraises the applicant, mainly based on collateral;

[**5**] The assigned bank official informs the head of the credit department about the applicant;
[**6**] The head of the credit department assesses the information and reports it to the director of the bank;
[**7**] The director of the bank decides on the loan and informs the head of the credit department;
[**8**] The head of credit department informs the assigned bank official about the decision;
[**9**] The assigned bank officer informs the applicant;
[**10**], [**11**], [**12**] Internal information among the bank's specialized departments;
[**13**] The treasury department disburses loans to the applicant, if accepted.

Source: Adapted from Ninh (2003).

Chart 2: Lending procedures by MFIs in Vietnam and Mekong



[1]. Poor households prepare the requests for borrowing and submit them to the Savings & Credit Group

[2]. Savings & Credit Group selects the households entitled to borrow and submits the list of borrowers to the Poverty Reduction Board and Commune People's Committee.

[3]. The Poverty Reduction Board and the Commune People's Committee certify and pass on the list of poor households to the bank for consideration.

[4]. The bank approves and announces to the Commune People's Committee the results of the approved list of borrowers, the schedule and location of disbursement.

[5]. Commune People's Committee announces the bank's results to Mass Organizations.

[6]. Mass Organizations announce the approved results to the Savings & Credit Groups

[7]. The Savings & Credit Groups announce the approved results to poor households; also announce the schedule and location of disbursement.

[8]. The bank together with the Savings & Credit Groups directly disburses loans to the borrowing households.
Source: Adapted from Vietnam Bank of Social Policy (2010)

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