



Determinants of Household Access to Formal Credit in the Rural Areas of the Mekong Delta, Vietnam

Vuong Quoc Duy,^{a,*} Marijke D'Haese,^a Jacinta Lemba,^a Le Long Hau,^b
Luc D'Haese^{a,c}

^a Department of Agricultural Economics, Faculty of Bioscience Engineering,
Ghent University, Belgium

Email: Duy.VuongQuoc@UGent.be

^b Faculty of Applied Economics, University of Antwerp, Belgium

^c Department of Bioengineering, Faculty of Sciences, University of Antwerp, Belgium

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 reduced significantly over the last decades, but in the rural areas they remain significant. If it is assumed that access to credit is a vehicle for poverty alleviation, it is necessary to assess how 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 Heckman selection model. Data used in this paper was obtained from a survey of 325 rural households, conducted between May and October 2009. The results indicate that household's capital endowments, marital status, family size, distance to the market center, and locations affect the probability to ask for and amount of credit.

Keywords

Formal credit, Double hurdle models, individual and group-based lending, rural households

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% in the 1980s, 7.6% in the 1990s and 7% 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 Brasard, 2005). The economic success in Vietnam is 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 smoothing consumption and promoting production especially for poor households (e.g. Swain et al. 2008; Conning and Udry, 2005; Armendariz and Morduch, 2005; Robinson, 2001; Zeller et al. 1997). Armendariz and Morduch (2005), amongst 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 former has been developed and quickly competed with other institutions. The formal credit sector followed the traditional approach (Ha, 2001). It is estimated that the formal sector accounts for only one-third of credit demand (Cao, 1997). However, this share 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). The rest will be accounted by the semi-formal sectors.

Arguably, the success of credit provision for poverty reduction depends on the possible access by poor households to credit-providing 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 their lack of it 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 (for example, Barslund and Tarp, 2008; Pham and Lensink, 2007; Akoten et al. 2006). 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 the credit is for business-related activities. For the case of Indonesia, Takahashi et al. (2010) found that the access to credit is significantly affected by

the relatively wealthier households but not by collateral ownership. In Bangladesh, the relation between gender (women) and access to microcredit is discussed by Rahman et al. (2009).

In this article we build on the analysis of Pham and Lensink (2007) yet we focus on lending from formal institutions. We analyze how household characteristics' affect the uptake and amount of credit. Getting a better insight in the reasons causing 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 households' access to credit in the MD region (Putzeys, 2002; Ninh, 2003).

Our analysis focuses on the provision of microcredit by formal institutions. We think this is relevant because in the MD the decision to borrow from informal sources is less constraining in collateral (see Pham and Lensink, 2007), and also probably less easily influenced by policy makers. It is also assumed that availability of small loans without collateral requirement greatly increases households' probability to borrow (Tsukada et al. 2010). Finally, 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 is deterministic for the access to credit and eventually also for the amount borrowed.

This study is based on household data that was 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 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 given in the next section.

2. Research Background

The Vietnamese rural financial system is composed of formal, semi-formal and informal credit providers. The former includes the Vietnam Bank for Agriculture and Rural Development (VBARD), Vietnam Bank for Social Policy (VBSP), and the People Credit Funds (PCF) (World Bank, 2002). They are generally well-developed in the rural areas and there is little competition amongst these formal institutions. However, the formal institutions seem not to be able to

Figure 1
Map of survey location



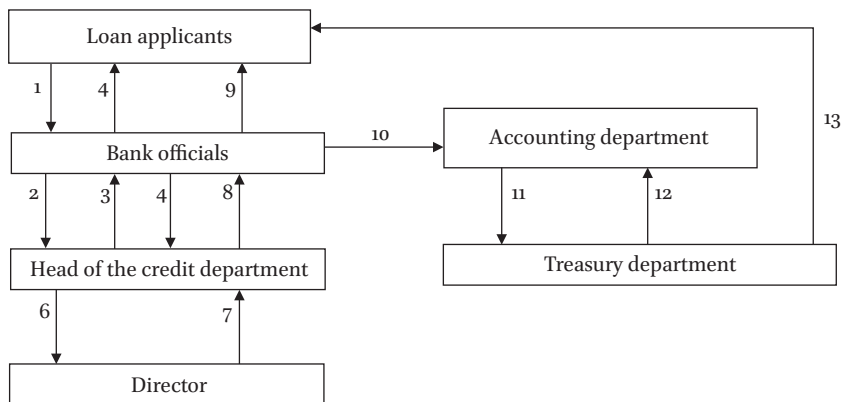
respond adequately to all rural household's demand for credit; and the remained of credit demand is met by the semi-formal and informal sectors. Semi-formal credit is provided by the national and international programs targeting a selective range of borrowers and conforming to certain development targets (Pham and Lensink, 2007). The informal sector consists of private moneylenders, revolving credit associations (RCA), relatives, friends and other individuals. Pham and Izumida (2002), using data from a small household survey undertaken in 1995, found that the informal sector accounted for 17% 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 com-

panies. As most of them do not have accountant records, it is very difficult for them to communicate with the banks and also difficult for the banks to acquire information about them. These banks are mostly based in the large cities or provincial towns. They are thus operating at a fair distance from the potential borrowers located in rural areas. One way for the banks to mitigate the problem is to ask for collateral, i.e. land use rights and other valuable assets.

In programs towards poor and vulnerable households, the Vietnamese Government included credit provision through microfinance institutions (MFIs) in their anti-poverty programs for the rural areas (Commins et al., 2001). Some

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



Notes:

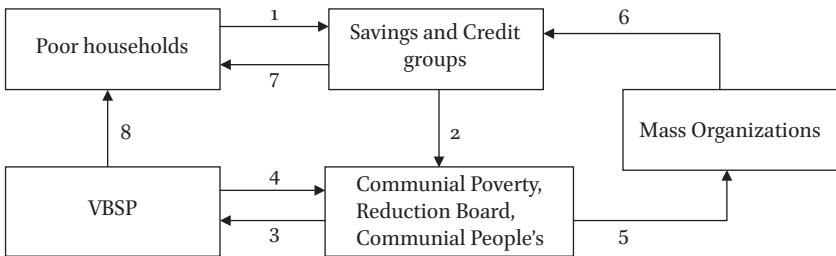
1. Bank officials receive loan application forms from the applicant;
2. After receiving loan application forms, bank officials report to the head of the credit department;
3. The head of the credit department assigns a bank official to examine the loan application forms to see if it is filled in properly;
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. 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).

of the programs target women who are found to be more credit constrained than men. These are programs focusing on female clientele who often join in groups, providing small loans for them to invest in income-generating activities (Armenariz and Morduch, 2005). The expected outcome is that rural female entrepreneurs can cope better with emergencies such as unfavorable 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 (Armenariz and Morduch, 2005). The operation of the MFIs show in chart 2.

In the case of informal lenders, the credit procedures of this form 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-

Chart 2
Lending procedures by MFIs in Vietnam and Mekong



Notes:

1. Poor households write the requests for borrowing and submit it to the Savings & Credit Group
2. Savings & Credit Group selects the households to be 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 the list of poor households to the bank for consideration.
4. The bank approves and announces to the Commune People's Committee about 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 borrowing households.

Source: Adapted from Vietnam Bank of Social Policy, 2010

known and has a good relation to the lender, the probability of borrowing and size of the loan will be bigger. The credit procedure in this case is very short. Malcolm Darling (1925) 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 behavior of the lenders.

Table 1
Comparison between VBARD and VBSP to informal lenders

	VBARD and VBSP	Informal lenders
Clients targets	Favor of a larger scale, special targeting of poor households and literate 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 procedure 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
Client target	Targeting on location of borrowers	Targeting on location of borrowers
Assumptions	Rural households in rural areas can save little out their income.	Assumed to be loan exploiters.
Interest rates	Supplying cheap credit to increase their income	Supplying expensive credit to exploit their benefits.
Collateral	Borrowers meet certain conditions such as creditworthiness, 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.

Although being part of government programs, the formal institutions seem not to be able to adequately respond 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 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 the harvest, 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 burden for low 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 (Okurut, 2006; Mohamed, 2003). 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. However, Diagne (1999) notes that size of the landholding is a significant determinant of access to informal 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 colored, while the negative and significant factors include being male, rural location, being poor and White.

Studies in Vietnam show that 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 if several of these characteristics are also important for credit uptake and loan amount in the Mekong Delta in Vietnam by using Heckman selection and double hurdle approaches. Our results should facilitate identifying and targeting 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 are able to reach in order to broaden their clientele base; and on the other hand, it is important to know how much 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 was obtained from interviewing households in three provinces in the Mekong Delta namely: Can Tho, Soc Trang, and Tra Vinh. These provinces are 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 center of the Mekong Delta. Since we are particularly interested in rural credit, data was collected from the more rural district of Thoi Lai, which is recently divided into two new districts namely Thoi Lai and Co Do. These districts traditionally supplied agricultural products and services to the urban areas of Can Tho. It furthermore hosts the headquarters of an agricultural research institute that

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%

supports rice production in the region. The second province, Soc Trang, is characterized by more ethnic diversity than Can Tho. Its economy is based on agriculture and the area is more prone flooding. The district of Thanh Tri was chosen for this study because it is found to be representative to 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 are mainly employed in arable farming and production of seafood. In total 325 households were interviewed, of whom 219 (67%) households had access to credit, and 106 (33%) had 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 reason are complex but the main causes are landless and land scarcity, lack of opportunity for stable non-farm employment, and lack of market participation (GSO, 2010).

3.2. Analytical Method

Biases due to sample selection arise because it is often not possible 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

(Schaffner, 2002; Schafgens and Zinde-Walsh, 2002; Vreeland, 2002; Przeworski and Vreeland, 2000). The two-step method includes the estimation of a probit model for selection, followed by the addition of correction factor which is the inverse Mills 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 includes age and education (Kimuyu and Omiti, 2000; Zeller 1993; 1994); 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 market center, and location of households.

In the second step, determinants of the loan size are explored. The first hurdle of taking up credit may result in a selection bias which is why we need control for these effects. One possible source of bias is that better-off, better educated, and more experienced households take out larger loans. A Heckman selection model was used to analyze the extent to which selection biases may affect the loan size. Determinants considered to influence loan size are the age, gender, educational level, religion, marital status, ethnic group, family size, community involvement, total land size, building value, and location of households, the instrumental variable of participation is distance to market center of households. The model estimations were done in Stata.

3.2.1. *Double hurdle model (DHM)*

This paper also uses a DHM formulated by Cragg (1971) assuming that the individual (or households) make two decisions concerning the borrowing. Each decision stage is determined by a different set of factors. According to the behavioral content of this model, two separate hurdles must be passed before a positive loan size can be obtained. The first hurdle involves decision about whether or not to access to formal credit (participation decision). It is reasonable to assume that the choice of access to credit, like the decision to smoke, is an economic decision and is influenced by social and demographic issues (Blaylock and Blisard, 1993). The second hurdle concerns on the level of loan obtained by the households that may be affected by various factors related to households as well as financial institution's characteristics. The two decisions can be regressed as dependent on or independent of each other. According to Lee and Maddala (1985), the two decisions have been modeled as sequential.

Formally, following Jones (1989) and Pudney (1989), the double hurdle model can be specified as follows:

$$\text{Observed loan size: } Y = d \cdot Y^{**} \quad (1)$$

$$\text{Loan participation: } W = \alpha'Z + u \quad (u \in N(0,1)) \quad (2)$$

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

$$\text{Loan size equation: } Y^* = \beta'X + v \quad (v \in N(0, \delta^2)) \quad (3)$$

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

Where W is defined whether the households decide to take out credit, Y^* is latent variable showing households' loan amount obtained, Y is the observed dependent variables (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 on the credit amount, 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 model (Cragg, 1971) in which zero loan amount has subscript p , positive loan amount is shown by a subscript $+$.

$$L = \Pi_0 [1 - p(v > -\alpha Z) p(u > -\beta X)] \Pi_1 p(u > -\beta X) f(y | u > -\beta X)$$

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

$$\begin{aligned}
 W_i^* &= \alpha'Z_i + u_i \\
 Z_i^* &= a_i L_i + u_i
 \end{aligned}
 \tag{4}$$

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 $Z_i^* \leq 0$.

Next, household characteristics are also assumed to influence the size of the loan the households take up. Under the condition that $Z_i = 1$, Y_i represents the log of the loan size expectedly received by each household, with the assumption that:

$$Y_i = b_i X_i + v_i
 \tag{5}$$

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 access to formal credit. Modified from the equation by Heckman (1979), the expected loan size may be written as follows:

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

Where:

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

And φ and Φ 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 Mills 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

Table 4
Specification variables in the propensity score of models

Y_i	Whether households access to credit which takes the value of 1 if the households take credit, 0 otherwise.
X_1	The age of 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 ethnic: 1 for Vietnamese households, 0 otherwise
X_7	Family size (person)
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 have certificate, 0 otherwise
X_{12}	The value of building hold by households (1,000 dongs)
X_{13}	The distance to the market center 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

^aNote: The province of Tra Vinh is the base

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. 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.

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 per 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 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 dong in total assets, an increase of 22% compared with 2008; total funding resources reached 434,331 billion dong, and total outstanding loans was 354,112 billion dong, of which outstanding loans to agricultural and rural areas was 242,062 billion dong (Agribank, 2009). VBSP is a smaller institution. By the end of 2008, total capital of VBSP reached 54,610 billion dong, an increase of 51% compared with that of 2007; total outstanding loans reached 52,510 billion dong (VBSP report, 2008).

In our sample, 53% of the respondents borrowed from VBSP and 42% from VBARD; the rest of the loans (about 5%) were given by other financial institutions such as People Credit Fund (Figure 2). The VBSP provides credit in two forms. People can borrow directly from its branches or via social economic unions. The most important unions for VBSP lending are, Farmer's Union, Women's Union, Youth's Union and War Veteran's 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 proofs 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 channeled through so-called guarantee groups composed of the members of women unions, citizen unions, and veterans unions. Collateral is not required as the organization guarantees VBARD of the loan repayment.

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

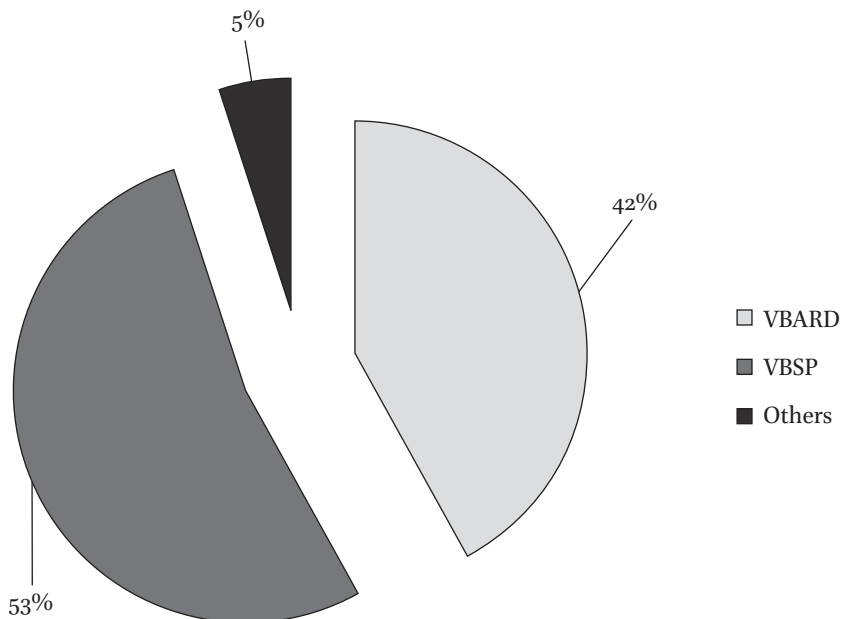


Table 5
Characteristics of formal loans received by rural households in MD 2009

Items	Unit	Mean	Group-based borrowers	Individual borrowers	T-Statistic
Average loan size	1000 dong	14356 (12702)	10150 (6530)	18970 (15880)	-5.42***
Interest rates	%/year	10.82 (2.80)	9.73 (2.18)	12.02 (2.92)	-6.57***
Loan maturity	Month	19.91 (14.51)	23.33 (16.47)	16.16 (10.90)	3.74***

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)

	Average	The VBARD	VBSP	T-statistic
n		91	102	
Loan amount (1,000 VND)	13852 (9547)	18000 (11047)	10198 (6006)	-6.14***
Interest rate (%)	10.64 (2.94)	12.01 (3.11)	9.42 (2.15)	-6.74***
Loan duration (months)	20.27 (15.34)	15.67 (11.36)	24.34 (17.19)	4.03***

Notes: Standard deviation in parentheses

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

4.1.2. Loan characteristics

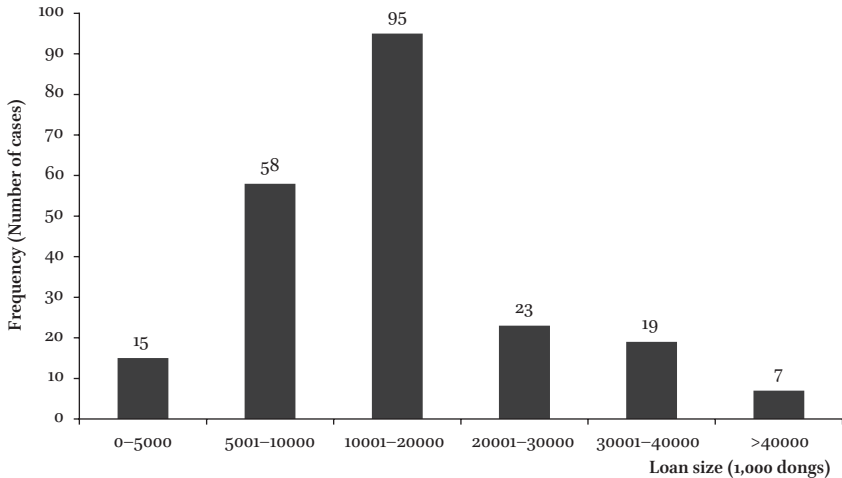
The loan characteristics by type of borrowing scheme and type of bank are compared in tables 5 and 6. Individual households had the largest average loans with 18,970 thousand dongs¹ while group-based households had on average loans of 10,150 thousand dongs. The interest rates charged per year on the households were 12 and 10% 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 Vietnam Banks of Agricultural and Rural Development (VBARD) offers larger loans amount (18,000 thousand dongs on average) than Vietnam Bank Social Policy (VBSP) with 10,198 thousand dongs while VBARD charges higher interest rates (12 percent/year) than the VBSP with 10% /year.

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

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

Figure 3

Distribution of loan-amounts received by the rural households in the Mekong Delta



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 higher than group-based borrowers. Most of the borrowers had completed at least nine years of schooling.

Among the borrowers, 46% were of Vietnamese origin compared to 61% 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, he or she may 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% of borrowers and non-borrowers were involved in village work.

Total landholding has been considered an important determinant of access to credit (Okurut, 2006; Vu, 2002; Zeller et al. 2001). 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.

Table 7
Household characteristics (continuous variables)

N	(1) 106	(2) 106	(3) 113	F-stat
Age of household (years)	44.57 (11.92)	47.64 (11.64)	46.61 (10.49)	1.99
Education level (years)	9.86 (3.82)	10.10 (3.36)	8.70 (3.16)	4.90***
Family size (person)	4.94 (1.70)	4.90 (1.46)	4.89 (1.61)	0.03
Dependency ratio (%)	0.28 (0.21)	0.27 (0.22)	0.31 (0.22)	1.45
Total land size (ha)	11.66 (13.01)	15.49 (10.18)	6.38 (8.17)	20.10***
Value of assets (dongs)	470523 (539095)	615507 (499161)	354495 (655350)	5.64***
Distance to market center (met)	1394 (603)	833 (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)

N	(1) 106	(2) 106	(3) 113	X ² -Stat
Gender (% male)	67	71	52	9.13***
Married (% yes)	90	96	99	10.39***
Red book certificate (%)	91	98	82	15.57***
Vietnamese (% yes)	61	43	51	6.75**
Village Work (% yes)	17	17	19	0.34
Religion (% at least one religion)	62	69	62	1.59
Can Tho (%)	37	27	35	2.72
Soc Trang (%)	34	36	31	0.60
Tra Vinh (%)	28	37	35	1.83

Notes: (1): Non borrowers; (2) Individual borrowers; (3): Group-based borrowers

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

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 incomes of individual borrowers was statistically higher than the income of group-based borrowers and non-borrowers. On average, group-based borrowers were poorest.

4.3 *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, not living far from the market center, and living in Can Tho 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 positively affected by the value of building and negatively related to Vietnamese ethnicity, family size, distance to the market center and being in the Soc Trang province. 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 center, and being in Can Tho province. Clearly these group-based schemes target poorer households.

Table 9
Factor affecting access to credit of rural households

Variables	Access to credit (Probit model)		
	(1)	(2)	(3)
Age (years)	0.013 (0.009)	0.009 (0.013)	0.017* (0.010)
Gender (%male)	-0.156 (0.217)	-0.326 (0.275)	-0.005 (0.261)
Education level (years)	-0.009 (0.029)	-0.064* (0.038)	0.025 (0.034)
At least one religion	0.06 (0.191)	-0.256 (0.248)	0.169 (0.234)
Marriage status	1.121*** (0.412)	1.995*** (0.645)	0.628 (0.468)
Vietnamese ethnic (%)	-0.324 (0.263)	0.168 (0.331)	-0.768*** (0.319)
Family size (person)	-0.044 (0.060)	-0.088 (0.074)	-0.112* (0.076)
Dependency ratio (%)	0.146 (0.453)	0.166 (0.621)	0.199 (0.524)

Table 9 (cont.)

Variables	Access to credit (Probit model)		
	(1)	(2)	(3)
Community involvement (yes=1)	-0.075 (0.258)	0.474 (0.344)	-0.159 (0.299)
Total land (1000 m ²)	-0.006 (0.009)	-0.041*** (0.013)	0.013 (0.009)
Red certificate (%)	0.041 (0.344)	0.081 (0.393)	0.447 (0.577)
Building value (1000 dong)	0.084 (0.082)	-0.090 (0.100)	0.226** (0.106)
Distance to market center (met)	-0.002*** (0.001)	-0.002*** (0.001)	-0.001*** (0.001)
Can Tho province	-0.349 (0.270)	-0.585* (0.341)	-0.033 (0.341)
Soc Trang province	-0.511** (0.284)	-0.269 (0.375)	-0.579** (0.318)
Constant	0.501 (1.006)	2.135 (1.341)	-1.772 (1.281)

Notes: (1): Pooled sample; (2) Individual-non borrowers; (3): Group-non borrowers
Standard deviation in parentheses

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

The determinants of the loan amount as calculated in the second step of Heckman selection and double hurdle models are illustrated in table 10. The results show that the loan amount in general is positively related to the given age, having a job in the community, assets, and having a small family. Loan sizes in group-based schemes seem to be higher for households with lower dependency ratio, having a job in the community, more land and a higher value of building, not being in the Can Tho province. The double hurdle model additionally indicates that female household heads and households with Vietnamese ethnicity may have larger loan amount.

For the individual borrowers, the loan size obtained by the households is positively affected by a smaller family size, having a job in the community, more land and larger building value in both two approaches. 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 mills ratio was not significant in the Heckman models. The findings confirmed that the 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.

Table 10

Factor affecting on loan size by Heckman selection and double hurdle models

Variables	Heckman selection model			Double hurdle model		
	(I)	(II)	(III)	(I)	(II)	(III)
Age (years)	0.069** (0.004)	0.003 (0.005)	0.004 (0.005)	0.007** (0.004)	0.003 (0.005)	0.002 (0.005)
Gender (% male)	0.097 (0.086)	0.125 (0.086)	-0.071 (0.139)	0.110 (0.084)	0.128* (0.086)	-0.057 (0.138)
Education level (years)	0.017 (0.013)	0.001 (0.015)	0.008 (0.019)	0.017 (0.013)	0.006 (0.014)	0.010 (0.018)
At least one religion	-0.099 (0.084)	-0.033 (0.087)	-0.197 (0.137)	-0.121 (0.083)	-0.028 (0.086)	-0.222* (0.134)
Marriage status	0.081 (0.305)	0.405 (0.444)	0.378 (0.417)	-0.102 (0.284)	0.392 (0.419)	0.161 (0.398)
Vietnamese ethnic (%)	0.153 (0.116)	0.181 (0.117)	0.227 (0.187)	0.191** (0.112)	0.173* (0.117)	0.289* (0.176)
Family size (person)	-0.046** (0.026)	-0.019 (0.026)	-0.115*** (0.045)	-0.041* (0.026)	-0.014 (0.026)	-0.096*** (0.043)
Dependency ratio (%)	-0.150 (0.183)	-0.415** (0.210)	0.004 (0.272)	-0.158 (0.182)	-0.440** (0.209)	-0.017 (0.267)
Community involvement (yes=1)	0.342*** (0.105)	0.421*** (0.112)	0.311** (0.170)	0.330*** (0.104)	0.398*** (0.108)	0.316** (0.168)
Total land (1000 m ²)	0.014*** (0.004)	0.010** (0.005)	0.013** (0.008)	0.014*** (0.004)	0.009** (0.005)	0.010 (0.007)
Red certificate (%)	-0.138 (0.142)	-0.199** (0.121)	0.342 (0.459)	-0.120 (0.141)	-0.193* (0.120)	0.318 (0.461)
Building value (1000 dongs)	0.150*** (0.036)	0.095*** (0.035)	0.127** (0.062)	0.147*** (0.035)	0.098*** (0.035)	0.125*** (0.061)
Can Tho province	-0.200* (0.120)	-0.334*** (0.118)	0.027 (0.212)	-0.202* (0.119)	-0.335*** (0.118)	0.066 (0.210)
Soc Trang province	-0.053 (0.111)	0.165 (0.122)	-0.207 (0.180)	-0.032 (0.110)	0.170 (0.122)	-0.104 (0.169)
Constant	7.384*** (0.496)	7.771*** (0.587)	7.632*** (0.857)	7.609*** (0.474)	7.700*** (0.027)	7.982*** (0.776)

Table 10 (cont.)

Variables	Heckman selection model			Double hurdle model		
	(I)	(II)	(III)	(I)	(II)	(III)
Inverse Mill ratio						
Rho	0.348	0.003	0.442			
Sigma	0.547	0.399	0.577			
Lamda	0.191	0.002	0.255			

Notes: (I): Pooled sample; (II) Individual-non borrowers; (III): Group-non borrowers
Standard deviation in parentheses

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

5. Conclusions and Implications

This paper investigates the determinants of demand for formal credit by rural households of 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 loan amount. Other factors influencing the decision to borrow were the marital status, distance to the market center, and location of households. The findings are similar to those of previous studies (Mohamed, 2003; Ha, 2001; Ha, 1999; Bell et al., 1997). 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 also 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 as important. Having collateral, or an institutional arrangement that overcomes the need for collateral such as group lending or government insurances, is a first step in closing the gap between demand and supply. 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. The VBARD issues loans without collateral, yet 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 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. Our results suggest that location is of great importance, with households in Can Tho having a lower probability to borrow. This is due to the fact that most of small ethnic group who are benefiting from the cheap credit or other government programs located in Soc Trang and Tra Vinh. Furthermore, the 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 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 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 formal credit sectors but they could not know what to do. It is significant to suggest that financial institutions in Mekong Delta in general and in three given provinces in particular, could make more efforts in exchanging and transferring information on the 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 transfer. These will promote 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 expenses based on their production cycles. In addition, financial institutions could adapt the loan producers to their rural clients' constraints. Finally, the institutions should consider the loan duration by focusing on medium and long-term loan contracts that could help for example to mobilize the 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.

References

- Agribank (2009). "Vietnam Bank of Agricultural and Rural Development Agribank's Milestones in Development." Access at: <http://www.agribank.com.vn/102/784/about-us/history.aspx>.
- Akoten, John. E., Sawada, Yasuyuki., and Kejiro Otsuka., 2006. The Determinants of Credit Access and Its Impact on Micro and Small Enterprises: The case of Garment Producers in Kenya. *Economic Development and Cultural Change*. 54(4): 927-944.
- Armendariz, B.A. and Jonathan Morduch. 2005. *The economics of microfinance*. London: MIT Press.
- Asia Development Bank: Annual report, 2005.

- Barney, J. 1991. Firm resources and sustained competitive advantage. *Journal of Management*. 17: 99-120.
- Barslun, Mikkil, and Finn Tarp., 2008. Formal and Informal Rural Credit in Four provinces of Vietnam. *Journal of Development Studies*. 44(4): 485-503.
- Bell, Clive., Srinivasan T.N., and Christopher Udry., 1997. "Rationing, Spill over and interlinking in Credit Markets: The Case of Rural Punjab." *Oxford Economic Papers*. 49: 557-585.
- Blaylock, J.R. and W.N. Blisard., 1993. Wine consumption by US men. *Applied Economics*. 25(5): 645-651.
- Cao, D.D., 1997. "Impacts of Interest Rates, Borrowing Transaction Costs on Borrowing and Structure of Rural Credit Market: A Study of Soctrang Province." Master of Arts in Economics of Development, Vietnam – Netherlands Project, Ho Chi Minh City.
- Commins, Stephen., Benson, Laura., El-Wakil, Sonja., Gambirazzi, Gerardo; Song, Peter., and Felicity Wood., 2001. "Poverty reduction strategies in Vietnam." UCLA School of Public Policy and Social Research, June 2001.
- Conning, Jonathan., and Christopher Udry., 2005 "Rural Financial Markets in Developing Countries, Economic Growth Centre." Yale University, and Centre Discussion Paper No. 914.
- Cragg, J., 1971. Some statistical models for limited dependent variables with application to the demand for durable goods. *Econometrica*. 39(5): 829-844.
- Darling, Malcolm Lyall., 1925. *The Punjab Peasant in Prosperity and Debt*, Oxford University Press, London.
- Diagne, Aliou., 1999. "Determinants of household access to and participation in formal and informal credit markets in Malawi." Food Consumption and Nutrition Division, Discussion Paper No. 67.
- Doan, Tinh Thanh., 2011. "Impacts of Household Credit on the Poor in Peri-Urban Areas of Ho Chi Minh City, Vietnam." A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Economics at The University of Waikato, Japan.
- Dutta, Dilip., and Ihab Magableh., 2006. A social-economic study of the borrowing process: the case of micro-entrepreneurs in Jordan. *Applied Economics*. 38: 1627-1640.
- Floro, S.L. and P.A. Yotopoulos., 1991. "Informal Credit Markets and the New Institutional Economics: The Case of Philippine Agriculture Boulder": Westview Press.
- Fritzen, Scott., and Caroline Brassard., 2005. "Vietnam Inequality Report 2005: Assessment and Policy Choices." Mekong Economics Ltd Synthesis Paper of the "DFID Drivers of Inequality in Vietnam" Project.
- Greene, W.H., 2000. *Econometrics Analysis*. Prentice-Hall, Inc. Upper Saddle River, New Jersey.
- GSO (2010). General Statistics Office: Statistical Yearbook of Vietnam 2008 (in Vietnamese). Statistical Publishing House, Hanoi.
- Gujarati, D.N. and D.C. Porter., 2009. *Basic Econometrics*. Fifth Edition. Mc Graw Hill, New York.
- Ha, Nguyen Thi Thu., 1999. "An analysis of informal versus formal microfinance for the poor in Vietnam." The Vietnamese – Netherlands Master's program in development economics, Class 6 (1999-2001).
- Ha, Vu Thi Thu., 2001. "Determinants of Rural Households' Borrowing from the Formal Financial Sector: A study of the rural credit market in Red river delta region", Master of Arts in Economics of Development, Vietnam – Netherlands Project, Hanoi.
- Heckman, J.J., H. Ichimura, and P.E. Todd., 1998. Matching as an econometric evaluation estimator. *Review of Economic Studies*. 65 (223): 261-294.
- Heltberg, Rasmus., 2003. "Inequality in Vietnam: A Regression-based Decomposition." Paper presented at the UNU-WIDER Conference on Inequality, Poverty and Human Well-Being, Helsinki. http://www.adb.org/Documents/Reports/Annual_Report/2005/ADB-Annual-Report-2005.pdf
- Jensen, H. and S. Yen., 1996. Food expenditures Away from Home by Type of Meal. *Canadian Journal of Agricultural Economics*. 44: 67-80.

- Jones, A.M., 1989. A double-hurdle model of cigarette consumption, *Journal of Applied Econometrics*. 4: 23-39.
- Kimuyu P. and J. Omiti., 2000. "Institutional Impediments to Access to Credit by Micro and Small Scale Enterprises in Kenya." IPAR Discussion Paper No.026/2000. IPAR. Nairobi.
- Lee, L.F., and G.S. Maddala., 1985. "Sequential Selection Rules and Selectivity in Discrete Choice Econometric Models." Mimeo, University of Florida.
- Lore, M., 2007. "An Evaluation of Human Capital Factors that can Enhance Access to Credit among Retailers in Nairobi." Unpublished Project Report Submitted to United States International University-Africa. Nairobi.
- Manig, Winfried., 1990. Formal and Informal credit markets for agricultural development in developing countries – The example of Pakistan. *Journal of Rural Studies*. 6(2): 209-215.
- Mohamed, Khalid., 2003. "Access to Formal and Quasi-Formal Credit by Smallholder Farmers and Artisanal Fishermen: A Case of Zanzibar." Research on Poverty Alleviation (REPOA), Mkuki na Nyota Publishers, Dar es Salaam, Tanzania.
- Nguyen, M.H., 2001. "Effect of Farmer's Education on Household's Access to Formal Credit: A Case of Vietnam Rural." M.A thesis, Master of Art in Economic Development, The Vietnam-Netherlands Project, Ho Chi Minh City.
- Nguyen Ngoc Anh., 2010. Better poultry value chain development through microfinance in Vietnam, Master thesis, Solvay Brussels School, Universite Libre De Bruxelles.
- Nguyen, V.C., 2007. "Determinants of credit participation and its impact on household consumption: Evidence from rural Vietnam." Paper presented at the 3rd Leicester PhD Conference on Economics, England.
- Ninh, Le Khuong., 2003. "Investment of Rice Mills in Vietnam: The Role of Financial Market Imperfections and Uncertainty." F. Tempelaar, Faculty of Economics in University of Groningen.
- Okurut, Francis Nathan., 2006. "Access to credit by the poor in South Africa: Evidence from Household Survey Data 1995 and 2000." Stellenbosch economic working papers: 13/2006.
- Pham, Bao Duong., and Izumida, Yoichi., 2002. Rural Development Finance in Vietnam: A Microeconomic Analysis of Household Surveys. *World Development*. 30(2): 319-335.
- Przeworski, Adam., and James Raymond Vreeland., 2000. The effect of IMF Programs on Economic Growth. *Journal of Development Economics*. 62(2): 385-421.
- Pudney, S., 1989. "Modelling Individual Choice: The Econometrics of Corners, Kinks and Holes." New York, Basil Blackwell.
- Putzeys, Ruth., 2002. "Microfinance in Vietnam: Three Case Studies." Rural Project Development, Hanoi 2002.
- Quach, Manh Hao., Mullineux, Andy W., and Victor Murinde., 2005. "Rural credit and household poverty in Vietnam." Paper presented at the 1st VDF Tokyo Conference on the Development of Vietnam at GRIPS, One-page Presentation, Tokyo Exhibition, Japan.
- , 2003. "Microcredit and Household Poverty Reduction in Rural Vietnam." Paper presented at the DSA Conference in Glasgow, 10-12th September 2003 and at the ESRC conference in Manchester 31st, October, 2003.
- Rahman, Sayma., Junankar, P.N., and Girijasankar Mallik., 2009. Factors influencing women's empowerment on microcredit borrowers: a case study in Bangladesh. *Journal of Asia Pacific Economy*. 14(3): 287-303.
- Robinson, Marguerite., 2001. "The Micro-finance Revolution: Sustainable Finance for the Poor", Washington D.C. World Bank.
- Rutherford, Samuel., 2002. "The poor and their money." Oxford University Press, Oxford.
- Schaffner, Julie Anderson., 2002. Heteroskedastic sample selection and developing country wage equations. *Review of Economics and Statistics* 8(2): 269-280.
- Schafgans, Marcia M.A., and Zinde-Walsh, Victoria., 2002. The intercept estimation in the sample selection model. *Econometric Theory* 18(1): 40-50.

- Schipper, Y., (2002) 'The Microfinance in Vietnam: Case Study', lecture notes paper. Soc Trang annually social economic report, 2009, access at: <http://www.soctrang.gov.vn/wps/portal>.
- Su, S., and S. Yen., 1996. Micro-econometric Models of Infrequently Purchased Goods: An Application to Household Pork Consumption. *Empirical Economics* 21: 513-533.
- Swain, R.B., Sanh, N.V. and V.V. Tuan. 2008. Microfinance and Poverty Reduction in Mekong Delta in Vietnam. *African and Asian Studies*. 7(2-3): 191-215.
- Takahashi, Kazushi, Higashikata, Takayuki., and Tsukada., Kazunari., 2010. The short-term poverty impact of small-scale, collateral free microcredit in Indonesia: A matching estimator approach. *The developing Economics* 48(1): 128-55.
- Tra, Pham Thi Thu., and Robert Lensink., 2007. Lending policies of informal, formal and semiformal lenders. *Economics of Transition*. 15(2): 181-209.
- Tsukada, Kazunari, Higashikata, Takayuki., and Takahashi, Kazushi. 2010. Microfinance penetration and its influence the credit choice in Indonesia: Evidence from a household panel survey. *The Developing Economics*. 48(1): 102-127.
- Vietnam Bank of Agricultural and Rural Development, 2009. "Agribank's Milestones in Development". <http://www.agribank.com.vn/102/784/about-us/history.aspx>
- Vietnam Bank Social and Policy, 2008. http://www.vbsp.org.vn/evbsp/view_content.php?mamm=34
- Vreeland, James Raymond., 2002. The effect of IMF Programs on Labor. *World Development*. 30(2): 121-139.
- Wiklund, J., and D. Shepherd., 2003. Knowledge-based Resources, Entrepreneurial Orientation and Performance of Small and Medium Sized Businesses. *Strategic Management Journal*. 24: 1307-1314
- World Bank report, 2002: <http://www.worldbank.org/html/extpb/2002/Contents.htm>
- Zeller, Manfred., 1993. "Participation of Rural Households in Informal and Formal Credit Markets in Madagascar." Washington, D.C.: IFPRI.
- , 1994. Determinants of Credit Rationing: A Study of Informal Lenders and Formal Credit Groups in Madagascar. *World Development*. 22 (12): 1895-1907.
- Zeller, Manfred., Diagne, Aliou., and Martine.C. Mataya., 1997. Market Access by Smallholder Farmers in Malawi: Implications for Technology Adoption, Agricultural Productivity, and Crop Income. *Agricultural Economics*. 19(1-2): 219-229.