Are households' poverty levels in Mekong Delta of Vietnam affected by access to credit?

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Abstract:

This paper investigates the impact of access to formal credit on household poverty in Mekong Delta (MD) – Vietnam. The analysis is based on some indicators of household poverty such as households' total assets, educational costs, healthcare costs, food consumption, non-farm expenses, off-farm expenses and total income. Based on the given indicators, a comparison is made between borrowers and non-borrowers in a sample of 325 households using the Matching Methods. The findings suggest that the borrowers are better off in education expenditure, healthcare expenses, and total income than those of non-borrowers. The results show that access to formal credit is likely to reduce poverty levels among rural households in Mekong Delta.

Key-words: Formal credit, propensity score matching, household welfare, individual and group based lending.

JEL: E5, G2, I3, O2

1. Introduction

Microfinance could be seen as a specialized institutions, pioneered by the Grameen Bank in Bangladesh, that supply to the needs of the poor (Morduch, 1999). As part of microfinance, rural credit could be defined as transactions in small amounts of both credit and saving, including mainly small-scale and medium-scale business for households. Households that cannot run a small business because of lacking capital may also benefit from credit institutions. Thus, credit may play an central role in reducing vulnerability through a number of channels, a significant impact on poverty reduction obtained under restrictive conditions (Zaman, 1999) .

Credit is found to provide opportunities for the households to be better off in per capita income, per capita expenditure, and asset levels (Khandker, 2001). Hulme and Mosley (1996) show that poor people are likely to invest in livelihood strategies and break out of a poverty circle through access to credit. Also Zaman (2001) confirmed the positive impact of microcredit provided by the Bangladesh Rural Advancement Committee. Khandker (2003), Morduch and Haley (2002), and Robinson (2001) validate the importance of microfinance for poverty alleviation, as it would improve households' productivity levels, and hence smooth income and consumption flows (Robinson, 2001).

Other studies found no significant impact of microcredit on households' welfare development and poverty reduction. For instance, Coleman (1999) concludes that a microcredit program he studied in Thailand had no impact on household income. And, Diagne and Zeller (2001) did not find a statistical significant impact of microcredit on household income in Tanzania. Chowdhury (2008) even suggests that, in his study poor households had become poorer through the additional burden of debt.

All these impact evaluations attempt to answer the same question: can microcredit make a difference? It remains an important question in all areas where microcredit is available in its

different forms with the aim to provide a platform for improvement of other programs or a benchmark for the creation of new credit programs, both from a bank business perspective as from an aid agency point of view.

Yet, measuring impact demands a careful analytical approach. A first major problem in evaluating the impact of access to credit is the endogeneity of the program participation on the output. Secondly, selection bias may overestimate the impact. It results from unobserved characteristics of households such as motivation for higher income or ability in business activities. To overcome endogeneity and selection bias, this paper uses a Propensity Score Matching approach to analyze the potential effect of formal credit in the Mekong Delta of Vietnam.

The rural areas of the Mekong Delta are among the poorest regions of Vietnam where the livelihoods of households have been affected by natural disasters such as floods, erosion, unpredictable rainfall, and other environmental disturbances (MPR, 2004). This has called for urgent attention from the state and development partners to help to improve the lives of the poor in the region. While most of non-poor farmers are in principle able to take out formal credit, it is frequently not sufficiently flexible or responsive to their financial needs. Poor households, on the other hand, have limited access to financial risk management instruments (savings, credit and insurance) which constrains their ability to cope with the shocks and further increases vulnerability to poverty (Ardington, 2004). The poor are often forced to borrow on informal markets to meet their credit demands (Montel et al, 1993), for both productive investment (Binswanger and Khandker, 1995) and consumption smoothing (Heidhues, 1995).

The aim of this paper is to analyze whether outreach projects of the formal financial institutions, for instances Vietnamese Bank of Agriculture and Rural Development (VBARD) and the Vietnamese Bank Social Policy (VBSP) with microcredit, had any effect on key-

livelihood indicators of the beneficiaries, namely on levels of expenditure, income, expenditure on food, education and health care. The question of whether credit really benefits poor households depends on how we classify poverty and what kind of help credit provides to the household to improve their living standards. The poverty may be defined as a lack of ability to participate in national life, especially in the economic sphere. Such lack of ability may includes lack of access to public provision of economics, social and human infrastructures; lack of access to credit, opportunities for income generation, and consumption stabilization, and so on (UNDP, 1996). It is argued that what credit can do for the households depend on their ability to utilize what microfinance offers them. In some cases, it provides opportunities for the households to be better off in capita income, per capita expenditure, and household net worth (Khandker, 2001). In other cases, credits are more important tools for the low income people to improve their household and enterprise management, increase productivity, smooth income flows, and consumption costs, enlarge and diversify their business (Robinson, 2001).

The aim of the paper is to determine the impact of rural credit on household poverty in Mekong Delta of Vietnam. The plan of the paper is constructed as follows. Section 2 provides an methodology of the paper while section 3 presents the empirical results of the paper. Finally, section 4 concludes the paper.

2. Methodology

This paper uses a propensity score matching (PSM) approach to assess the impact of access and uptake of formal microcredit. The domains of change as a result of microcredit are expenditure on human capital creation (health care and education), and the markers of change are income and expenditure levels. Due to a lack of baseline data, cross-sectional data of a control group of non-borrowers is used as a counterfactual. The particularity of this study is that we assess the impact of formal microcredit institutions and we compare the different

outcomes between borrowers and non-borrowers cases. This will enable to assess the impact of formal rural microcredit policy as well as the success of the institutional tools.

The matching method consists of two steps. First, a probit model assesses the propensity score or the probability of the households' access to credit. Second, the difference in outcomes between borrowers and non-borrowers is measured by a matching method while controlling for the propensity scores. This guarantees that a borrower is compared to a non-borrower with the same characteristics. Both steps are explained below.

2.1 Propensity score matching on the access to credit

The decision to take out credit by households is expected to be affected by institutional factors, product features and household socio-economic characteristics (Okurut, 2006). At the level of the access to the institution, the location of the financial service providers and their conditions are expected to influence the probability to attract rural borrowers (Dallimore and Mgimeti, 2003). Product features may include issues of credit rationing such as the interest rates and collateral requirements (Kochar, 1997). The socio-economic characteristics of the household are important because these will influence the household's willingness (including the purpose of borrowing) and capacity (including the potential repayment performance) to borrow. The propensity scores are based on probit models as follows (adapted from Gujarati and Porter (2009)):

$$P(Y_i) = P(Y = 1 \mid X) = \beta_i X_i + v_i \qquad (1)$$

$$Y_i = 1 \text{ if } Y^* > 0 \qquad (2)$$

$$Y_i = 0 \text{ otherwise.} \qquad (3)$$

X_i represents vector of random variables, β_i is a vector of unknown parameters, and v_i is defined as standard error of estimation. The outcome Y_i is whether the household has taken out credit or not.

Following Aleem (1990), Bell (1997) and Vaessen (2011), the following household characteristics are included in the model, namely age of the household head, gender, educational level, and marriage status. In addition, Kochar (1997) uses the level of income and expenditure of households factors affecting on the access to credit of households. The issues relative to households, institutions and finance can influence on whether or not use credit of households. Furthermore, location as a major indicator for access to banking is capture in dummies for provinces (Dallimore and Mgimeti, 2003). Location is also important because the distribution of Vietnamese government programs are different over provinces, thus the probability of access to credit may also be affected. The given variables are likely included in the model of this paper.

>>>>> Insert table 1 about here

2.2 Propensity Score Matching Method

The second model calculates the difference in outcome levels between borrowers and non-borrowers based on a matching approach. Estimating the treatment effects on the treated based on propensity score requires two assumptions (Chemin, 2008) the first is the Conditional Independence Assumption which indicates that for a given set of covariates, participation is independent of potential outcomes (non-treatment) or in other words, that 'non-treated outcomes are what treated outcomes would have been had they not been treated' (Chemin, 2008). The second assumption is that of Common Support. This is that the average treatment effect on the treated (ATT) is only defined within the region of common support. This assumption should guarantee that households with the same values for independent variables X_i have a positive probability of being both participants and non-participants (Heckman et al., 1997; Chemin, 2008). All non-participants could constitute a possible participant and all treated participant have a counter part in the non-participant population (Chemin, 2008).

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The ATT is defined as the average treatment effect for the sub-population with a given value of the pre-treatment variables. It is estimated by taking the difference between the treatment and control averages in the sub-population that are matched through the propensity scores. The population average treatment effects are then estimated by weighting these sub-population estimates. The ATT effect is thus (Becker and Ichino, 2002):

$$ATT = E\{Y_{1i} - Y_{0i}|D_i=1\} \tag{4}$$

$$ATT = E[E\{Y_{1i} - Y_{0i}|D_i=1, p(X_i)\}] \tag{5}$$

$$ATT = E[E\{Y_{1i}|D_i=1, p(X_i)\} - E\{Y_{0i}|D_i=0, p(X_i)\}|D_i=1] \tag{6}$$

Where ATT is the average treatment on the treated; Y_{1i} and Y_{0i} are the potential outcomes in two counterfactual situations of the borrowers and non-borrowers, respectively; the $p(X_i)|D_i=1$ is the propensity score of treated households.

Several matching techniques are used (see Caliendo and Kopeinig (2005) for details). This paper uses a Stratification matching and a Kernel matching approach. The details are given in the next sections.

2.2.1. Stratification matching (SM) approach

The stratification procedure is based on the same approach used for estimating the propensity scores such that, within each interval, treated and control units have on average the same propensity score (Dehejia and Wahba, 1999). It is advised to use the same blocks within which the balancing property is examined. Within each interval, the difference between the average outcomes of the treated and the control observation is computed as follows (Hehejia and Wahba, 1999):

$$T_q^S = \frac{\sum_{i \in I(q)} Y_i^T}{N_q^T} - \frac{\sum_{j \in I(q)} Y_j^C}{N_q^C} \tag{7}$$

Where: I(q) is the set of units in block q, that is automatically chosen in the propensity score estimation; NTq, NCq are the numbers of treated and control units in block q, respectively. The total number of blocks is Q.

Finally, the ATT is obtained as an average of the ATT of each block with the weight of each block given by the corresponding fraction of treated units (Hehejia and Wahba, 1999):

$$T^{S} = \sum_{q=1}^{Q} T_{q}^{S} \frac{\sum_{i \in I(q)} D_{i}}{\sum_{\forall i} D_{i}} \tag{8}$$

2.2.2. Kernel matching (KM) approach

In the Kernel matching method all treated cases are matched with a weighted average of all controls using weights that are inversely proportional to the distance between the propensity scores of treated and controls (Heckman et al., 1998). The ATT is then calculated as follows (Heckman et al. 1998):

$$ATT = \frac{1}{N_{1}} \sum_{i \in I_{1}} \left\{ Y_{i} - \sum_{j \in I_{O}} \frac{K\left[(P(x_{j}) - P(x_{i}))/h\right]}{K\left[(P(x_{j}) - P(x_{i}))/h\right]} Y_{j} \right\} \tag{9}$$

Where Y_{i}, and Y_{j} are the outcomes of treated and non-treated households, respectively; K(.) is the Kernel function; h is the estimated bandwidth; I_{1} is the sample of the treated cases and I_{0} is the sample of non-treated controls; P(.) are the probabilities of treated and non-treated cases.

Apart from the two methods used in this paper, other propensity score matching methods are available (see Heckman et al., 1998). Yet, these have a number disadvantages which is why we did not use them for this study. The Nearest Neighbor Matching approach (NNM) method should be used very carefully as it violates the common support assumption (Cochran and Rubin, 1973). This approach will provide an estimate even when there are no sufficient comparable units. Radius Matching (RM) is more suitable but the estimated results are

relatively imprecise compared to the SM and KM approaches because only one control is matched with each participant. Instead, the SM method matches the average of several individuals. However, equal weights are given to an individual at the limit of the stratum and to an individual close to the observed unit, since the average is only arithmetic (Chemin, 2008). The KM method overcomes this problem by giving each individual a weight decreasing in distance compared to the intentional unit. As all individuals in the control group are used, the KM method is also likely to relax the common support assumption (Chemin, 2008).

2.3 Research area and data

The Mekong Delta is located in the southern part of Vietnam (Figure 4). With 13 provinces, the Mekong Delta has a population of more than 17 million people and 40.6 thousand square kilometers (GSO, 2009). This delta region receives rich alluvium nutrition from the Mekong River, which is very advantageous for agriculture especially for rice production (Hien and Kawaguchi, 2002). The main cash crop of the region is rice. Additionally, aquaculture has rapidly developed in this region with the export of raw and frozen fish products (in particular Pangasius species) to the rest of the world (Dang and Danh, 2008).

The data used in this paper was obtained from interviewing rural households in three provinces in the Mekong Delta namely: Can Tho, Soc Trang, and Tra Vinh (Figure 1). 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 supports rice production in the

region. The second province, Soc Trang, is characterized by more ethnic diversity compared to Can Tho. Its economy is based on agriculture and the area is more vulnerable to flooding. The district of Thanh Tri was chosen for this study because it is found to be representative. Finally, the province of TraVinh was chosen for its distinctive rural characteristics. Households were randomly selected in the Cau Ngang district. They are mainly employed in arable farming and seafood production.

>>>>> Insert figure 1 about here

The sampling of the rural households was based on a combination of randomness and convenience, dictated mainly by the accessibility of the households. The respondents were directly interviewed by the lead author and colleagues from the Can Tho University. The questionnaire was designed to gather general information on households, their economic activities including the outcomes of the agricultural activities and details on the access to credit and the loan status. More specifically, during the interviews, general information such as the age, education and household size, as well as data on the household's expenditure and asset levels, employment, agricultural activities and non-agricultural employment and self-employment were collected. Important was also the membership to ethnic groups, and involvement in social village work. Finally details on credit and savings were recorded.

In total 325 households were interviewed of whom 219 (67 percent) households had access to credit, and 106 (32 percent) had not (Table 2).

>>>>> Insert table 2 about here

Poverty in Vietnam is concentrated in the rural area, about 90 percent of people living under the poverty line (VPA, 2002). The average monthly income and expenditure per capita of the region is 939,900 dongs[1] and 703,300 dongs, respectively. These figures are lower than the

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[1] 1 USD = 20,905 dongs from http://www.vietcombank.com.vn/en/exchange%20rate.asp

averages of the whole country, which are 995,200 dongs and 792,500 dongs per month, respectively (GSO, 2008). The region has an gini coefficient of 0.395 in 2008 (GSO, 2008) which is lower than the average for Vietnam (0.434). Poverty levels in the Mekong Delta are especially high among the rural population, Khmer people and female headed households. Poverty rates also vary between provinces of the Mekong Delta. Soc Trang and Tra Vinh have the highest head counts, while Can Tho and Long An have relative less poor people (Figure 2).

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A report by the Mekong Delta Poverty Analysis (MDPA) (2004) showed that one of the main causes of rural poverty is a lack of access to land. Recent government policies towards land issues are expected to have a positive impact on reducing poverty in Vietnam and in the Mekong Delta (Ravallion and Walle, 2008). Yet, also poor human capital and low market accessibility have contributed to high poverty among farmers in the Mekong Delta. Furthermore, etnicity plays a role. The Khmer ethnic people make up a large part of the poor in Soc Trang, Tra Vinh, Bac Lieu and Kien Giang (MDPA, 2004).

3. Empirical results

3.1. Poverty in Vietnam and Mekong Delta

This part aims at describing the current poverty level in Vietnam and in MD. It depicts the mechanism behind the poverty path. Poverty levels in Vietnam have dropped remarkably in the last years (Figure 3). These improvements partly resulted from governmental poverty reduction programs, namely programs number 143, 134 and 135[2]. The 135 program has, therefore been extended to second phase from 2006 to 2010 (CEMA and UNVN, 2009). In addition to those programs, many other mass organizations, social unions and NGOs take part

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[2] These programs have their names from their Decree Number 135/1998 QD-TTg and 134/2004QD-TTg of the government. The 135 program aims at developing the socio-economic situation of ethnic people in extremely difficult communes and villages, and narrowing the development gap between ethnic groups and other regions (CEMA and UNVN, 2009). The 134 program also aims at the similar outcomes but focus on land and water issues (135 program website).

in the poverty alleviation in the MD by providing credit to the poor and other social policy beneficiaries, namely the Vietnam Women Union, Farmer Union, War Veterans Union e.g.

>>>> Insert figure 3 about here

The poverty level in the MD has been remarkably concerned, similar to the general trend of the country as a whole in the last several years (Figure 3). This resulted from the economic growth of the region. MD is located in the southern part of Vietnam. With 13 provinces, the MD has a population of more than 17 million persons and 40.6 thousand square kilometers (GSO, 2009). This delta region receives rich alluvium nutrition from the Mekong River, which is very advantageous for developing agriculture especially rice cultivation and horticulture (Akira, 2005). Therefore, the main economic activities in the MD are agricultural activities. The main cash crop of the region is rice, which is the most important export product of Vietnam. Additionally, aquaculture of this region has rapidly developed with the export of raw or frozen products to the rest of the world (Dang and Danh, 2008).

The poverty rate of the MD is relative lower than in some other regions (Figure 3). However, poverty remains concentrated in the rural area and some provinces. The average monthly income per capita and expenditure per capita of the region is 939,900 VND and 703,300 VND. These are lower than the averages of the whole country, which are respectively 995,200VND and 792,500VND per month (GSO, 2008). Poverty levels in MD are high among the rural population, Khmer people and women. The poverty rate in MD varies between provinces. Soc Trang and Tra Vinh have the highest rate of poor people in the total population. Can Tho and Long An are the two provinces having the least number of poor people. The Mekong Delta Poverty Analysis (MDPA) (2004) report showed that the main cause of poverty is a lack of land, but the recent improvement of government on land issues has a positive impact on poverty in Vietnam and in MD (Ravallion and Walle, 2008). Poor human capital and low market accessibility has also contributed to the poverty of farmers in

the MD. The Khmer ethnic people make up a largest of the poor in Soc Trang, Tra Vinh, Bac Lieu and Kien Giang (MDPA, 2004).

The region has a relative average Gini Coefficient of 0.395 in 2008 (GSO,2008) which is smaller than the average of the whole country 0.434. This means that the gap between the rich and the poor is not very large. However, the government needs to take this gap into account in times of fast economy growth.

With impressive recent economy growth, Vietnam attracts many aids from foreign countries. However, targeting these aids for poverty alleviation needs appropriate policies by the government. Le (1999) suggests that there is a failure in aid allocation in Vietnam and that donors need to use information from other donors in allocating their aids. Dollar (2002) investigates that although, Vietnam's institutional environment has improved, the starting level of this process in Vietnam is much lower than in other emerge economies.

3.2. Probability of rural households' access to credit in MD

>>>> Insert table 3 about here

Table 3 gives the factors that affect the probability of access to formal credit by rural households in Mekong Delta. These factors include household's characteristics, financial issues and location effects. Determinant for the access to credit seems to be the marital status (higher likelihood to borrow when married), distance to a market center (higher likelihood when closer to the center) and staying in Can Tho or Tra Vinh province (table 8). These results concur with findings of Okurut (2000) and Ha (1999).

3.4. Impact of access to credit on rural households' poverty

The ATT calculated with a stratification and a kernel matching method are given in Table 4. The findings indicate that there is a tendency for borrowers to improve their living standard in the long run. Borrowers seem to have spent more on education and on health care. For group-based lenders, having access to credit also seems to increase income and asset

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levels. It needs to be reminded that the propensity score method attempts to reduce selection bias. The difference in income could therefore be attributed to the access to credit, given that other factors are controlled for by the propensity scores. Unobservable factors such as entrepreneurship and attitudes towards work or risk may of course play a role, and we are not able to control for these.

In short, the different effects of access to formal credit have been significantly illustrated in the case of rural areas of Mekong Delta. Based on given indicators, most of borrowers are better off than the counterparts.

4. Conclusions and implications:

The findings on the treatment effect suggest that the borrowers are better off in terms of long term livelihood investments compared to non-borrowers. The results show that access to formal credit is likely to increase expenditure on health care and education among rural households in Mekong Delta of Vietnam. This would imply that access to credit has a particularly beneficial effect on increasing the living standards of the children in the household. Individual borrowers do not report higher income, asset and investment levels, but they seem to make a clear choice for improved levels of wellbeing.

Additionally, with given issues in mind, the impact of access to credit is very importance for all rural households in Mekong Delta of Viet Nam. As discussed previously, the gap between urban and rural households' income is gradually increased. A benefit implication for credit access is to provide the fuel for households increasing their living standards through their generating income activities. For the poorest households, the impact of credit is mainly on their consumption (expenditure) level. The demand for credit by the poorest households is largely for emergency credit to support consumption and reduce vulnerability to various risks. However, most of the existing credit programs have not adequately addressed the issue of servicing the demands for financial services emanating from

the poorest ones. Therefore, it is very significant to take into account the differences among the credits programs clients in different income groups and their need demands in designing more effective financial instruments.

Lastly, as discussed by earlier studies, the credit alone is not sufficient to improve the living conditions of the rural households. Some of the problems that many customers of formal credit programs are lack of skills and training, limited access to markets and technology. As a result, even when these households have access to credit and start up new business or firm, the sustainability of these businesses become an topic of consideration. Thus, it is very importance that the financial institutions facilitate or involve directly in giving "credit plus" services that may include skill development/training, marketing facilities and business development services to their customers to help them to sustain their economic activities supported by financial schemes.

References

Akira, Y. (2005) *Zoning for risk assessment of water-related natural disasters in the Mekong Delta. N. H. Chiem*, Faculty of Agriculture in Can Tho University 132 pages

Aleem, I. (1990) Imperfect Information, Screening, and the Costs of Informal Lending: A Study of a Rural Credit Market in Pakistan, *The World Bank Economic Review* l4(3):329 - 349.

Ardington, C., D.Lam, and J. Levinsohn (2004) *Savings, Insurance and Debt over the Post-Apatheid Period: a review of recent research*, CSSR Working Paper No. 65, University of Cape Town.

Becker, S.O. and A.Ichino (2002) Estimation of average treatment effects based on propensity scores, *The Stata Journal* 2(4): 358 – 377.

Bell, C; T.N. Srinivasan, and C.Udry (1997) Rationing, Spillover and Interlinking in Credit Markets: The Case of Rural Punjab, *Oxford Economic Papers* 49: 557 - 585.

Binswanger, H.P. and S.R. Khandker (1995) The Impact of Formal Finance on the Rural Economy of India, *The Journal of Development Studies* 32(2): 234 – 265.

Caliendo, M. and S. Kopeinig (2005) *Some practical Guidance for the Implementation Propensity Score Matching,* Discussion paper No.1588 of Forschungsinstitut zur Zukunft der Arbeit Institute for the Study of Labor, Bon Germany, May 2005.

CEMA The Committee for Ethnic Minority Affairs and UNVN The United Nations in Vietnam (2009). Reviewing The Past Responding To New Challenges: Mid-term Review of Programme 135-II, 2006 - 2008

Chemin, M. (2008) The Benefits and Costs of Microfinance: Evidence from Bangladesh, *Journal of Development Studies* 44(4): 463–84.

Chowdhury, M. A. (2008) *Poverty and Microfinance: An investigation into the role of Microcredit in Reducing the Poverty Level of Borrowing Households in Bangladesh and The Philipines,* The Whitehead Journal of Diplomacy and International Relations. No 19 Summer/Fall 2008.

Cochran, W. G. and D. B. Rubin (1973) Controlling Bias in Observational Studies: A Review,*The Indian Journal of Statistic* 35(4): 417–446.

Coleman, B.E. (1999) Risk, Mutual Assistance, and Mutual Insurance Among Village Bank Members, University of California at Berkeley, unpublished mimeo

Dang, N.H. and T.V. Danh (2008) *An Overview of The Development of The Agricultural Economy in The Mekong Delta*. In Economic Development of the Mekong Delta in Vietnam. M. V. Nam and R. Lensink (eds), University of Groningen, Centre for Development Studies (CDS): 31-50

Dehejia, R.H. and S. Wahba (1999) Causal Effects in Non-experimental Studies: Reevaluating the Evaluation of Training Programs, *Journal of the American Statistical Association* 94(448): 1053-1062.

Diagne A., Zeller M. (2001) Access to credit and its impact on welfare in Malawi, Research report number 116, International Food Policy Research Institute, Washington DC, USA.

Dollar, D. (2002) *Reform, Growth, and Poverty in Vietnam*, World Bank Policy Research Working Paper (2837). Washington D.C., The World Bank

GSO General Statistics Office (2008) Statistical Yearbook of Vietnam 2008, Statistical Publishing House, Vietnam, Hanoi.

GSO General Statistics Office (2009) Statistical Yearbook of Vietnam 2008, Statistical Publishing House, Vietnam, Hanoi.

Gujarati, DN and DC Porter (2009) Basic Econometrics, 5th edition, New York: McGraw-Hill.

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).

Heckman, J.; Ichimura, H. and P. Todd. (1997) Matching As An Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Program, *Review of Economic Studies* 64(4): 605-654.

Heckman, J., Ichimura, H. and P. Todd. (1998) Matching As An Econometric Evaluation Estimator, *Review of Economic Studies* 65(2): 261-294.

Dhejia, R.H; and S. Wahba. (1999). Causual Effects in Nonexperimental Studies: Reevaluating the Evaluation of Training Programs. Journal of the American Statistical Association, 94(448): 1053-1062.

Heidhues, F.(1995) Rural Finance Markets- An Important Tool to Fight Poverty, *Quarterly Journal of International Agriculture* 34(2): 105 – 108.

Hien, N.T.M. And T. Kawaguchi. (2002) Overview of Rice Production in the Mekong Delta – Vietnam. *Journal Faculty Agriculture Kyushu University 47*(1): 221 – 231.

Hulme, D.. and P. Mosley (1996) *Finance against Poverty: Effective Institutions for Lending to small Farmers and Micro-enterprises in Developing Countries*, London: Routledge.

Khandker, S.R. (2001) *Does Micro-Finance Really Benefit the Poor? Evidence from Bangladesh*. Paper delivered at Asia and Pacific Forum on Poverty: Reforming Policies and Institutions for Poverty Reduction help by the Asian Development Bank. Manila.

Khandker, S.R. (2003) *Micro finance and Poverty: Evidence using Panel data from Bangladesh,* Policy Research Working Paper no.2945.

Kochar, A. (1997) An Empirical Investigation of Rationing Constraints in Rural Credit Markets in India, *Journal of Development Economics* 53(2): 339 – 371.

Le, N.H. (2002) An Analysis of Access to Formal Credit by Household Farms: The Case of Vietnam. Master of Arts in Economics of Development, Vietnam – Netherlands Project, Hochiminh city.

MDPA Mekong Delta Poverty Assessment (2004). Mekong Delta Poverty Analysis

Mekong Poverty Report, 2004. http://www.ausaid.gov.au/publications/pdf/mekong_poverty_report_04.pdf

Montiel, P.J; Agenor, P.R. and N. Ul Haque (1993) *Informal Financial Markets in Developing Countries: A Macroeconomic Analysis*, Blackwell Publishers: London

Morduch, Jonathan. (1999) The role of subsidies in microfinance: evidence from the Grameen Bank, *Journal of Developmental Economics 60*(1): 229 – 248..

Morduch, J. and B. Haley. (2002) Analysis of the Effects of Microfinance on Poverty Reduction, NYU Wagner Working paper No.1014, No.28, 2002.

Okurut. F.N. (2006) *Access to credit by the poor in South Africa: Evidence from Household Survey Data 1995 and 2000*, Stellenbosch economic working papers: 13/2006.

Ravallion, Martin and Dominique van de Walle, 2008, Land in Transition: Reform and Poverty in Rural Vietnam, Palgrave Macmillan, forthcoming.

Robinson, M. (2001) The Micro-finance Revolution: Sustainable Finance for the Poor. Work Bank. Washington.

UNDP. Human Development Report 1996. Oxford University Press. New York. 1996.

Vaessen, J. (2001) Accessibility of Rural Credit in Northern Nicaragua: The Importance of Networks of Information and Recommendation, *Savings and Development* 25(1):5 – 31.

Zaman, H. (1999) Assessing the Poverty and Vulnerability Impact of Micro-credit in Bangladesh: A case study of BRAC, Policy Research Working Paper No. 2145, Washington DC: The World Bank.

Table 1: 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 (met)
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 2: Distribution of borrowers and non-borrowers in the sample

Province	Non-borrowers	Borrowers	Total
Can Tho	41	67	108
			33%
Soc Trang	35	74	109
			34%
Tra Vinh	30	78	108
			33%
Total	106	219	325
	32,6%	77,4%	100%

Table 3: Households access to formal credit in Mekong Delta:

Variables	Coefficients	Standard deviation
Age (years)	0.013	0.009
Gender (1:male))	-0.159	0.193
Education level (years)	-0.009	0.029
At least one religion (1: yes)	0.007	0.192
Marriage status (1: married)	1.122***	0.412
Vietnamese ethnic (1:yes)	-0.327	0.262
Family size (person)	-0.043	0.061
Dependency ratio (%)	0.144	0.453
Village work (have a job in the community)	-0.077	0.258
Total land (1000 m2)	-0.006	0.009
Red certificate (%)	0.042	0.344
Value of buildings (1000dongs)	0.085	0.082
Distance to a market center (m)	-0.002	0.001
Can Tho province (1:yes)	-0.352	0.270
Soc Trang province (1:yes)	-0.515*	0.284
Constant	0.494	1.995

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

Table 4: ATT for income, assets, consumption and asset levels (1,000 dongs)

Methods	Stratification		Kernel	
	ATT	Standard Deviation	ATT	Standard Deviation
Total income	14400	34513	1449	8585
Total assets	-20000	291000	87856**	45485
Food-consumption	-3505**	1602	-3048**	1639
Food per person	-306	305	-340	367
Education costs	3083***	1034	3409***	587
Education per person	732***	184	777***	144
Healthcare costs	2506***	178	2432***	253
Healthcare per person	555***	44	537***	57
Farm expenditure	-10300	12939	2883	2499
Non-farm expenditure	2814	2297	2510	4738
Off-farm expenditure	1401	2595	1372	3420

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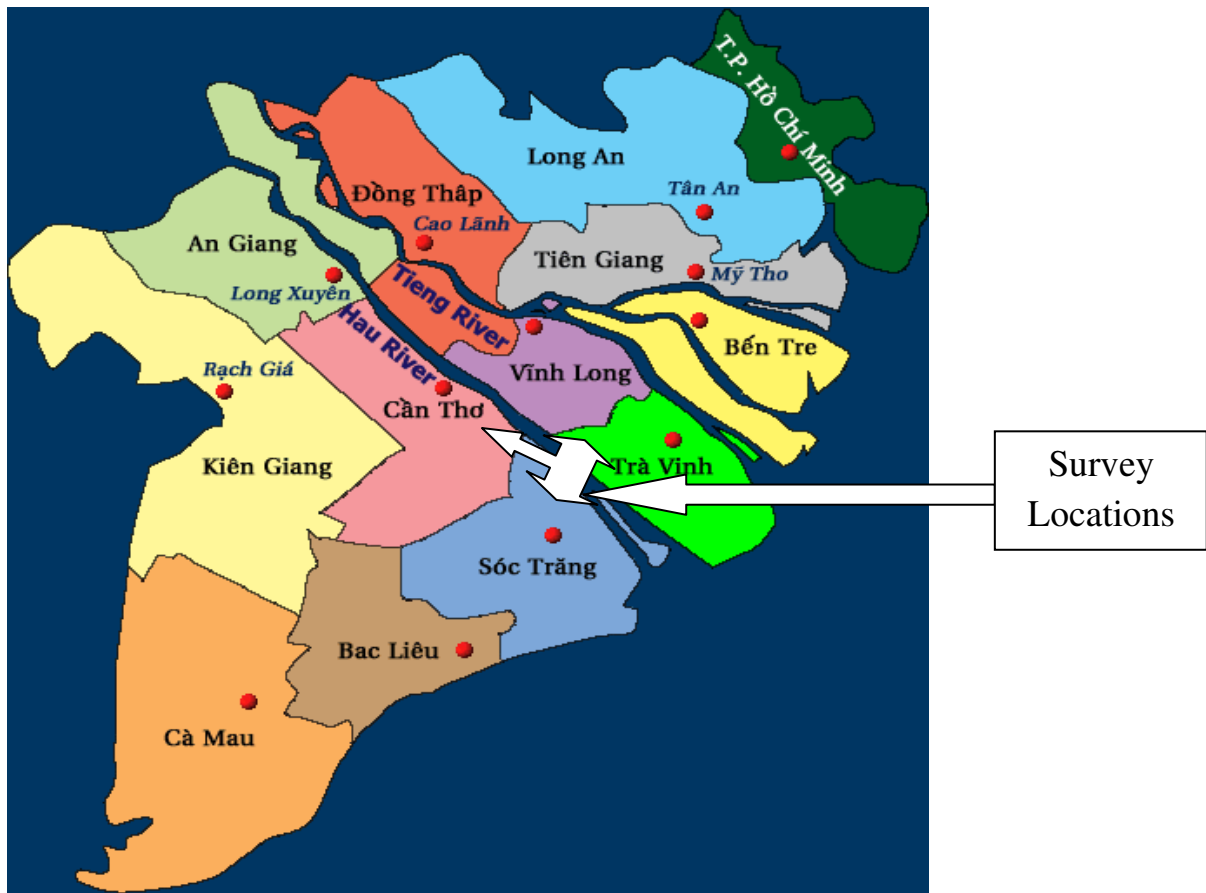
FIGURES:
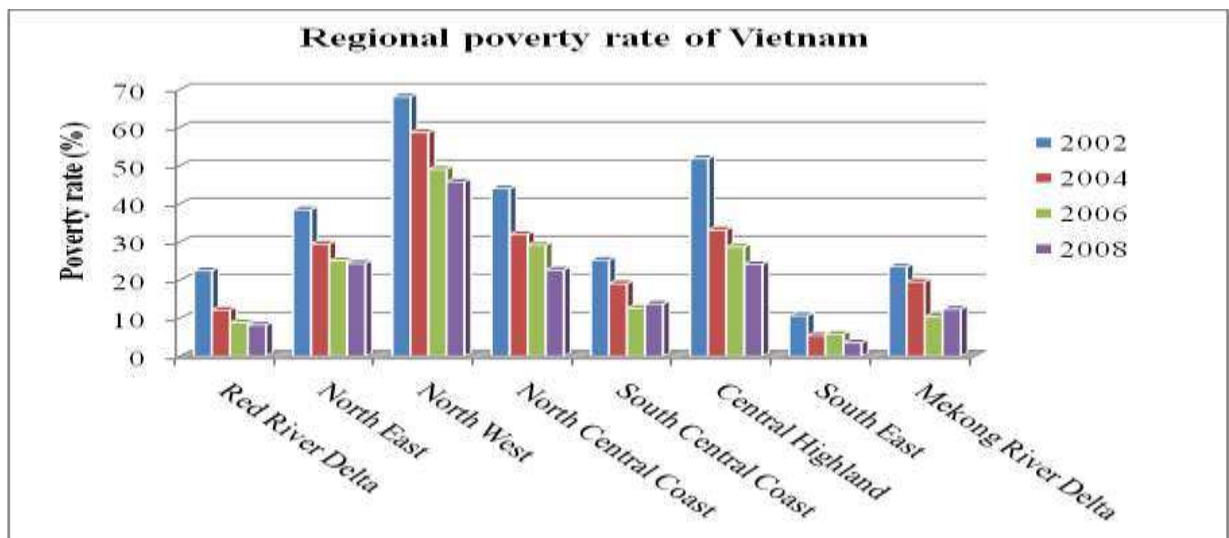

Figure 1: Map of survey location
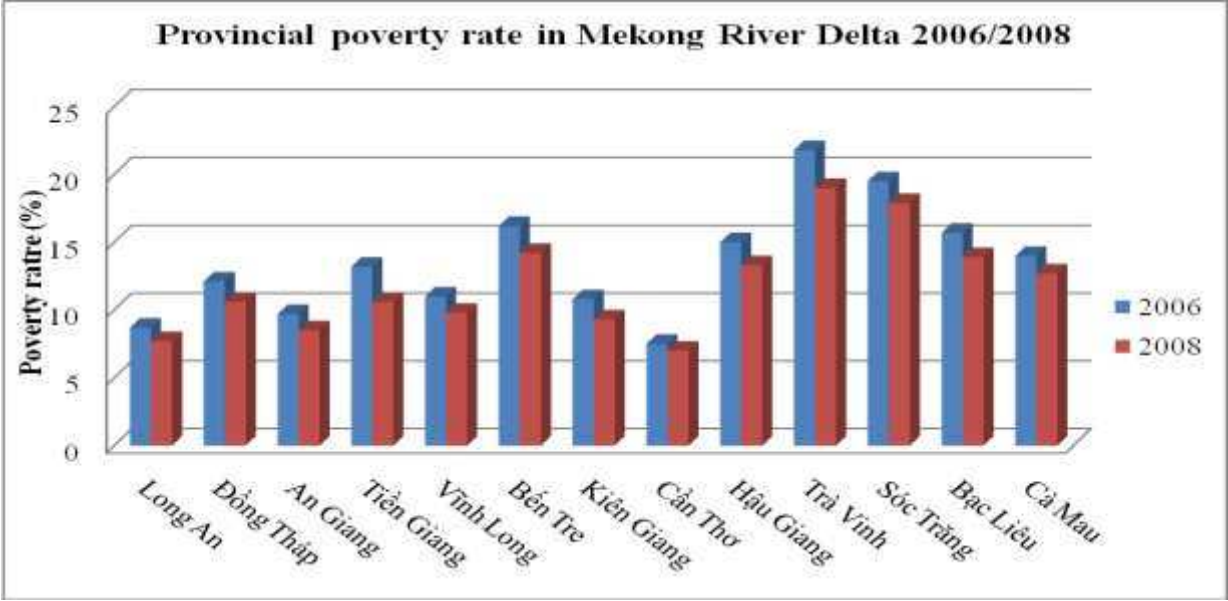

Figure 2: Regional poverty of Vietnam (GSO, 2008).

Figure 3: The provincial poverty rate in MD 2006/2008