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Nguyen, Cuong and Van den Berg, Marrit

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The impact of Micro-credit and Informal Credit on Poverty and Inequality in Vietnam

Nguyen Viet Cuong¹

Marrit Van den Berg²

Abstract

This study finds a very small effect of micro-credit on income and consumption of the borrowers in the short-term. Although the effect estimates on poverty and inequality are negative, they are very small and not statistically significant. This might be because both income and credit in these survey are defined for the past 12 months. Micro-credit tends to be used in production and investment, which often require long period to be effective in increasing income and expenditure. Meanwhile, although informal credit has negative and not statistically significant impact on per capita income, it has positive and statistically significant impact on per capita expenditure. As a result, informal credit helps borrowers reduce expenditure poverty. Due the informal credit, the poverty incidence of the borrowers was reduced by around 1.6 and 1.4 percentage points in 2004 and 2006, respectively.

Keywords: Micro-credit, information credit, household, inequality, poverty.

¹ Development Economics Group, Mansholt Graduate School of Social Science, Wageningen University, the Netherlands. Email: c_nguyenviet@yahoo.com

² Development Economics Group, Mansholt Graduate School of Social Science, Wageningen University, the Netherlands. Email: Marrit.vandenBerg@wur.nl

1. Introduction

Micro-finance is seen as an important tool for reaching the Millennium Development Goal of halving the proportion of poor people between 1990 and 2015. Micro-credit and other financial services would enable the poor to build assets, increase incomes, and reduce their vulnerability to economic stress. Credit markets are severely rationed for poor households. Commercial banks are not interested in poor clients because of information problems and lack of collateral (Hoff and Stiglitz, 1990; Nagarajan, Meyer, and Hushak, 1995; Kochar, 1997; Bell, Srinivasan, and Udry, 1997; Bose, 1998; Boucher, Carter, and Guirking, 2008). The poor do borrow from informal sources such as moneylenders, neighbours, relatives and local traders, but their resources are supposedly limited and, if charged, interest rates are mostly very high. Governments and NGOs have stepped into the gap and have provided credit to the poor, often at highly subsidized interest rates.

While there is intuitive appeal of providing cheap funds to the poor, these subsidies have been severely criticised. Subsidized banks and programs would push out informal credit suppliers on which the poor rely. They would also break down the rationing mechanism of the interest rate and cause credit to be allocated on the basis of politics or social concerns instead of productivity. Moreover, a steady inflow of money into financial institutions would decrease the incentives to collect savings deposits, leaving poor households with unattractive and inefficient ways to save. Critics of subsidized banks therefore argue that the poor would often have been better off without the subsidies (Armendáriz de Aghion and Morduch, 2005).

Given the wide popularity of microfinance, resulting in a large allocation of development funds, and the controversy about an essential element such as the level of the interest rate charged, it is important to evaluate the impact of ongoing programs. Yet, while there is ample anecdotic evidence consisting of individual success stories and, to a smaller extent, accounts of people who went bankrupt, the number of thorough quantitative evaluations is surprisingly limited. Although inefficient, State Banks in India are shown to have increased income for the poor (Burgess and Pande, 2002; Binswanger and Khandker, 1995). Similar results have been found for, *e.g.*, Bangladesh (Khandker, 1998;2003; Zaman, 2001), Indonesia (Robinson, 2001), Pakistan (Khandker and Faruqee, 2003), and a number of cases presented in the review paper of Morduch and Haley (2002). Other studies indicate that credit programs are not always effective in improving welfare and reducing poverty. For example, Diagne and Zeller (2001) did not find a statistically significant impact of micro-credit programs on household income in Malawi. Similarly, Coleman (1999) found only negligible effects on household welfare of a micro-credit program in Thailand, and Morduch (1998) showed that most of potential effects of micro-credit from the Grameen bank in Bangladesh were on vulnerability reduction instead of poverty reduction.

Not only is the evidence mixed, there is no study yet that has achieved wide consensus as to its reliability (Armendáriz de Aghion and Morduch, 2005). Separating

out the causal role of microfinance is extremely difficult. Microfinance programs do not lend to random citizens but carefully select areas in which they work and clients to whom they lend. Similarly, not all persons in the target group are equally interested in taking loans. Borrowers are therefore different from non-borrowers. Unfortunately, not all of these differences are easily measured. Borrowers may, for example, have a more entrepreneurial spirit and better business connections than non-borrowers. These unobserved differences, and not getting access to credit, may explain income and investment differences between borrowers and seemingly similar non-borrowers. Failing to account for this problem will lead to biased estimates of program impact, and the bias can be large.

Although, governments have launched many subsidized micro-credit programs, informal credit remains popular, especially in developing countries (Timberg and Aiyar 1984; Manig, 1990; Hoff and Stiglitz, 1990; Nagarajan, Meyer, and Hushak, 1995; Kochar, 1997; Bell, Srinivasan, and Udry, 1997; Agénor and Montiel, 1999; Conning and Udry, 2005; Boucher, Carter, and Guirking, 2008). Subsidized micro-credit programs do not require collaterals, but they do screen the borrowers by other eligibility criteria such as poverty status or repayment capacity. As a result, not all the poor households can be able to obtain micro-credit, and some of them have to resort to informal credit. Like other credit, informal credits are also important for the poor to increase capital and mitigate consumption fluctuation. Yet, impact assessments are very rare for informal credit. Most of theoretical and empirical studies focus on determinants of informal credit and interactions between informal credit and formal credit (e.g., see Hoff and Stiglitz, 1990; Nagarajan, Meyer, and Hushak, 1995; Kochar, 1997; Bell, Srinivasan, and Udry, 1997; Bose, 1998; Conning and Udry, 2005; Boucher, Carter, and Guirking, 2008).

Vietnam has set poverty reduction as a major goal of development policy. The poverty rate decreased remarkably from 29 percent to 16 percent during the period 2002-2006 (according to Vietnam Household Living Standard Surveys (VHLSS) in 2002, 2004, and 2006). The government has maintained an extensive public safety net system to support the poor in all dimensionalities of welfare. One of the most important antipoverty programs is the provision of credit for the poor. In 2003, the Vietnam Bank for Social Policies (VBSP) was established to provide the poor with preferential micro-credit. The poor can borrow from the bank at low interest rates without collateral. In December 2008, the total outstanding loans for the poor households were around VND 27,400 billion (VBSP, 2008). The total number of poor clients was around 8,100 thousand during 2003-2008.

In addition to VBSP, informal credit is also an important source for people in Vietnam. In early 1990s, informal credit accounted for more than 70 percent of total credit in the rural areas (McCarty, 2001; Pham and Lensink, 2007). The proportion of

informal loans tends to decrease overtime because of the growing role of formal credit. Using a data sample of four provinces in Vietnam, Barslund and Tarp (2007) found that the informal loans accounted for 36 percent of all loans in rural areas in 2003.

Only a few previous studies have analyzed the quantitative impact of micro-credit programs and informal credit in Vietnam, and their findings are not consistent. Quach and Mullineux (2007) used Vietnam Living Standard Surveys in 1993 and 1998 to measure impacts of credit from both formal and informal sources. Their study found that credit can help increase household expenditure. Nguyen (2008) found that micro-credit from VBSP had positive impacts on income, consumption and poverty reduction of the borrowers in the rural areas using Vietnam Household Living Standard Surveys in 2002 and 2004. Recently, Pham and Lensink (2008) analyze the effect of micro-credit programs and formal credits on self-employment profits of rural households using VHLSSs 2004 and 2006. Their conclusions are that micro-credit does not have positive effects on household self-employment profits, meanwhile credit from commercial banks seem to help households increase their self-employment profits.

The present study adds to the limited existing evidence on the impact of microfinance and informal credit by analysing the case of Vietnam. We apply fixed-effect regression using before-after program data from the Vietnam Household Living Standard Surveys (VHLSS) to account for the attribution problem described above. Based on the regressions, we compute the average effect of the program on income and expenditures of participating households and compute the impact of the program on poverty and inequality.

The case of Vietnam is interesting for at least two reasons. First, the Vietnamese government has spent huge amounts of money on microfinance: In 2003 it established the Vietnam Bank for Social Policies (VBSP) to consolidate the provision of preferential micro-credit to the poor. The VBSP reportedly has received VND 1.515 trillion (US\$ 100 million) in charter capital from the state budget and was scheduled to receive another VND 3.5 trillion (US\$ 230 million). This funding is complemented by mandatory contributions of two percent of total VND deposits by the state owned commercial banks, which will amount to approximately US\$200 million, with rates negotiable (World Bank, 2004). Second, nominal interest rates of VBSP are highly subsidized at about half the “market” rates charged by most of the other microfinance programs (World Bank, 2007). The low and even negative real interest rates may have pushed out informal credit suppliers, weakened alternative programs, and/or caused high leakage rates to non-poor households.

The rest of the paper is structured into 5 sections. The second section describes data set used in this study. The third section presents poverty and households’ access to micro-credit and informal credit. The fourth section presents the estimation method. Next, the empirical findings on impact measurement are presented in the fifth section. Finally, the sixth section concludes.

2. Data sources

The study relies on data from the two most recent Vietnam Household Living Standard Surveys (VHLSS), which were conducted by the General Statistical Office of Vietnam (GSO) with technical support from the World Bank (WB) in the years 2004 and 2006. The 2004 and 2006 VHLSSs cover 9188 and 9189 households, respectively. The samples are representative for the national, rural and urban, and regional levels. The 2004 and 2006 VHLSSs result in a panel of 4216 households, for which data is available for both years. The number of urban and rural households is 1012 and 3204, respectively.

The sample selection of VHLSSs 2004 and 2006 follows a method of stratified random cluster sampling. GSO selected households in all rural and urban provinces of Vietnam, i.e. rural and urban areas of all provinces are strata. Among each stratum, communes were selected randomly as a primary sampling unit. The number of communes per stratum is proportionate to the population. The number of selected communes in each VHLSS is 3063. In each commune, about 3 households were selected randomly.

The surveys collected information through household and community level questionnaires. Information on households includes basic demography, employment and labour force participation, education, health, income, expenditure, housing, fixed assets and durable goods, participation of households in poverty alleviation programs, and especially information on loans that households had obtained or still owed during the 12 months before the interview.

Data on expenditure and income were collected using very detailed questionnaires. Information on small and detailed expenditure and income categories was collected and then aggregated into expenditure and income per capita. Food expenditure includes purchased food and foodstuff and self-produced products of households. Non-food expenditure comprises expenditures on education, healthcare, housing, consumer durables, power, water supply and garbage collection. Household income can come from any source. Total income includes income from agricultural and non-agricultural production, salary, wage, pension, scholarship, income from loan interest and house rental, remittance and subsidies. Income from agricultural production comprises crop income, livestock income, aquaculture income, and income from other agriculture-related activities.

Information was also collected on commune characteristics, but only for rural areas. In our analysis, we use two commune level variables, namely distance to the nearest market and a dummy variable indicating whether the village has a road. Since our sample includes the entire country, we had to come up with estimates for the urban areas. We assumed that for urban areas, the variables “distance to market” and “have a

road” are equal to 0 and 1, respectively. This is a reasonable assumption given the fact that in all cities there is a market and at least one road.

3. The VBSP Program and informal credit

The VBSP was established in 2003 as an independent public institute for the provision of government lending to the poor and other vulnerable groups. The creation of the VBSP meant a consolidation of government-lending for the poor, and since 2003 outreach and outstanding loans have increased continuously (VBSP, 2005). As indicated above, the program is highly subsidized. Average monthly interest rates increased from 0.26 to 0.36 percent during the period 2004-2006, which amounts to about 4 percent on a yearly basis. Given that inflation was 7.7 percent over 2004, this implied that the real interest rate was minus four percent. For sake of comparison: commercial banks used a yearly rate of twelve percent for loans of 6-12 months with collateral.

The VBSP program is designed as a group-based lending scheme with credit disbursed through groups of 5 to 50 members living in a single village. The argument for the group-based design is that monitoring of loan payments by group members would lead to high repayment rates (e.g., Coleman, 1999). This strategy seems to have been successful, as reported default rates are less than two percent (VBSP, 2005).

To apply for credit, a household first sends a formatted letter to their credit group. The credit group will arrange a meeting of all members to consider the relevance of the borrowing. They will determine which household can borrow, and credit amount for corresponding households. The list of borrowing households will be prepared by the credit group and sent to the People Committee in that commune. Once the list has been approved by the People Committee, it will be sent to a VBSP branch for loan provision. Generally, the VBSP endorses the list sent by the People Committee. Households can then receive their loans at a VBSP branch in their locality or the VBSP staff brings the loans to the households.

There are four criteria that a household should officially meet to become a member of a credit group. First, the household should have a long-term residence permit at the locality in which the group is located. Second, at least one household member should be able to work. Third, the household has a sanctioned demand for credit, which can officially only be used for income-generating activities, such as production, business, and services; the repair of a seriously damaged house; or to cover the educational cost for primary and secondary school pupils. Finally, the household should be classified as poor by the local authority. The classification procedure is rather complicated. Basically, a village committee prepares a list of the poor based on their own criteria, which may for example include asset levels, food security, type of housing, and school-going of children. The number and nature of the criteria differ widely between villages. The preliminary list is submitted to a commune-level committee of Hunger Eradication and Poverty Reduction (HEPR), which conducts an income survey for all households on the list. The resulting incomes are compared to the

income poverty line of the Ministry of Labour, War Invalids and Social Affairs (MOLISA), which was set relatively low at VND 80-100 thousands per capita in rural areas for the period 2001-2005, the equivalent of about fifteen to twenty kg of rice. Those households with higher per capita income than this poverty line are excluded from the list. Finally, the refined list is updated by the village committee and the People's Committee and People's Council in an iterative procedure (MOLISA, 2003).

To examine whether the program reached poor households, we classified households as poor if their per capita expenditure is below the poverty line as defined by GSO and WB and then compared credit use from the VBSP between poor and non-poor households using the data from VHLSS 2004 and 2006. The WB-GSO poverty line is equivalent to the expenditure level that allows for nutritional needs and some essential non-food consumption such as clothing and housing and amounts to VND 2,077 and 2,560 thousands per capita in 2004 and 2006, respectively.³ Please recall that this is not the poverty classification used as an eligibility criterion for credit group membership. The criteria for the latter classification are partly commune-specific and therefore not consistent throughout the population. Moreover, local power structures may have affected the outcomes of the iterative classification process. Yet the overlap between the two classifications is quite large: more than seventy percent of those classified as poor according to the commune-level classification are also considered poor using the GSO-WB poverty line. The reverse cannot be said to be true, as poverty rates are more than twice as high using the GSO-WB classification. This implies that the GSO-WB classification, which we use in the remainder of this paper, includes most of the poor according to the commune-level classification, a formal requirement for receiving VBSP credit, and many more households.

The coverage rate of the VBSP was low: only seven percent of all households and twelve percent of the poor borrowed from the program in 2004. The share of poor people with VBSP loans has increased slightly to fifteen percent in 2006, with the overall share remaining almost constant. The average loan size was VND 3,537 thousand and 4,414 in 2004 and 2006, respectively, which was about 23 percent of household income or 1.7 times the per capita poverty line.

Leakage rates were very high. Only 30 and 28 percent of borrowing households was classified as poor in 2004 and 2006, respectively. Moreover, non-poor households on average obtained larger loans, such that in both years only 26 percent of outstanding credit was allocated to poor households, the official target group of the program. This indicates that eligibility criteria were not always upheld. According to Dufhues, et al. (2002) credit groups and commune heads were reluctant to include poor households in the list of credit applicants as non-poor are expected to be more reliable in using credit effectively and repaying loans. Moreover, the negative real interest rates will have added pressure to allocate loans to politically favoured residents, rather than the poor.

³ Regional price differences and monthly price changes over the survey period have been taken into account when the poverty lines are calculated.

Finally, the poor may tend to apply for lower loans than the non-poor, who have higher levels of assets and possibly skills.

There is a tendency of contraction of informal credit. The percentage of households borrowing from informal credit was reduced from 20 to 16 during the period 2004-2006. However, compared to the VBSP credit, informal credit covered a larger proportion of both the poor and non-poor. The ratio of the poor and non-poor borrowed from the informal sources was 21 and 15 percent in 2006, respectively. The average loan size from informal sources was also higher than that from the VBSP. The non-poor had much higher average loan size than the poor. In 2006, the loan size per a borrowing household is VND 3,977 and 6,372 thousand, respectively. As expected, compared to the VBSP credit, the informal credit has much higher interest rate. The monthly interest rate of the VBSP and informal credit was 0.3 percent and 0.6 percent in 2006, respectively.

An interesting question is whether credit from VBSP can replace informal credit. Among the borrowers from VBSP, the ratio of households also receiving informal credit was 18 percent in 2006. It means that credit from VBSP is not sufficient for households, and they have to resort informal credit. Similarly, households who are not able to borrow from VBSP also have to find informal sources for credit. In 2006, there were around 16 percent of the non-borrowers from VBSP who obtained informal credit.

One important issue in examining the effectiveness of the credit is the use of credit. Although credit can be fungible, we can get some insight how credit is used by using households' information on the use of credit. It shows that a large proportion of VBSP credit is used for investment and production capital. In 2006, the poor and non-poor households used 62 and 43 percent of VBSP loans for agricultural production and investment. However, the non-poor spent more credit in non-farm activities. In 2006, the poor and non-poor used 2 and 15 percent of the VBSP credit in non-farm production and investment. Credit was also used for debt repayment and important needs such as house construction, healthcare and education. However the poor households reported that 12.4 percent of credit is used for consumption.

Compared to VBSP credit, a smaller proportion of informal credit was used in production and investment. In 2006, the poor and non-poor households used 22 and 10 percent of informal loans for agricultural production and investment. Regarding the non-farm production, the poor and non-poor used around 3 and 18 percent of the informal credit. Most of informal loans are used in consumption, especially house construction and purchase.

4. Evaluation methodology

4.1. Impact of credit on income and expenditure

To assess the impact of VBSP and informal credit, we assume welfare can be specified as follows:

$$Y_{ijt} = \beta_0 + G_t \beta_1 + X_{ijt} \beta_2 + D_{ijt} \beta_3 + C_{jt} \beta_4 + \eta_{ijt}, \quad (1)$$

where Y is income per capita or expenditure per capita. The subscripts i, j and t refer to household i in commune j at time t , respectively. Note that “per capita” refers to the average per household member at period t . For instance, per capita income is calculated as total household income at period t over the number of household members at period t . G_t is a year dummy, with a one for 2006; This dummy enables to control for common macroeconomic changes between the two years. X and C are vectors of household and community level control variables. The vector D covers per capita VBSP credit and informal credit (i.e. average loan size per household member at period t).

The main problem in estimating the equation is the endogeneity of program participation. Borrowing can be correlated with unobserved characteristics of households, such as motivation for higher income or abilities in business. Failure to control for such factors leads to biased estimates of program impact: if it is, for example, the better entrepreneurs who take a loan, and we do not directly include information on managerial capacity in our regression (because it is not available), a significant and positive coefficient for program participation is at least partly caused by these capacity differences and not by the program itself.

In this study, we use the panel nature of the data to avoid endogeneity bias. A main assumption of the method used is that unobserved variables that are correlated with both outcome and program variables remained unchanged during the period 2004-2006, which is covered by the panel. We feel that it is reasonable to assume that the relevant variables, such as business and production skills or motivation for higher income, were time-invariant during such a short period of time.

The marginal impact of credit is measured by β_3 . We will also measure the impact of credit by calculating the Average Treatment Effect on the Treated (ATT) (Heckman, et al., 1999). ATT is the expected impact of credit on borrowers (with $D > 0$):

$$ATT_t = E(Y_{ijt} | D_{ijt} > 0) - E(Y_{ijt(D=0)} | D_{ijt} > 0), \quad (2)$$

Where $E(Y_{ijt(D=0)} | D_{ijt} > 0)$ is the expected value of the outcome variable of the borrowers, i.e. income per capita and expenditure per capita, had they not received credit. This is not observed and has to be estimated.

Using equation (1), we get

$$ATT_t = E(Y_{ijt} | D_{ijt} > 0) - E(Y_{ijt(D=0)} | D_{ijt} > 0) = (\beta_0 + G_t \beta_1 + X_{ijt} \beta_2 + D_{ijt} \beta_3 + C_{jt} \beta_4) - (\beta_0 + G_t \beta_1 + X_{ijt} \beta_2 + C_{jt} \beta_4) = D_{ijt} \beta_3 \quad (3)$$

The ATT at time t is thus estimated by:

$$A\hat{T}T_t = \frac{1}{n_t} \sum_{i=1}^{n_t} D_{ijt} \hat{\beta}_3, \quad (4)$$

where n_t is the number of the borrowers at the time t .

We estimate the standard error of the ATT estimates by using a non-parametric bootstrap technique. This bootstrap is implemented by repeatedly drawing samples from the original sample of the VHLSS panel data. Since the VHLSSs sample selection follows stratified random cluster sampling, communes instead of households are bootstrapped in each stratum (Deaton, 1997). In other words, the bootstrap is made of communes (i.e., clusters) within strata. The number of replications is 500.⁴

4.2. The impact of credit on poverty and inequality

We considered not only the traditional impact indicators described above, but also looked directly at the effect of the program on a set of poverty and inequality indicators. We measured poverty by three Foster-Greer-Thorbecke poverty indexes. To measure the inequality, we used three common measures of inequality: the Gini coefficient, Theil's L index of inequality, and Theil's T index of inequality. For all measures, we used per capita expenditures as welfare indicator.

The Foster-Greer-Thorbecke poverty indexes can all be calculated using the following formula (Foster, Greer and Thorbecke, 1984):

$$P_\alpha = \frac{1}{n} \sum_{i=1}^q \left[\frac{z - Y_i}{z} \right]^\alpha, \quad (4)$$

where z is the poverty line, n is the number of people in the sample population, q is the number of poor people, and Y_i is per capita expenditures for person i . α can be interpreted as a measure of inequality aversion. When $\alpha = 0$, we have the headcount index H which measures the proportion of people below the poverty line. When $\alpha = 1$ and $\alpha = 2$, we have the poverty gap PG , which measures the depth of poverty, and the squared poverty gap P_2 , which measures the severity of poverty, respectively.

The Gini coefficient can be calculated from the individual expenditures in the population as follows:

$$G = \frac{1}{2n(n-1)\mu} \sum_{i=1}^n \sum_{j=1}^n |Y_i - Y_j| \quad (5)$$

⁴ In order to examine the robustness of our bootstrap technique, we also tried to bootstrap households. The results were similar.

The value of the Gini coefficient varies from 0 when everyone has the same expenditures to 1 when one person has everything. Hence, the closer a Gini coefficient is to one, the more unequal is the distribution.

The Theil L index of inequality is calculated as follows:

$$Theil_L = \frac{1}{n} \sum_{i=1}^n \ln\left(\frac{\bar{Y}}{Y_i}\right), \quad (6)$$

where \bar{Y} is the average per capita expenditure. The Theil L index ranges from 0 to infinity, and the higher is the value of Theil L, the higher is inequality.

The Theil T index of inequality is calculated as:

$$Theil_T = \frac{1}{n} \sum_{i=1}^n \frac{Y_i}{\bar{Y}} \ln\left(\frac{Y_i}{\bar{Y}}\right) \quad (7)$$

The Theil T index ranges from 0 (lowest inequality) to $\ln(N)$ (highest inequality).

The impact of the program on poverty index for participants is expressed as follows:

$$\Delta_p = P(D = 1, Y_1) - P(D = 1, Y_0), \quad (8)$$

where the first term in the right-hand side of (8) is the measure of poverty in the presence of the VBSP program. This term is observed and can be estimated directly from the sample data. However, the second term in the right-hand side of (8) is the counterfactual measure of poverty, *i.e.*, poverty indexes of the credit recipients had they not received the credit. This term is not observed directly, and it is estimated.

Regarding inequality, we measure the impact of the program on reduction of inequality of the whole population. If the program increases expenditure for the poor more than for the rich, it will decrease inequality. If, on the other hand, the high leakage rate results in higher benefits for the rich, the program will increase inequality. The impact on an inequality index is expressed:

$$\Delta_I = I(Y) - I(Y_0), \quad (9)$$

where $I(Y)$ is the observed inequality based on the observed outcome, and $I(Y_0)$ is the estimated inequality in the absence of a program.

5. Credit impact

5.1. Program impact on household income and expenditure

To estimate the effects of VBSP and informal credit on per capita income and per capita expenditure, we regress per capita income and per capita expenditure on per capita VBSP credit and per capita informal credit and other control variables. Control variables include household composition, education of household members, land and housing, villages, urbanity, and regional variables. It should be noted that we use two

village level variables, distance to the nearest market, and a dummy variable indicating whether the village has a road. The VHLSS data sets only provide information on these variables for the rural area.⁵

The list of the variables and summary statistics for the borrowing and non-borrowing households are presented in Table A.1 and A.2 in the Appendix. In order to control for inflation, we have deflated all variables in terms of 2004 prices. Tables A.3 and A.4 present the regression results. We present both random effects and fixed effects estimates, without and with sampling weight and cluster correlation. Since the Hausman tests strongly favor the fixed effects estimates we focus the discussion on the fixed effects estimates.

Table A.3 shows that both VBSP and informal credit do not have statistically significant impacts on per capita income. The point impact estimates of VBSP and informal credit on income per capita are -0.04 and -0.15. However, credit from formal sources has positive and statistically significant impact on income per capita. An increase of 1 VND in per capita formal credit results in an increase of 0.2 VND in per capita income.

The impact of VBSP and informal credit on expenditure per capita is positive. However, only informal credit has statistically significant impact. An increase of 1 VND in per capita informal credit results in an increase of 0.05 VND in per capita expenditure. Impact of formal credit on expenditure per capita is very small and not statistically significant.

Table 1 presents the ATT for the effect of VBSP on per capita income and per capita expenditure. The advantage of ATT over the regression coefficient is that it gives a better estimate of the total increase in per capita income and expenditure caused by credit. Since ATT depends on the loan size, it differs for 2004 and 2006. The impact estimates of VBSP credit are small and not statistically significant.

⁵ We tested whether VBSP credit and informal credit have a different impact in rural and urban areas by including interaction terms for the two types of credit and a dummy for living in an urban area. These estimates indicate that the effects of credit do not differ between urban and rural areas. We, therefore, only present the estimates for the entire sample.

Table 1. *Impact of VBSP measured by ATT*

	2004			2006		
	Y ₁	Y ₀	ATT (Y ₁ - Y ₀)	Y ₁	Y ₀	ATT (Y ₁ - Y ₀)
Income per capita	3715.5*** [90.6]	3746.8*** [138.4]	-31.3 [99.5]	4359.1*** [118.9]	4398.2*** [168.3]	-39.1 [118.7]
Expenditure per capita	2944.7*** [65.1]	2916.9*** [95.9]	27.8 [67.3]	3506.9*** [97.2]	3472.2*** [135]	34.7 [87.3]
Difference in ATT between income and expenditure			-59.1 [89.5]			-73.8 [114.9]

* significant at 10%; ** significant at 5%; *** significant at 1%
 Figures in parentheses are standard errors.
 Standard errors are corrected for sampling weights and estimated using bootstrap (non-parametric) with 500 replications.
 Source: Estimation from VHLSSs 2004 and 2006

The impact estimates of informal credit measured by ATT are presented in Table 2. It indicates that the informal credit is quite effective in increasing expenditures but not income. Using the point estimates, the informal credit on average increases per capita expenditure by 112 and 118 thousand VND in 2004 and 2006, respectively. The point estimates on per capita income are negative but not statistically significant.

Table 2. *Impact of informal credit measured by ATT*

	2004			2006		
	Y ₁	Y ₀	ATT (Y ₁ - Y ₀)	Y ₁	Y ₀	ATT (Y ₁ - Y ₀)
Income per capita	4693.1*** [103.7]	5015.8*** [241.4]	-322.7 [221.2]	5491.2*** [144.7]	5832.5*** [273.7]	-341.2 [228.5]
Expenditure per capita	3701.1*** [69.5]	3589.3*** [83.8]	111.8** [56.9]	4279.8*** [100.3]	4161.6*** [115.1]	118.2** [59.3]
Difference in ATT between income and expenditure			-434.5* [224.4]			-459.5* [231.7]

* significant at 10%; ** significant at 5%; *** significant at 1%
 Figures in parentheses are standard errors.
 Standard errors are corrected for sampling weights and estimated using bootstrap (non-parametric) with 500 replications.
 Source: Estimation from VHLSSs 2004 and 2006

5.2. Program impacts on poverty and inequality

Table 3 and 4 presents the impact estimates of the VBSP and informal credit impact on expenditure poverty and inequality. The impact estimates of VBSP credit on poverty and inequality are negative but not statistically significant. The impact estimates of informal credit on poverty and inequality are also negative and quite similar to the impact estimates of VBSP credit. Only impact estimates of informal credit on the head count index are statistically significant at 10%. Informal credit helps the borrowers reduce the poverty incidence by around 1.6 and 1.4 percentage points in 2004 and 2006,

respectively. The informal credit also decreases inequality, but these effects are extremely small and not statistically significant.

Table 3. *Impact of VBSP credit on poverty and inequality*

	2004			2006		
	With credit	Without credit	Impact	With credit	Without credit	Impact
Poverty of borrowers						
P0	0.3363*** [0.0209]	0.3402*** [0.0305]	-0.0038 [0.0222]	0.3215*** [0.0196]	0.3330*** [0.0363]	-0.0115 [0.0298]
P1	0.0857*** [0.0069]	0.0892*** [0.0112]	-0.0035 [0.0087]	0.0797*** [0.0062]	0.0840*** [0.0131]	-0.0044 [0.0112]
P2	0.0310*** [0.0032]	0.0327*** [0.0055]	-0.0017 [0.0043]	0.0270*** [0.0027]	0.0291*** [0.0061]	-0.0020 [0.0053]
All poverty						
P0	0.1949*** [0.0053]	0.1952*** [0.0054]	-0.0003 [0.0016]	0.1597*** [0.0051]	0.1606*** [0.0055]	-0.0009 [0.0023]
P1	0.0472*** [0.0017]	0.0475*** [0.0018]	-0.0003 [0.0006]	0.0383*** [0.0017]	0.0386*** [0.0019]	-0.0003 [0.0009]
P2	0.0170*** [0.0009]	0.0171*** [0.0009]	-0.0001 [0.0003]	0.0137*** [0.0009]	0.0139*** [0.0010]	-0.0002 [0.0004]
All inequality						
Gini	0.3698*** [0.0040]	0.3701*** [0.0041]	-0.0003 [0.0006]	0.3580*** [0.0040]	0.3583*** [0.0041]	-0.0003 [0.0008]
Theil L	0.2235*** [0.0050]	0.2239*** [0.0050]	-0.0004 [0.0009]	0.2117*** [0.0049]	0.2122*** [0.0051]	-0.0004 [0.0011]
Theil T	0.2407*** [0.0065]	0.2410*** [0.0066]	-0.0003 [0.0008]	0.2268*** [0.0071]	0.2271*** [0.0072]	-0.0003 [0.0009]

* significant at 10%; ** significant at 5%; *** significant at 1%
 Figures in parentheses are standard errors.
 Standard errors are corrected for sampling weights and estimated using bootstrap (non-parametric) with 500 replications.
 Source: Estimation from VHLSSs 2004 and 2006

Table 4. *Impact of informal credit on poverty and inequality*

	2004			2006		
	With credit	Without credit	Impact	With credit	Without credit	Impact
Poverty of borrowers						
P0	0.2532*** [0.0127]	0.2688*** [0.0154]	-0.0156* [0.0092]	0.1972*** [0.0121]	0.2102*** [0.0151]	-0.0138* [0.0083]
P1	0.0574*** [0.0040]	0.0651*** [0.0070]	-0.0077 [0.0059]	0.0468*** [0.0040]	0.0505*** [0.0048]	-0.0037 [0.0025]
P2	0.0204*** [0.0020]	0.0332*** [0.0429]	-0.0129 [0.0430]	0.0170*** [0.0018]	0.0186*** [0.0025]	-0.0016 [0.0017]
All poverty						
P0	0.1949*** [0.0053]	0.1981*** [0.0056]	-0.0032* [0.0019]	0.1597*** [0.0051]	0.1619*** [0.0053]	-0.0022 [0.0015]
P1	0.0472*** [0.0017]	0.0488*** [0.0021]	-0.0016 [0.0012]	0.0383*** [0.0017]	0.0389*** [0.0018]	-0.0006 [0.0004]
P2	0.0170*** [0.0009]	0.0196*** [0.0087]	-0.0026 [0.0087]	0.0137*** [0.0009]	0.0140*** [0.0009]	-0.0003 [0.0003]
All inequality						
Gini	0.3698*** [0.0040]	0.3707*** [0.0041]	-0.0008 [0.0007]	0.3580*** [0.0040]	0.3584*** [0.0040]	-0.0005 [0.0004]

	2004			2006		
	With credit	Without credit	Impact	With credit	Without credit	Impact
Theil L	0.2235*** [0.0050]	0.2243*** [0.0050]	-0.0007 [0.0005]	0.2117*** [0.0049]	0.2123*** [0.0049]	-0.0006 [0.0004]
Theil T	0.2407*** [0.0065]	0.2417*** [0.0066]	-0.0010 [0.0009]	0.2268*** [0.0071]	0.2274*** [0.0071]	-0.0006 [0.0005]

* significant at 10%; ** significant at 5%; *** significant at 1%
Figures in parentheses are standard errors.
Standard errors are corrected for sampling weights and estimated using bootstrap (non-parametric) with 500 replications.
Source: Estimation from VHLSSs 2004 and 2006

6. Conclusions

The provision of subsidized loans without formal collateral requirement through the VBSP forms a cornerstone of Vietnam’s anti-poverty policy. Yet, little is known on the impact of these preferential loans, as most evaluation reports simply describe the implementation and outputs of the program. In this paper, we take a completely different approach and use fixed-effect regression to estimate the average effect of the program on income and expenditures of participating households, and subsequently assess the impact of the program on poverty and inequality. In doing so, we intend to eliminate bias caused by differences between participants and non-participants in the VBSP.

Like for similar impact studies before us, the reliability of our estimates may still be disputed. Fixed-effects regression only eliminates endogeneity bias caused by unobserved variables that remained unchanged between survey rounds and that have an additive effect on the outcome. We feel that it is reasonable to assume that the relevant household-level variables, such as business and production skills or motivation for higher income, were time-invariant during the two periods covered in this study. Fixed-effect regressions will, however, fail to eliminate all endogeneity bias if the unobserved variables affect not only the level of the output but also its growth rate. Similarly, depending on unobserved characteristics, some households may be better able to benefit from new opportunities arising between survey rounds than other households are. We are however confident that the estimation bias resulting from these factors is small relative to the bias eliminated by using fixed-effects regression.

Our estimates indicate that the VBSP credit has very small effects on income and consumption of the borrowers in the short-term. The impact estimates are not statistically significant. Although the effect estimates on poverty and inequality are negative, they are very small and not statistically significant. This might be because both income and credit in these survey are defined for the past 12 months. Most VBSP micro-credit are used in production and investment, which often require long period to be effective in increasing income and expenditure. This result seems different from findings of Nguyen (2008), who found positive impacts of the VBSP program on per

capita income and expenditure. This can be because we use different data set and investigate impacts on the whole population, not only on rural population as Nguyen (2008). In addition, Nguyen (2008) measures the effect of the VBSP using single cross-section data. As known, households often borrow from VBSP for long time, and the effect measured in Nguyen (2008) can reflect accumulated effect of the VBSP micro-credit overtime.

Meanwhile, although informal credit has negative and not statistically significant impact on per capita income, it has positive and statistically significant impact on per capita expenditure. As a result, informal credit helps borrowers reduce expenditure poverty. Due the informal credit, the poverty incidence of the borrowers was reduced by around 1.6 and 1.4 percentage points in 2004 and 2006, respectively.

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Appendix

Table A.1. *Variables of households with and without VBSP credit*

Variables	Type	2004		2006	
		Household with VBSP credit	Household without VBSP credit	Household with VBSP credit	Household without VBSP credit
<u>Outcome variables</u>					
Income per capita (thousand VND)	Continuous	3715.5 [91.6]	6104.0 [97.5]	4372.1 [121.6]	7094.8 [100.4]
Expenditure per capita (thousand VND)	Continuous	2944.7 [68.8]	4574.9 [68.9]	3511.5 [102.0]	5165.2 [71.3]
The poverty rate (P0)	Continuous	0.3363 [0.0208]	0.1838 [0.0059]	0.3188 [0.0208]	0.1466 [0.0056]
<u>Control variables</u>					
<u>Household variables</u>					
Ratio of members younger than 16 to total	Continuous	0.2978 [0.0082]	0.2633 [0.0027]	0.2928 [0.0092]	0.2369 [0.0027]
Ratio of members older than 60 to total	Continuous	0.0593 [0.0048]	0.0962 [0.0020]	0.0592 [0.0047]	0.0999 [0.0020]
Household size	Discrete	5.2395 [0.1117]	4.9945 [0.0271]	5.0383 [0.0687]	4.8531 [0.0304]
Ratio of members with technical degree to total	Continuous	0.0463 [0.0052]	0.0587 [0.0020]	0.0528 [0.0052]	0.0682 [0.0021]
Ratio of members with post secondary to total	Continuous	0.0077 [0.0018]	0.0343 [0.0018]	0.0124 [0.0021]	0.0360 [0.0017]
Area of annual crop land per capita (m2)	Continuous	688.5 [36.4]	667.2 [19.6]	740.9 [44.2]	691.6 [20.9]
Area of perennial crop land per capita (m2)	Continuous	144.6 [38.4]	206.4 [15.5]	183.1 [26.9]	242.7 [15.0]
Forestry land per capita (m2)	Continuous	432.7 [113.3]	175.8 [21.9]	375.7 [68.3]	200.9 [27.5]
Aquaculture water surface per capita (m2)	Continuous	25.6 [7.4]	62.2 [7.6]	36.6 [13.6]	63.8 [8.4]
Other credit (thousand VND)	Continuous	116.4 [22.2]	903.3 [54.5]	293.1 [43.1]	1182.9 [97.6]
<u>Commune variables</u>					
Road to village (yes = 1)	Binary	0.6742 [0.0223]	0.5971 [0.0099]	0.7251 [0.0209]	0.6281 [0.0098]
Distance to nearest daily market (km)	Continuous	3.7390 [0.4263]	2.0758 [0.0926]	3.9762 [0.4525]	2.2117 [0.1033]
<u>Regional variables</u>					
Household in Red River Delta	Binary	0.1721 [0.0176]	0.2216 [0.0082]	0.1152 [0.0149]	0.2243 [0.0083]
Household in North East	Binary	0.2309 [0.0197]	0.1048 [0.0052]	0.1984 [0.0186]	0.1082 [0.0054]
Household in North West	Binary	0.0651 [0.0111]	0.0267 [0.0026]	0.0692 [0.0111]	0.0287 [0.0028]
Household in North Central Coast	Binary	0.1734 [0.0197]	0.1253 [0.0070]	0.2125 [0.0212]	0.1252 [0.0071]
Household in South Central Coast	Binary	0.1197 [0.0148]	0.0828 [0.0050]	0.0793 [0.0115]	0.0850 [0.0052]
Household in Central Highlands	Binary	0.0456 [0.0087]	0.0574 [0.0044]	0.0854 [0.0139]	0.0581 [0.0045]
Household in North East South	Binary	0.0559 [0.0104]	0.1672 [0.0085]	0.0885 [0.0162]	0.1652 [0.0084]
Household in Mekong River Delta	Binary	0.1373 [0.0166]	0.2142 [0.0081]	0.1516 [0.0157]	0.2053 [0.0079]
Household in Living in urban areas	Binary	0.1309 [0.0151]	0.2680 [0.0093]	0.1738 [0.0174]	0.2749 [0.0093]
Observations		705	8483	747	8442

Standard errors in parentheses.
Source: Estimation from VHLSSs 2004-2006.

Table A.2. *Variables of households with and without informal credit*

Variables	Type	2004		2006	
		Household with informal credit	Household without informal credit	Household with informal credit	Household without informal credit
<u>Outcome variables</u>					
Income per capita (thousand VND)	Continuous	4693.1 [114.9]	6246.2 [105.9]	5491.2 [147.6]	7165.7 [105.7]
Expenditure per capita (thousand VND)	Continuous	3701.1 [78.0]	4649.2 [74.4]	4279.8 [107.8]	5190.7 [73.7]
The poverty rate (P0)	Continuous	0.2532 [0.0125]	0.1800 [0.0061]	0.1972 [0.0131]	0.1523 [0.0060]
<u>Control variables</u>					
<u>Household variables</u>					
Ratio of members younger than 16 to total household members	Continuous	0.2970 [0.0058]	0.2579 [0.0028]	0.2735 [0.0062]	0.2347 [0.0027]
Ratio of members older than 60 to total household members	Continuous	0.0748 [0.0035]	0.0983 [0.0021]	0.0670 [0.0037]	0.1027 [0.0021]
Household size	Discrete	5.0194 [0.0593]	5.0105 [0.0294]	4.8786 [0.0551]	4.8650 [0.0321]
Ratio of members with technical degree to total household members	Continuous	0.0568 [0.0037]	0.0581 [0.0020]	0.0636 [0.0048]	0.0677 [0.0021]
Ratio of members with post secondary to total household members	Continuous	0.0150 [0.0020]	0.0368 [0.0019]	0.0183 [0.0024]	0.0374 [0.0018]
Area of annual crop land per capita (m2)	Continuous	573.9 [31.0]	692.9 [20.7]	627.6 [35.6]	708.9 [21.8]
Area of perennial crop land per capita (m2)	Continuous	183.2 [27.8]	206.7 [15.6]	221.7 [24.2]	241.5 [15.4]
Forestry land per capita (m2)	Continuous	170.4 [36.3]	200.6 [25.6]	175.9 [32.4]	221.8 [30.5]
Aquaculture water surface per capita (m2)	Continuous	27.6 [5.2]	67.6 [8.7]	43.0 [13.9]	65.4 [9.0]
Other credit (thousand VND)	Continuous	633.6 [96.9]	900.2 [57.6]	655.9 [83.7]	1207.0 [106.7]
<u>Commune variables</u>					
Road to village (yes = 1)	Binary	0.6735 [0.0151]	0.5846 [0.0103]	0.7090 [0.0157]	0.6208 [0.0101]
Distance to nearest daily market (km)	Continuous	2.3459 [0.1534]	2.1588 [0.1049]	2.7613 [0.2761]	2.2634 [0.1091]
<u>Regional variables</u>					
Household in Red River Delta	Binary	0.2606 [0.0138]	0.2071 [0.0082]	0.2437 [0.0145]	0.2105 [0.0082]
Household in North East	Binary	0.1172 [0.0092]	0.1132 [0.0057]	0.1340 [0.0108]	0.1113 [0.0056]
Household in North West	Binary	0.0244 [0.0040]	0.0308 [0.0030]	0.0302 [0.0056]	0.0321 [0.0031]
Household in North Central Coast	Binary	0.1536 [0.0132]	0.1225 [0.0070]	0.1513 [0.0134]	0.1280 [0.0073]
Household in South Central Coast	Binary	0.0650 [0.0073]	0.0907 [0.0056]	0.0579 [0.0075]	0.0899 [0.0055]
Household in Central Highlands	Binary	0.0772 [0.0089]	0.0512 [0.0042]	0.0885 [0.0101]	0.0545 [0.0044]
Household in North East South	Binary	0.1400 [0.0129]	0.1640 [0.0087]	0.1370 [0.0133]	0.1638 [0.0086]
Household in Mekong River Delta	Binary	0.1620 [0.0111]	0.2205 [0.0084]	0.1574 [0.0117]	0.2099 [0.0081]
Household in Living in urban areas	Binary	0.2138 [0.0137]	0.2693 [0.0096]	0.1999 [0.0139]	0.2806 [0.0095]
Observations		1791	7397	1473	7716

Standard errors in parentheses.

Source: Estimation from VHLSSs 2004-2006.

Table A.3. *Regressions of per capita income*

Explanatory variables	Random effect (no sampling weight)	Fixed-effect (no sampling weight)	Fixed-effect with sampling weight and cluster correlation	Random effect (no sampling weight)	Fixed-effect (no sampling weight)	Fixed-effect with sampling weight and cluster correlation
VBSP credit (thousand VND)	-0.401** [0.170]	0.047 [0.192]	-0.02 [0.148]	-0.280* [0.156]	-0.001 [0.185]	-0.041 [0.132]
Informal credit (thousand VND)	-0.071** [0.028]	-0.297*** [0.032]	-0.250* [0.150]	-0.006 [0.025]	-0.188*** [0.031]	-0.153 [0.100]
Ratio of members younger than 16 to total household members				-1332.275*** [335.205]	348.26 [656.639]	1175.09 [1113.231]
Ratio of members older than 60 to total household members				-1576.37*** [289.439]	-1416.74** [713.976]	-1201.93 [967.652]
Household size				-806.90*** [122.663]	-1208.37*** [219.023]	-1277.04*** [370.091]
Household size squared				37.445*** [10.921]	64.983*** [19.022]	72.059*** [27.083]
Ratio of members with technical degree to total household members				5589.02*** [376.165]	2708.20*** [566.345]	2958.45*** [763.572]
Ratio of members with post secondary to total household members				11913.96*** [548.693]	4036.41*** [1044.384]	4654.64** [1985.389]
Area of annual crop land per capita (m2)				0.503*** [0.038]	0.541*** [0.066]	0.563*** [0.128]
Area of perennial crop land per capita (m2)				0.390*** [0.046]	-0.052 [0.070]	-0.118 [0.182]
Forestry land per capita (m2)				0.032 [0.025]	0.024 [0.038]	0.022 [0.065]
Area of aquaculture water surface per capita (m2)				0.621*** [0.095]	0.347*** [0.131]	0.338*** [0.130]
Other credit (thousand VND)				0.270*** [0.010]	0.183*** [0.013]	0.195*** [0.062]
Road to village (yes = 1)				387.36** [169.569]	477.96** [221.82]	649.75*** [224.97]
Distance to nearest daily market (km)				-28.96*** [9.715]	-10.475 [12.329]	-10.112 [6.222]
Red River Delta						
North East				-641.71*** [234.570]		
North West				-2176.06*** [364.483]		
North Central Coast				-1076.24*** [247.722]		
South Central Coast				-508.07* [265.668]		
Central Highlands				-1167.07*** [324.287]		
North East South				1440.15*** [250.048]		
Mekong River Delta				34.445 [219.051]		
Urban				2408.02*** [222.285]		
Time effect (2006 variable)	1278.88*** [84.92]	1,268.14*** [83.95]	1,231.91*** [102.96]	970.66*** [82.755]	1084.50*** [83.735]	1048.73*** [114.820]
Constant	5808.78*** [95.09]	5,854.03*** [61.43]	6,174.24*** [70.88]	7107.26*** [396.196]	8658.64*** [639.718]	8754.82*** [1271.401]
Observations	8432	8432	8432	8432	8432	8432
Number of i	4216	4216	4216	4216	4216	4216
R-squared	0.07	0.08	0.09	0.32	0.16	0.15
Hausman test χ^2 (prob)		201.6(0.000)			159.2(0.000)	

Standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Estimation from panel data VHLSSs 2004-2006.

Table A.4. Regressions of per capita expenditure

Explanatory variables	Random effect (no sampling weight)	Fixed-effect (no sampling weight)	Fixed-effect with sampling weight and cluster correlation	Random effect (no sampling weight)	Fixed-effect (no sampling weight)	Fixed-effect with sampling weight and cluster correlation
VBSP credit (thousand VND)	-0.045 [0.085]	0.159* [0.093]	0.107 [0.102]	-0.046 [0.080]	0.086 [0.091]	0.036 [0.095]
Informal credit (thousand VND)	0.073*** [0.014]	0.045*** [0.015]	0.041 [0.025]	0.072*** [0.013]	0.053*** [0.016]	0.048** [0.024]
Ratio of members younger than 16 to total household members				-1649.79*** [178.755]	-537.467* [324.129]	-429.962 [350.014]
Ratio of members older than 60 to total household members				-828.979*** [155.768]	-848.395** [352.431]	-767.033 [674.304]
Household size				-632.301*** [65.091]	-984.302*** [108.114]	-1143.423*** [169.066]
Household size squared				30.182*** [5.788]	51.914*** [9.390]	65.632*** [15.154]
Ratio of members with technical degree to total household members				3196.43*** [196.832]	923.764*** [279.558]	945.558** [419.991]
Ratio of members with post secondary to total household members				8390.74*** [292.248]	1550.06*** [515.527]	1568.71 [1059.221]
Area of annual crop land per capita (m2)				0.098*** [0.020]	0.097*** [0.033]	0.088*** [0.026]
Area of perennial crop land per capita (m2)				0.142*** [0.024]	0.109*** [0.034]	0.112*** [0.035]
Forestry land per capita (m2)				-0.008 [0.013]	-0.027 [0.019]	-0.033*** [0.010]
Area of aquaculture water surface per capita (m2)				0.127*** [0.049]	0.008 [0.065]	0.01 [0.065]
Other credit (thousand VND)				0.035*** [0.005]	0.016** [0.006]	0.016 [0.010]
Road to village (yes = 1)				39.041 [87.570]	9.776 [109.494]	86.264 [131.785]
Distance to nearest daily market (km)				-11.164** [4.999]	-2.471 [6.086]	-3.638 [3.215]
Red River Delta						
North East				-693.759*** [128.506]		
North West				-1184.547*** [199.361]		
North Central Coast				-678.43*** [135.917]		
South Central Coast				-126.727 [145.769]		
Central Highlands				-595.504*** [177.455]		
North East South				1238.25*** [137.073]		
Mekong River Delta				123.716 [119.813]		
Urban				2221.648*** [118.748]		
Time effect (2006 variable)	627.071*** [40.779]	621.833*** [40.692]	617.212*** [52.756]	468.800*** [41.045]	533.039*** [41.333]	520.804*** [56.646]
Constant	4,296.560*** [54.577]	4,292.421*** [29.779]	4,553.957*** [28.586]	5905.78*** [210.578]	7492.23*** [315.777]	8050.05*** [457.584]
Observations	8432	8432	8432	8432	8432	8432
Number of i	4216	4216	4216	4216	4216	4216
R-squared	0.01	0.01	0.01	0.41	0.15	0.15
		43.7(0.000)		316.0(0.000)		

Standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Estimation from panel data VHLSSs 2004-2006.