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Poverty Targeting and Impact of a Governmental Micro-Credit Program in Vietnam

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Abstract

It is argued that without collateral the poor often face binding borrowing constraints in the formal credit market. This justifies a micro-credit program, which is operated by the Vietnam Bank for Social Policies to provide the poor with preferential credit. This paper examines poverty targeting and impact of the micro-credit program. It is found that the program is not very pro-poor in terms of targeting. Among the participants, the non-poor account for a larger proportion of loans. The non-poor also tend to receive larger amounts of credit compared to the poor. However, the program has positive impact on poverty reduction of the participants. This positive impact is found for all the three Foster-Greer-Thorbecke poverty measures.

Key words: Micro-credit, poverty, poverty targeting, impact evaluation, instrumental variables, fixed-effect model.

JEL classification: I32; I38; H43; H81

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1. Introduction

Although Vietnam has experienced remarkable reduction in poverty over the past 10 years, nearly 20 percent of the population still lives below the poverty line (Table 1). It is often argued that micro-credit is an important tool for smoothing consumption and promoting production, especially for poor households (e.g. Zeller, et al. 1997; Conning and Udry, 2005). However, without collateral the poor can face binding constraints in the credit market. Thus, the Vietnamese government has set up the Vietnam Bank for Social Policies (VBSP) to provide the poor with preferential micro-credit since 2003.

The role of micro-credit in improving household welfare is found in many empirical studies. Micro-credit programs that are assessed are implemented in several developing countries such as Bangladesh, Pakistan, Thailand, et al. For example, Pitt and Khandker (1998) measured the impact of group-based lending programs in Bangladesh, and found that the programs had positive and statistically significant impact on household consumption. In another paper, Khander (2003) found that micro-finance brings benefits for the poorest, thereby significantly reducing poverty in Bangladesh. Significant impacts of credit on expenditure increases for farmers in Pakistan are also found in Khander and Faruqee (2003). Burgess and Pande (2002) examined the expansion of bank branches on household welfare, and showed that this expansion decreases poverty and inequality. Zaman (2001) found positive impact of micro-credit provided by the Bangladesh Rural Advancement Committee on poverty and vulnerability reduction in Bangladesh. Other successful stories of the role of micro-credit programs in reducing poverty can be found in a review paper of Morduch and Haley (2002).

However, there are several studies that do not find significant impact of micro-credit on welfare improvement and poverty reduction. For example, Diagne and Zeller (2001) did not find statistically significant impact of micro-credit on household income in Malawi. Morduch (1998) showed that most potential impacts of micro-credit from the Grameen bank in Bangladesh were on vulnerability reduction instead of poverty reduction. Coleman (1999) found only negligible impact of a micro-credit program in Thailand on household welfare.

In Vietnam, questions on poverty targeting and impact of the VBSP program remain unanswered so far. Most of the evaluation reports simply describe the implementation and outputs of the program, such as how many people received credit from the program or how much capital was put into the program. The Government has spent a huge amount of money to finance the VBSP program. According to VBSP (2005), the total outstanding loans for households were 8249 billion VND in 2004.[1] Information on the quantitative assessment of a

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[1] 1 USD = 15 000 VND in 2004

program can be of interest for several reasons. Firstly, it is very helpful in determining whether the program should be expanded, terminated, or revised. A program with bad targeting and negligible impact should be considered for termination or modification. Secondly, the assessment can provide useful information for improving the program. For example, if it is found that only a small proportion of the poor in urban areas receive credit from the program, the program selection should be changed to increase the effectiveness of targeting in those areas.

The main objective of this paper is to examine how well the VBSP program reaches the poor, and to what extent the program has an impact in terms of household welfare and poverty reduction. To measure impact the paper employs two methods, including the instrumental variables regression and the fixed-effect panel data with instrumental variables. Data used in the analysis are from Vietnam Household Living Standard Surveys that were conducted in 2002 and 2004.

The paper is composed of five sections. The first section gives a brief literature review of micro-credit program assessments, while the second section introduces the data sources and examines the poverty targeting of the VBSP program. The third section presents the methodology of impact evaluation. Empirical findings on program impact are presented in the fourth section, with the fifth section discussing the conclusion and study recommendations.

2.   Poverty Targeting of a VBSP Program

2.1   Data Sources

The study relies on data from the two VHLSSs, which were conducted by the General Statistical Office of Vietnam (GSO) with technical support from the World Bank (WB) in the years 2002 and 2004. The 2002 and 2004 VHLSSs covered 30000 and 9000 households, respectively.[2] The selection of the samples follows a method of stratified random cluster sampling so that the households are representative at the national, rural and urban, and regional levels. It is very interesting that the 2002 and 2004 VHLSSs set up a panel of 4000 households, which are representative of the whole country, and regions of large populations.

The surveys collected information through household and community level questionnaires. Information on households includes basic demography, employment and labor force participation, education, health, income, expenditure, housing, fixed assets and durable goods, participation of households in poverty alleviation programs, and especially

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[2] In 2002, GSO increased the sample size to 30000 households so that the data could be representative for some large provinces. However, this large sample survey was very expensive, and the sample size of VHLSS 2004 was reduced to 9000 households.

information on loans that households had obtained or still owed during the twelve months before the interview.

Information on commune characteristics was collected from 2960 and 2181 communes in the 2002 and 2004 surveys, respectively. Data on commune characteristics consists of demography and the general situation of communes, general economic conditions and aid programs, non-farm employment, agriculture production, local infrastructure and transportation, education, health, and social affairs. Commune data can be linked with household data to assess relationship between characteristics of households and characteristics of communes in which the households are located. It is unfortunate that the commune data in the 2004 VHLSS are only available for rural areas.

This study focuses on the rural population. The main reason is that several commune variables are used in regression analysis of the VBSP impact, and there are only data on commune information for rural areas in the 2004 VHLSS.

2.2   Description of the VBSP Program

The poor often face shortages of capital and assets. Without collateral they find it more difficult to access credit in formal markets. Table 1 compares income, expenditure and main assets between the poor and non-poor in Vietnam. It shows that the poor have lower income and expenditure per capita than the non-poor. The domestic and foreign remittances are very limited for the poor. They also tend to have lower value of fixed and durable assets compared to the non-poor. The government of Vietnam was aware of this fact, and had conducted policies to provide the poor with preferential micro-credit. Between 1995 and 2002, the Vietnam Bank for the Poor (VBP) was established under the control of the Bank for Agriculture and Rural Development (BARD) with the purpose of providing poor households with favorable credit. Since the government has aimed at expanding the credit program for the poor, they closed VBSP and launched a new bank called the Vietnam Bank for Social Policies (VBSP) beginning 2003. VBSP was independent of BARD and expanded its operations rapidly. The branches of VBSP are currently established in all the districts of Vietnam. The poor can borrow from a close VBSP branch at low interest rates without collateral.

Table 1: Household characteristics of the poor and non-poor for rural areas in 2004

Household characteristics	Poor		Non-Poor	
	Mean	Std. Err.	Mean	Std. Err.
Income and expenditure (VND thousands)[3]				
Income per capita	2226.9	26.8	7100.3	110.6
Expenditure per capita	1599.7	9.7	5405.0	74.7
Foreign remittance	62.8	27.0	1386.0	130.2
Domestic remittance	698.6	41.6	2324.7	88.5
Household asset				
Value of fixed asset (VND thousands)	7286.0	454.3	31149.0	1572.9
% households having a motorbike	14.1	0.9	58.8	0.6
% households having a color television	29.4	1.2	77.8	0.5
% household having a telephone	0.1	0.1	27.3	0.7
Housing				
Living areas (m2)	46.6	0.6	62.7	0.5
% households living in permanent house	4.8	0.6	24.5	0.6
% households living in semi-permanent house	55.3	1.4	59.6	0.7
% households living in temporary house	39.9	1.3	15.9	0.5
Land areas				
Total area of land (m2)	5614.0	1537.3	30462.2	9534.9
Area of annual crop land (m2)	2512.5	154.6	6397.5	2523.6
Perennial crop land (m2)	1764.9	718.3	2553.3	442.0
Forestry land (m2)	1077.2	877.9	20513.7	7306.4
Area of aquaculture water surface (m2)	259.3	95.8	997.8	249.4

Source: Estimation from VHLSS 2004

The VBSP program is designed as a group-based lending scheme. In order to borrow credit from VBSP, a household has to join a credit group in their locality. A credit group should include from 5 to 50 members who are located in the same village. If the number of members in a village is lower than 5, they need to join a group in another village. Each credit group sets up a management board, which is responsible for borrowing and credit use of its members.

Following are several criteria that a household should meet to become a member of a credit group:

- The household has a long-term residence permit at the locality in which the credit group is located;

- The household has someone who is able to work (working force);

- The household is classified as the poor by commune authority;[4] and

- The household has a demand for credit. The credit needs to be used in production, or consumption necessary for subsistence.[5] Total loan size is not more than 7 million

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[3] 1 USD = 15 000 VND in 2004
[4] The procedure to classify a household as poor by the local authority is rather complicated. Basically, it depends on the income poverty line - which is set by the Ministry of Labor, Invalid, and Social Affairs - and other specific criteria set up by each commune.

VND. A household can borrow several times, but the total outstanding loans cannot be larger than 7 million VND.

Once a member of a credit group, a household can apply for loans with the VBSP. Firstly, they send a letter of intent to their credit group, where the household specifies the amount and purpose of the loan that they intend to take. When receiving the application, the credit group will arrange a meeting of all members to consider the relevance of the loan. The credit group determines which household is able to borrow, as well as the amount and terms of each loan. A list of applicants will be prepared by the credit group and sent to the People's Committee in that commune. Once the list is ratified by the People's Committee, it will be sent to a VBSP branch for final approval. Credit processing time is quite fast; it often takes from one to four weeks to obtain credit since households send the borrowing request to their credit groups.

It is shown that VBSP's process of lending and monitoring credit is rather stringent, which is expected to ensure high repayment rates. According to VBSP (2005), the ratio of overdue outstanding loans to the total outstanding loans is about 2.96 percent in 2005. Among the overdue loans, the amount of loans that borrowers cannot return accounts for 59.9 percent. VBSP branches try to keep their overdue outstanding loans, since the repayment rate can affect the amount of financing that a bank branch can receive. The VBSP at the national level allocates fewer funds to VBSP branches with overdue outstanding loans. On the other hand, credit groups and the People's Committee are also highly responsible for the repayment of credit group members. They tend to exclude very poor households who might not be able to repay loans (Dufhues, et al. 2002). Non-poor or even better-off households can get loans from VBSP, since they are expected to have higher capacity to repay the loans.

2.3   Poverty Targeting of the VBSP Program

In this study, a household is classified as poor if their per capita expenditure is below the poverty line which is set by WB and GSO Please explain these acronyms. The poverty line is equivalent to the expenditure level that allows for nutritional needs and some essential non-food consumption such as clothing and housing. This poverty line was first estimated in 1993. Poverty lines in the following years are estimated by deflating the 1993 poverty line using the consumer price index.[6] Figure 1 presents the poverty rates over the period 1993-2004.

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[5] Specifically, the loan can be used for the following activities: production, business, and service provision, which can generate income in the future; home repair in case of serious damage; and educational cost for primary and secondary school pupils.
[6] Regional price differences and monthly price changes over the survey period have been taken into account when the poverty lines were calculated.
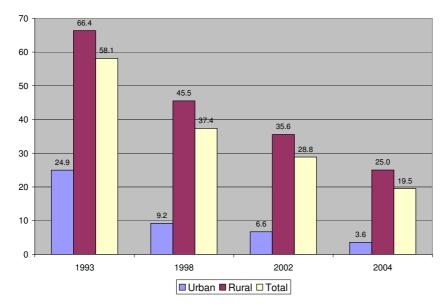
Figure 1: Poverty rate over the period 1993-2004 (%)

Source: Estimation of VHLSS in 1993, 1998, 2002, and 2004.

The figure shows that the proportion of people with per capita expenditure under the poverty line dropped dramatically from 58.1 percent in 1993 to 37.4 percent in 1998. The poverty rate continued to decrease to 28.9 percent and 19.5 percent in 2002 and 2004, respectively.[7] However the poverty rate remains rather high in rural areas, at 25 percent in 2004. The VBSP mainly targets rural areas, since around 95 percent of the poor are located in rural areas. As a result, about 87 percent of the VBSP participants in 2004 were rural people.

The poverty targeting of the VBSP program is examined in table 2. The left panel of this table investigates how well the program reaches households who are defined as poor by the WB-GSO poverty line. It shows that only 12 percent of the poor households in rural areas borrowed credit from the VBSP in 2004. This means that the coverage rate of the program was relatively low: nearly 88 percent of poor households did not use the favorable credit, while the coverage rate for the non-poor was 6.9 percent. The poor tended to receive smaller amounts of credit than the middle income and the rich. The loan size per a participating poor household was VND 3174.6 thousands, which was lower than the amount of VND 3714.8 thousands that a non-poor household borrowed on average. In addition, the VBSP program had very high leakage rates. Among the borrowing households, poor households accounted for only 32.5 percent of this number. In other words, a large proportion of borrowing households were non-poor.

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[7] The poor are classified based on the expenditure poverty line constructed by WB-GSO. The poverty lines in the years 1993, 1998, 2002, and 2004 are equal to 1160, 1790, 1917, and 2077 thousands VND, respectively.

The right panel of Table 2 examines how the program targets households who are classified as poor by commune authorities. As regulated by the program, only households who are classified as poor by commune authorities are eligible for credit borrowing. This shows that the coverage of the program is a bit higher, at 17.9 percent. This is because the ratio of poor households classified by communes is lower than the ratio of poor households classified by the WB-GSO poverty line. However, the leakage rate is also high for this classification level. 75.9 percent of the program participants were found non-poor households.

Table 2: Percentage of borrowing households, average credit amount and interest rate, coverage and leakage rates of the program for rural areas using poverty classification in 2004

Indicators	Poor by WB-GSO			Poor by commune authorities		
	Poor	Non-Poor	Total	Poor	Non-Poor	Total
Coverage rate: % borrowing households	12.0	6.9	8.0	17.9	6.8	8.0
	[0.8]	[0.4]	[0.4]	[1.4]	[0.4]	[0.4]
Amount of borrowed credit (thousands VND)	3174.6	3714.8	3537.0	3199.0	3644.1	3537.0
	[117.8]	[101.1]	[78.2]	[143.2]	[91.4]	[78.2]
Average of monthly interest rate (%)	0.30	0.28	0.29	0.34	0.27	0.29
	[0.02]	[0.01]	[0.01]	[0.02]	[0.01]	[0.01]
Leakage rate: distribution of borrowing households (%)	32.9	67.1	100	24.1	75.9	100
	[2.1]	[2.1]		[1.9]	[1.9]	
Leakage rate: Distribution of borrowed credit amount (%)	29.5	70.5	100	21.8	78.2	100
	[2.1]	[2.1]		[1.9]	[1.9]	

Figures in brackets are standard errors (Standards errors are corrected for sampling weights and cluster correlation).
Note: Number of observations used is 6427, from the 2004 VHLSS.
Source: Estimation from VHLSS 2004.

Using poverty status of households after program implementation can result in misleading analysis of the program targeting. Households who received credit can increase their income and expenditure and rid themselves of poverty. Thus, table 3 analyses program targeting using poverty status in 2002, i.e., before the program. The estimates of the coverage rates of the program do not differ significantly from those in table 2. However, the leakage rates are smaller. When the poor were classified using the WB-GSO poverty line, they accounted for 45.5 percent of the program participants.

Table 3: Percentage of borrowing households, average credit amount and interest rate, coverage and leakage rates of the program for rural areas using poverty classification in 2002

Indicators	Poor by WB-GSO			Poor by commune authorities		
	Poor	Non-Poor	Total	Poor	Non-Poor	Total
Coverage rate: % borrowing households	13.0	6.4	8.1	17.0	6.8	8.1
	[1.1]	[0.6]	[0.5]	[1.9]	[0.5]	[0.5]
Amount of borrowed credit (thousands VND)	3151.2	3555.2	3371.3	3045.5	3490.8	3371.3
	[152.9]	[161.1]	[115.4]	[207.4]	[135.2]	[115.4]
Average of monthly interest rate (%)	0.30	0.31	0.31	0.34	0.29	0.31
	[0.02]	[0.02]	[0.02]	[0.03]	[0.02]	[0.02]
Leakage rate: distribution of borrowing households (%)	45.5	54.5	100	26.8	73.2	100
	[3.3]	[3.3]		[2.8]	[2.8]	
Leakage rate: Distribution of credit amount (%)	42.6	57.4	100	24.2	75.8	100
	[3.6]	[3.6]		[3.0]	[3.0]	

Figures in brackets are standard errors (Standards errors are corrected for sampling weights and cluster correlation).
Number of households in panel data VHLSS 2002-2004 is 2867.
Source: Estimation from VHLSS 2002 and VHLSS 2004

There are at least two reasons why the VBSP program did not reach the poor households well enough. The first is the difference in poverty definition between the WB-GSO approach and the approach employed by local commune authorities. In a commune, a household is classified as poor if their income is below the income poverty line constructed by the Ministry of Labor, Invalid and Social Affairs (MOLISA) and they meet several criteria such as if they lack food or live in a damaged house. These criteria are set up by each commune, and they can be very different from one commune to another (The poverty classification procedures by commune authorities are presented in Box A.1 of Appendix). As a result, the poverty classification of commune authorities is not consistent across communes and over time. Table 4 presents the distribution of population by the poverty classification of commune authorities and WB-GSO over the period 2002-2004. It shows that 13.1 percent of rural people were classified as poor using the commune approach in 2002, while this figure was 35.5 percent using the WB-GSO approach. Only 9.8 percent of rural people were classified as poor by both approaches. Also in 2002, 25 percent of rural people were classified as poor by commune authorities but were considered non-poor according to the WB-GSO approach.

Table 4: Distribution of rural population using the poverty classification of commune authorities and WB-GSO (in percent)

		The year 2002			The year 2004		
		Poor by commune authorities			Poor by commune authorities		
		Poor	Non-Poor	Total	Poor	Non-Poor	Total
Poor by Expenditure using WB-GSO poverty line	**Poor**	9.8 [0.4]	25.7 [0.5]	35.5 [0.6]	7.3 [0.4]	17.7 [0.6]	25.0 [0.7]
	Non-Poor	3.3 [0.2]	61.2 [0.6]	88.5 [0.6]	3.5 [0.3]	71.5 [0.7]	75.0 [0.7]
Total		13.1 [0.4]	86.9 [0.4]	100	10.8 [0.5]	89.2 [0.5]	100

Figures in brackets are standard errors (Standards errors are corrected for sampling weights and cluster correlation).
Source: Estimation from VHLSS 2002 and VHLSS 2004

The second reason why the VBSP program did not effectively reach poor households is mentioned in Dufhues, et al. (2002). Credit groups and commune heads are reluctant to include poor households in the list of credit applicants. Non-poor can find it easier to obtain credit, since they are expected to be more reliable in using credit effectively and repaying credit.

One important issue in examining the effectiveness of credit is the usage of credit. Table 5 tabulates loan size by stating the purpose for loans as reported by respondents. A large proportion of credit was used in production and investment. The poor used about 62.5 percent of the VBSO credit amount for production capital and capital investment, while this proportion for the non-poor was at 58.9 percent. Credit was also used for dept repayment. However, the poor and non-poor also used 29.2 percent and 33.7 percent, respectively of the credit amount for consumption.

Table 5: Distribution of credit amount by credit usage and poverty status for rural areas in 2004

	Poor	Non-Poor	Total
Production capital	41.6	51.9	48.9
	[4.0]	[2.9]	[2.4]
Capital investment	20.9	7.0	11.1
	[3.3]	[1.3]	[1.5]
Dept repayment	8.3	7.4	7.7
	[2.3]	[1.6]	[1.3]
Consumption	29.2	33.7	32.3
	[3.8]	[2.7]	[2.2]
Total	100.0	100.0	100.0

Figures in brackets are standard errors (Standards errors are corrected for sampling weights and cluster correlation).
Source: Estimation from VHLSS 2004

3. Methodology to Impact Evaluation

3.1 Parameters of interest

The main objective of program impact evaluation is to assess the extent to which the program has changed outcomes of subjects.[8] Suppose that there is a program assigned to some people in population P, and denote D^b as a binary variable of participation in the program of a person, *i.e.*, D^b equals 1 if she/he participates in the program, and D^b equals 0 otherwise. Further, let Y denote the observed value of the outcome of interest. This variable can receive two potential values corresponding to the values of the participation variable, *i.e.*, $Y = Y_1$ if $D^b = 1$, and $Y = Y_0$ otherwise.[9] Then the program impact on a person i is defined as:

$$\Delta_i = Y_{i1} - Y_{i0} . \tag{1}$$

The most popular parameter of the program impact is Average Treatment Effect on the Treated (ATT) (Heckman, et al., 1999), which is the expected impact of the program on the actual participants:[10]

$$ATT_{(0,1)} = E(\Delta|D^b = 1) = E(Y_1 - Y_0|D^b = 1) = E(Y_1|D^b = 1) - E(Y_0|D^b = 1) .^{11} \tag{2}$$

Since the size of loans taken by a household can be regarded a continuous variable, one can be interested in additional impacts of a program when the size of loans changes by an amount, denoted by δ. Denote D^c as a continuous variable indicating the size of loans that a household borrows. For simplicity, denote $Y_i(D^c)$ as potential outcome of person i corresponding to the value of variable D^c. We can measure the change in program impact due a change in the amount of credit from d to $d + \delta$:

$$\Delta_i(D^c = d + \delta) - \Delta_i(D^c = d) = Y_i(D^c = d + \delta) - Y_i(D^c = d) . \tag{3}$$

Since we cannot estimate (5) for each person, we are interested in its average:

$$E\left[\Delta(D^c = d + \delta) - \Delta(D^c = d)\right] = E\left[Y(D^c = d + \delta)\right] - E\left[Y(D^c = d)\right]. \tag{4}$$

Expectation in (6) can be written for those who participate in the program:

$$E\left[\Delta(D^c = d + \delta) - \Delta(D^c = d)\big|D^c > 0\right] = E\left[Y(D^c = d + \delta) - Y(D^c = d)\big|D^c > 0\right]. \tag{5}$$

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[8] In the literature of impact evaluation, a broader term "treatment" instead of program/project impact is sometimes used to refer to an intervention whose impact is evaluated.
[9] Y can be a vector of outcomes, but for simplicity let us consider a single outcome of interest.
[10] There are other parameters such as average treatment effect (ATE), local average treatment effect, marginal treatment effect, or even effect of "non-treatment on non-treated" which measures what impact the program would have on the non-participants if they had participated in the program, etc.
[11] In some formulas, the subscript i is dropped for simplicity.

We can divide the right-hand side of (7) by δ to obtain a parameter called the average treatment effect of additional credit amount on the treated:[12]

$$ATT_{(d,\delta)} = \frac{E\left[Y(D^c = d + \delta) - Y(D^c = d)\middle| D^c > 0\right]}{\delta}. \tag{6}$$

This parameter measures how the average program impact on the treated changes due to a small change in the amount of credit.

If we consider $E\left[Y(D^c)\middle| X, D^c > 0\right]$ as a real function of D^c, and denote this function by $f_{D^c>o}(D^c)$, the impact parameter can be represented by the derivative of $f_{D^c>o}(D^c)$ with respect to D^c.

3.2 Impact evaluation methods

The main problem in measuring impact of a micro-credit program is endogeneity of program participation. The borrowing of credit can be correlated with unobserved characteristics of households such as motivation for higher income or abilities in business. By failing to control for unobservable factors affecting program participation, the program impact estimation is no longer unbiased. Most of the studies on impact evaluation of micro-credit programs are aware of the endogeneity problem of program participation. Since experimental designs are difficult to be implemented for micro-credit programs, quasi-experimental and non-experimental designs are often used in impact evaluation. Examples of evaluation of micro-credit based quasi-experiments are Coleman (1999), and Pitt and Khandker (1998). Popular methods in non-experimental designs include instrumental variables (Khander and Faruqee, 2003; Burgess and Pande, 2002), sample selection (e.g., Zaman, 2001), and models based on panel data (e.g., Khander, 2003; Nguyen and Westbrook, 2006).

To measure program impact on household welfare, the paper assumes welfare can be specified as follows:

$$\ln(Y_i) = \alpha + X_i\beta + D_i\gamma + \varepsilon_i, \tag{7}$$

where Y is per capita expenditure or per capita income, X is a vector of household and regional characteristics, and D is the program variable. The program impact is measured by parameter γ.

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[12] This can be called the marginal treatment effect on the treated. However, in some papers, e.g., Heckman and Vytlacil (2005), marginal treatment effect is defined as the treatment effect on the persons at the margin, i.e., those who are different between program participation and non-participation.

It should be noted that when we are interested in the impact of participation in the program regardless of the size of the program, we can use D as a binary variable. When we are interested in the impact of additional credit amount on the participant, D is the loan size, which is a continuous variable.

In the case of credit programs, the main problem in getting the unbiased estimator of γ is the correlation between the variables D and ε in equation (7). For the VBSP program, there can be unobserved variables such as business and production skills of households and the prevailing business environment, which would affect both the outcomes and program participation. As a result, the problem of endogeneity can happen, and methods that do not deal with this problem can lead to biased estimates of the program impact.

This study uses two methods to estimate program impact.[13] The first method is the instrumental variables (IV) regressions. This method requires at least one instrumental variable Z, which must be correlated with the D variable but not correlated with the error tem, ε, given the X variables. If instruments are found, all the coefficients in (7) can be identified and estimated consistently using different estimators such as parametric two-stage least squares (2SLS), generalized method of moments (GMM), and limited information maximum likelihood (LIML).[14]

The second method is the fixed-effect with IV regression using panel data from VHLSS 2002-2004. Using fixed-effect transformation, we can remove unobserved variables that are time-invariants. Then, the IV regressions are applied to solve the problem of correlation between the D variable and the remaining time-variant error terms.

4.   Impact Measurement to a VBSP program

4.1   Impact of the VBSP Program on Household's Expenditure and Income

This section presents empirical findings of the VBSP program's impact. The first step is to select the outcome and conditioning variables. A household is expected to use credit in production or consumption. If the credit is used effectively, their income and consumption expenditure per capita will increase. We measure the program's impact on consumption expenditure per capita and income per capita. One reason for using expenditure per capita as an outcome is that expenditure is a popular welfare indicator with which we can measure impact of VBSP on poverty reduction.

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[13] We do not use parametric sample selection models, since it requires assumption on the joint distribution of errors in the outcome and treatment equations. Although there are several nonparametric estimators in sample selection methods, it is difficult to write software programs to implement the estimation.
[14] Examples of instrumental variables as well as a detailed discussion of instrument variable methods can be seen in econometrics textbooks (Wooldridge, 2001 and Greene, 2003), papers   (Baum et. al., 2003, and Staiger and Stock, 1997), or literature on the review of impact evaluation (Moffitt, 1991).

Total expenditure per capita is collected using very detailed questionnaires in VHLSS. Total expenditure includes food and non-food expenditure. Food expenditure includes purchased food, foodstuff, and self-produced products of households. Non-food expenditure comprises expenditure on education, healthcare, houses and commodities, power, water supply, and garbage collection?

Total income figures per capita are also collected carefully. 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, remittances, and subsidies. Income from agricultural production comprises crop income, livestock income, aquaculture income, and income from other agriculture-related activities.

There can be a large number of explanatory variables in outcome equations. The household variables include demography, household assets, housing, education, employment, and health status. The commune and village variables include infrastructure and socioeconomic characteristics. The explanatory variables should not be affected by the program. It should be noted that data on communes and villages are collected only for rural areas. Summary statistics of explanatory variables in the 2004 VHLSS are presented in table A.1 in Appendix.

The first method used to measure program impact is instrumental variables using single cross section data from the 2004 VHLSS. The key identification issue is to find a valid instrument for program participation, i.e. credit borrowing. Such an instrument should be correlated with the program participant and excluded from the outcome equation. In this study, two instrumental variables are employed. The first one is the commune poverty rate which is based on the poverty classification of commune authorities. It is obvious that households' participation is correlated with criteria of program selection. One of the selection criteria is the poverty status classified by the commune authorities. A commune which has a large number of poor households will have a large number of potential participants in the program. However, when there are many applicants for credit borrowing, credit groups and commune heads tend to screen the applicant list more carefully, since they also have responsibility in ensuring the repayment rate of the borrowers. More applicants can be excluded from the borrowing list. As a result, an eligible household who lives in a commune with a large number of poor households will face higher competition when borrowing from the program.

The second instrumental variable is the distance from a village (where households are located) to the nearest bank. The 2004 VHLSS collected just information on the distance from a village to a branch bank. There is no information on whether the closest branch bank

is a VBSP one. Although the nearest bank can be any commercial bank instead of a VBSP branch, the VBSP bank can be located close to the nearest bank. Households in a village which is closer to a VBSP branch bank are more likely to obtain credit from the bank.

The condition of correlation between the instrumental variables and credit borrowing can be investigated by running a regression of borrowing on the instrumental variables and other explanatory variables. Table A.2 in Appendix reports results of selected regressions. The second and third columns show regressions of program participation and size of VBSP loans. Variable "commune poverty rate" and "distance to the nearest bank" are statistically correlated with the participation of households in the VBSP program. As expected, both the instrumental variables are statistically significant and negatively correlated with program participation. Living in an area with many eligible households or far from banks reduces the chance of program participation. Although the instrumental variables can be statically significant in the regressions on the endogenous variables, i.e., the program participation and the credit size, they can be weakly correlated with the endogenous variables. The problem of weak identification causes the traditional two-stage least square estimator to not function properly, which leads to unreliability of the statistical inference about the estimates (Stock and Yogo, 2005). In the study, this test is based on the Cragg-Donald statistic (Cragg and Donald, 1993). The test statistic in per capita expenditure and income equations is equal to 24.74 and 29.99, respectively (Table A.3 in Appendix). As a rule of thumb, if a test is over 10, the instruments would not be weak (Staige and Stock, 1997). However, to examine whether the impact estimates are sensitive to different instrumental variable estimators, the study uses three types of parametric estimators, including two-stage least squares (2SLS), generalized method of moments (GMM), and limited information maximum likelihood (LIML).

The condition of un-correlation between the instrumental variables and the error term in outcome equations cannot be tested, since the error term is unobserved. In this study, there are at least two reasons for the absence of the commune poverty rate and distance to the nearest bank in the outcome equation. Firstly, commune and village variables that are most important in determining households' welfare are often a function of infrastructures and geographic characteristics. Infrastructure variables can include road, market and school, etc. Geographic variables can be dummy regional variables, geographic types of locality, and distance to the nearest town, etc. Provided these variables are controlled for in the outcome equation, the instrumental variables would be uncorrelated with the unobserved variables in this outcome equation. Secondly, empirical findings show that communes and villages do not play an important role in households' welfare once household variables are controlled for. Table A.2 in Appendix shows that only a few variables of villages and communes are statistically significant in outcome regressions.

Using the two instruments, we can then perform an over-identification test. Table A.3 in Appendix presents the Sargan-Hansen tests for estimators of 2SLS and LIML. Based on this test statistic, we cannot reject the hypothesis on over-identification of instrumental variables. In addition, the endogeneity of program participation and loan size can be tested using the instruments. Results from Durbin-Wu-Hausman tests show that the hypothesis on the exogeneity of program participation and loan size from the program is strongly rejected.

The second method is fixed-effect with IV regression using panel data from VHLSS 2002-2004. In this method, there is only one instrument, which is the poverty rate of communes. This is because the 2002 VHLSS did not collect information on the distance from villages to the nearest bank.

Table 6 present the results of impact evaluation for rural areas using the instrumental variable method. In this table, only the estimates of coefficients of program participation and the amount of borrowed credit from instrumental variables regression are presented.[15] The left panel of the table presents estimates from IV the regressions using single-cross section data of the 2004 VHLSS, while the right panel reports estimates from the fixed-effect with IV regressions using panel data from the 2002 and 2004 VHLSSs. It shows that the estimates of the coefficient of the loan size are positive and statistically significant at the 1 percent and 5 percent levels for log of expenditure per capita and log of income per capita. Program participation also has positive and statistically significant coefficients. The estimates do not differ significantly across various IV estimators.

The estimates from the fixed-effect with IV methods are also positive, and are statistically significant at the 1 percent level. Thus, compared to the IV regressions, the estimates from the fixed-effect with IV ones have small standard errors.

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[15] Some of regression results using 2SLS estimators are presented in Table A.1 in the Appendix.

Table 6: Program impact on expenditure and income per capita

Program variable	IV estimators	IV regression		Fixed-effect with IV regression	
		Log of expenditure per capita	Log of income per capita	Log of expenditure per capita	Log of income per capita
Loan size (in VND thousands)	2SLS	0.00019***	0.00017**	0.00021***	0.00029***
		[0.00007]	[0.00008]	[0.00004]	[0.00006]
	GMM	0.00018***	0.00017**		
		[0.00007]	[0.00008]		
	LIML	0.00019***	0.00017**		
		[0.00007]	[0.00008]		
Program participation (dummy variable)	2SLS	0.68611***	0.62768**	0.70177***	0.96788***
		[0.25375]	[0.27715]	[0.13829]	[0.17866]
	GMM	0.68572***	0.62714**		
		[0.25249]	[0.27705]		
	LIML	0.68612***	0.62777**		
		[0.25376]	[0.27719]		
Number of observations in regression		6427	6427	5552	5552

Figures in brackets are standard errors (Standards errors are corrected for sampling weights and cluster correlation).

5552 is the total number of observations in the panel data of VHLSS 2002-2004. The number of households in the panel data is 2772.

Source: Estimation from VHLSS 2002 and VHLSS 2004

The difference in impact between the poor and non-poor participants is tested by adding the interaction between the poverty status and the program variables to the IV regression. We use the poverty status in 2002, since it is not affected by the program. It is found that all the estimates of the interaction coefficients are not statistically significant (Table A.4 in Appendix). It suggests that the difference in program impact between the poor and non-poor households is not statistically significant.

4.2 Impact of the VBSP Program on Poverty

Since the VBSP program has a positive impact on the consumption expenditure per capita, it is expected that the program can also reduce poverty. This study measures poverty by three Foster-Greer-Thorbecke poverty indexes which can all be calculated using the following formula (Foster, Greer and Thorbecke, 1984):

$$P_\alpha = \frac{1}{n} \sum_{i=1}^{q} \left[\frac{z - y_i}{z} \right]^\alpha , \qquad (8)$$

where y_i is a welfare indicator (consumption expenditure per capita in this paper) for person i, z is the poverty line, n is the number of people in the sample population, q is the number of poor people, and 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.

Impact of the program on poverty of the participants is given by:

$$\Delta_{P_\alpha} = P_\alpha(D = 1, Y_1) - P_\alpha(D = 1, Y_0),$$
(9)

where the first term in the left-hand side of (9) 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 left-hand side of (9) is the counterfactual measure of poverty, i.e., poverty indexes of the credit recipients if they had not received the credit. This term is not observed directly, and it is estimated using predicted expenditure in the absence of the micro-credit program. Since the use of instrumental variables produces statistically significant results, it is also utilized to estimate counterfactual expenditure. Recall the outcome equation as follows:

$$\ln(Y_i) = \alpha + X_i\beta + D_i\gamma + \varepsilon_i$$
(10)

Counterfactual expenditure in the absence of the program for a participant is:

$$\hat{Y}_{i0} = \exp\left(\hat{\alpha} + X_i\hat{\beta}\right),$$
(11)

However, we do not use this counterfactual expenditure to estimate the poverty indices directly. Using the counterfactual expenditure to estimate poverty for each households and then adding these up will lead to biased estimators of poverty indices (Hentschel, et al., 2000). Instead, we employ the idea of "small area estimation" by Elbers, et al. (2003). Firstly, we estimate equation (10) using the instrumental variables regression. Then, for household i, denote P_i as the indicator of poverty for the household. P_i is equal to 1 if per capita expenditure of the household is below the poverty line, and equal to 0 otherwise. The estimator to predict the expected poverty of household i if they had not borrowed credit is as follows:

$$\hat{P}_i = \Phi\left[\frac{\ln z - \ln(\hat{Y}_{i0})}{\hat{\sigma}}\right] = \Phi\left[\frac{\ln z - \left(\hat{\alpha} + X_i\hat{\beta}\right)}{\hat{\sigma}}\right],$$
(12)

where Φ is the cumulative standard normal function; $\hat{\alpha}$ and $\hat{\beta}$ are estimators of α and β, respectively; $\hat{\sigma}$ is the estimator of the standard deviation of error term ε in the outcome equation, $\hat{Y}_{i0}$ is predicted expenditure per capita of household i in the absence of the VBSP credit.

Poverty rate for the group of the participants is simply the sum of expected poverty of the participants. Thus the estimator of the headcount index is simply as follows:

$$\hat{P}_0(D = 1, Y_0) = \frac{m_i}{M} \sum_{i=1}^{N} \hat{P}_i ,$$ (13)

where m_i is the size of household i; M is the total population of the participating group; and N is the number of households in the participating group.

To estimate the poverty gap index PG, and the poverty severity index P_2, we employ a method proposed by Minot, et al. (2003) to estimate the cumulative distribution of the expenditure per capita in the absence of the VBSP credit by changing the poverty line from the lowest expenditure per capita to the highest expenditure per capita in the sample. The estimated cumulative distribution is then used to estimate the poverty indexes PG and P_2 (in the state of no-credit from the program). To estimate standard error of estimates, the paper uses a nonparametric bootstrap technique with 200 replications.

Table 7: Program impact on poverty indices

Poverty indices & IV estimators	Actual	No-credit counterfactual	Difference
2SLS			
Headcount ratio	0.3633***	0.4145***	-0.0512*
	[0.0234]	[0.0238]	[0.0270]
Poverty gap index	0.0898***	0.1222***	-0.0324**
	[0.0077]	[0.0142]	[0.0134]
Poverty severity index	0.0319***	0.0487***	-0.0168**
	[0.0035]	[0.0082]	[0.0078]
GMM			
Headcount ratio	0.3633***	0.4098***	-0.0465
	[0.0234]	[0.0232]	[0.0295]
Poverty gap index	0.0898***	0.1192***	-0.0294**
	[0.0077]	[0.0135]	[0.0139]
Poverty severity index	0.0319***	0.0470***	-0.0151**
	[0.0035]	[0.0078]	[0.0077]
LIML			
Headcount ratio	0.3633***	0.4128***	-0.0496*
	[0.0234]	[0.0245]	[0.0297]
Poverty gap index	0.0898***	0.1219***	-0.0321**
	[0.0077]	[0.0152]	[0.0159]
Poverty severity index	0.0319***	0.0487***	-0.0168*
	[0.0035]	[0.0090]	[0.0092]

***, **, and * represent statistical significance at 1%, 5% and 10%, respectively.
Figures in brackets are standard errors.
Standard errors are calculated using bootstrap (non-parametric) with 200 replications and are corrected for sampling weights.
Source: Estimation from VHLSS 2004

Table 7 presents an estimation of the VBSP's impact on poverty of the participants. The IV regressions are used to predict the expenditure per capita without the program, and

the program variable is the size of loans. The IV estimators include 2SLS, GMM, and LIML. The three estimators yield rather similar results of estimation of the program's impact on poverty. For example, based on the 2SLS estimator, the impact on reduction in poverty rate is estimated at 5.1 percent with a significance level of 10 percent. In other words, the VBSP program helps the participants reduce the poverty rate by 5.1 percentage points. The program also reduces the poverty gap index of the participants by 0.032 with a statistical significance level of 5 percent. The poverty severity index is also reduced by 0.017 due to credit from the program, while the statistical significance level of this estimate is 5 percent.

5   Conclusions

The paper examines the VBSP's poverty targeting and the impact of its preferential credit program for the poor. The program is designed to provide the poor households with credit at low interest rates without collateral. However, the program's targeting methods leave much to be desired: only 12 percent of the poor households in rural areas participated in the program in 2004. Meanwhile, the program covered 6.4 percent of the non-poor households. The non-poor households accounted for 67.1 percent of the beneficiaries. The poor households also received smaller amounts of credit than the non-poor. Thus, in terms of targeting, the program is not very pro-poor. Although, the poor access the program more proportionally than the non-poor, they account for a smaller proportion of the program participants.[16]. One of the main reasons for such ineffective targeting can be explained in Dufhues, et al. (2002). Heads of credit groups and communes are reluctant to verify the poor households in the list of credit applicants because of their low repayment capacity. The Government and VBSP should therefore employ measures to reduce the lending program's leakage rate and increase its coverage rate at the same time, while keeping the program effective. Further studies on the lending system and the selection process should be conducted in order to generate more detailed suggestions for the modification.

Empirical results from impact evaluation show that the program has positive and statistically significant impact on consumption expenditure per capita and income per capita of the participating households. Since the program has a positive impact on households' expenditure, it is expected that the program can contribute to poverty reduction. It is found that the program has positive and statistically significant effects on reduction of the poverty rate, poverty gap and poverty severity.

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[16] The poor access "more proportionally" than the non-poor, i.e., the program coverage for the poor is higher than for the non-poor.

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APPENDIX

Box A.1: Procedure on Poverty Classification for Commune Authorities

Although the idea of poverty classification is to compare household income with the poverty line, the practical procedure of classifying the poor households of MOLISA is rather complicated. One reason for this is that one cannot collect reliable data on income for all households in the country. Accurate collection of income data is very costly. As a result, MOLISA is only able to collect income data for those who are considered as poor and near poor by the commune authorities. They rely on the administrative system at the local level in identifying the poor households. The poverty classification can be described by the following stages:

Stage 1: Preparing a preliminary list of poor households at the village level.

Each village sets up a committee which includes the village head and members of social organizations, which then prepares a preliminary list of poor households in the village. Usually, the committee starts with the list of the poor households in the previous (current) period, and considers which households should be excluded from the list, as well as which households should be added to the preliminary list. The committee puts forward several criteria for this exclusion and inclusion of households. These criteria can be very different from one village to another.

Once the preliminary list of poor households is finalized, it will be submitted to a committee of Hunger Eradication and Poverty Reduction (HEPR) also within the commune.

Stage 2: Justifying the list of poor households at the commune level.

The HEPR committee collects the lists of poor households from all villages. They conduct a survey on income for all households in the preliminary list. Those who have income per capita higher than the MOLISA income poverty line will be excluded from the list. At the end of this stage, a refined list of the poor is constructed.

Stage 3: Conducting village meetings to verify the refined list of poor households.

The HEPR committee sends the new list of poor households to each village in the commune. Each village then organizes meetings for all people in the village to discuss the list of poor households. The list can be revised and then sent back to the HEPR committee.

Stage 4: Finalizing the list of poor households at the commune level.

The HEPR committee submits the revised list of poor households to the People Committee and People Council to finalize the list of the poor households. The list can still be changed at this stage. The commune authorities can adjust the number of poor households in the list. If so, the HEPR committee has to repeat Stages 1 to 3 to determine who should be excluded or added to the list of poor households.

Stage 5: Providing certificates to the poor households.

Each commune sends the list of the poor households to the district authorities. The district collects the lists from all communes, and prepares the district list of the poor households. Then, this list is sent to the Department of Labor, Invalid and Social Affairs (DOLISA) of the province. DOLISA finalizes the list, and prepares the poor household certificates for all the households in the list. Finally, these certificates are sent to the poor households.

Once the list of poor households is finalized, poverty rates of small areas such as communes or even villages can be easily estimated by counting the number of poor households and dividing this number by the total number of households.

Table A.1; Description of variables in regressions

Explanatory variables	Variable type	Participants		Non-Participants	
		Mean	Std. Dev.	Mean	Std. Dev.
VARIABLES FROM HOUSEHOLD DATA					
Age of household head	Discrete	46.4	11.6	48.6	13.6
Gender of household head	Binary	0.8386	0.3682	0.8313	0.3745
Head are ethnic minorities	Binary	0.3025	0.4597	0.1474	0.3545
Completed education degree of head					
Without education degree	Binary	0.2964	0.4571	0.3183	0.4658
Primary school degree	Binary	0.2816	0.4502	0.2546	0.4357
Lower-secondary school	Binary	0.2918	0.4550	0.2705	0.4443
Upper secondary school	Binary	0.0427	0.2023	0.0626	0.2422
Technical degree	Binary	0.0813	0.2735	0.0770	0.2666
Post-secondary school	Binary	0.0061	0.0781	0.0170	0.1293
Ratio of hh. members younger than 16	Continuous	0.3048	0.2096	0.2776	0.2081
Ratio of hh. members older than 60	Continuous	0.0549	0.1325	0.0972	0.1964
Ratio of female hh. members	Continuous	0.4720	0.1646	0.5046	0.1757
Household size	Discrete	5.1796	2.0295	5.0342	1.7925
Ratio of members with lower secondary school	Continuous	0.2195	0.2457	0.2132	0.2368
Ratio of members with upper secondary school	Continuous	0.0541	0.1140	0.0701	0.1379
Ratio of members with technical degree	Continuous	0.0401	0.1221	0.0421	0.1175
Ratio of members with post secondary school	Continuous	0.0055	0.0445	0.0145	0.0714
Number of day-off due to sickness per HH member	Continuous	5.0137	10.9696	4.9532	12.1650
Ratio of hh. members working in agriculture	Continuous	0.7057	0.3585	0.6253	0.3948
Ratio of hh. members working in service	Continuous	0.1402	0.2649	0.1856	0.3131
Ratio of hh. members working in industry	Continuous	0.1446	0.2611	0.1577	0.2795
Being classified as poor hh. by commune authority	Binary	0.2379	0.4262	0.0957	0.2942
Land variables					
Area of annual crop land (m2)	Continuous	4204.9	5512.5	4305.2	7585.1
Area of perennial crop land (m2)	Continuous	1059.0	5485.1	1283.9	7572.6
Area of aquaculture water surface (m2)	Continuous	127.3	912.2	408.7	3021.2
Domestic remittance (thousand VND)	Continuous	918.1	2098.8	1651.0	4013.0
Foreign remittance (thousand VND)	Continuous	247.4	2115.9	742.1	6068.9
Pension (thousand VND)	Continuous	370.1	1557.3	597.6	2488.4
VARIABLES FROM COMMUNE DATA					
Commune variables					
Poverty ratio by commune authority (also instrumental variable)	Continuous	0.1086	0.0822	0.0977	0.0855
Geographic variables					
Costal areas	Binary	0.0427	0.2024	0.0737	0.2612
Delta	Binary	0.4337	0.4960	0.5778	0.4940
Midland/hilly land	Binary	0.0645	0.2458	0.0671	0.2501
Low mountainous areas	Binary	0.2279	0.4199	0.1394	0.3464
High mountainous areas	Binary	0.2312	0.4220	0.1421	0.3492
Region variables					
Red River Delta	Binary	0.1934	0.3953	0.2472	0.4314
North East	Binary	0.2276	0.4197	0.1003	0.3004
North West	Binary	0.0806	0.2725	0.0370	0.1889
North Central Coast	Binary	0.1682	0.3744	0.1394	0.3464
South Central Coast	Binary	0.1043	0.3059	0.0859	0.2802

Explanatory variables	Variable type	Participants		Non-Participants	
		Mean	Std. Dev.	Mean	Std. Dev.
Central Highlands	Binary	0.0487	0.2155	0.0573	0.2325
North East South	Binary	0.0501	0.2184	0.0985	0.2980
Mekong River Delta	Binary	0.1269	0.3332	0.2344	0.4236
Have post-office	Binary	0.8736	0.3326	0.8282	0.3773
Have inter-communal market	Binary	0.6043	0.4894	0.6473	0.4778
Have non-farm enterprises	Binary	0.4895	0.5003	0.5538	0.4971
Have irrigation plant	Binary	0.7151	0.4518	0.6645	0.4722
Distance to nearest agr. extension center (km)	Continuous	10.451	10.507	10.563	9.872
Have national electricity network	Binary	0.9492	0.2198	0.9669	0.1790
Have primary school	Binary	0.9987	0.0355	0.9972	0.0524
Have lower secondary school	Binary	0.9331	0.2500	0.9462	0.2256
Have upper secondary school	Binary	0.1265	0.3327	0.1488	0.3559
Poverty alleviation in the communes					
Employment generation	Binary	0.2235	0.4170	0.2684	0.4432
Poverty reduction	Binary	0.5755	0.4947	0.5494	0.4976
Socioeconomic development and infrastructure	Binary	0.6071	0.4888	0.5901	0.4918
Education and culture	Binary	0.3048	0.4607	0.2922	0.4548
Public Health	Binary	0.2014	0.4014	0.1540	0.3609
Environment and clean water	Binary	0.1647	0.3713	0.1438	0.3510
Have the program 135 that supports communes with difficulties	Binary	1.7559	0.4352	1.8127	0.3936
Village variables					
Have car road	Binary	0.8594	0.3480	0.8737	0.3322
Distance to nearest town (km)	Continuous	10.586	9.843	9.961	9.633
Distance to Commune People Committee (km)	Continuous	1.5476	2.0427	1.4527	2.0831
Distance to nearest daily market (km)	Continuous	4.7661	9.7936	3.0449	6.1988
Distance to nearest periodic market (km)	Continuous	3.0275	5.4298	2.2217	4.9126
Distance to nearest whole-sale market (km)	Continuous	6.3901	11.1145	6.3536	11.8301
Distance to nearest primary school (km)	Continuous	0.7862	1.1934	0.6652	1.0765
Distance to nearest lower secondary school (km)	Continuous	1.606	2.249	1.516	2.187
Distance to nearest upper secondary school (km)	Continuous	4.631	7.738	3.929	6.188
Distance to nearest regional health polyclinic (km)	Continuous	7.880	13.472	7.859	14.403
Distance to nearest district hospital (km)	Continuous	11.194	9.688	10.640	10.089
Distance to nearest other hospital (km)	Continuous	51.490	83.068	45.581	74.116
Distance to nearest bank (km)	Continuous	6.504	7.530	6.623	7.520
Number of observations		549		5878	

Source: Estimation from VHLSS 2004

Table A.2: Results on OLS and 2SLS regressions of expenditure and income per capita

	DEPENDENT VARIABLES AND REGRESSION MODELS									
	First-stage regression		2SLS regression using VHLSS 2004 data				Fixed-effect with IV-2SLS regression using panel data			
EXPLANATORY VARIABLES	Participation in the program (Logit)	Size of the VBSP loans (OLS)	Log of expenditure per capita (2SLS)	Log of expenditure per capita (2SLS)	Log of income per capita (2SLS)	Log of income per capita (2SLS)	Log of expenditure per capita	Log of expenditure per capita	Log of income per capita	Log of income per capita
Household variables										
Size of the VBSP loans			0.00019***		0.00017**		0.00021***		0.00029***	
			[0.00007]		[0.00008]		[0.00004]		[0.00006]	
Participation in the VBSP program				0.68611***		0.62768**		0.70177***		0.96788***
				[0.25375]		[0.27715]		[0.13829]		[0.17866]
Age of household head	0.00951	3.3910**	0.00024	0.00042	-0.0011	-0.00093	0.00172	0.00211	0.00104	0.00158
	[0.00610]	[1.6201]	[0.00077]	[0.00074]	[0.00088]	[0.00084]	[0.00133]	[0.00128]	[0.00173]	[0.00166]
Gender of household head	-0.20629	-52.395	0.02129	0.02077	0.05523***	0.05479***	-0.0589	-0.04874	-0.01301	0.00102
	[0.16553]	[44.220]	[0.01682]	[0.01656]	[0.01948]	[0.01918]	[0.04137]	[0.03987]	[0.05387]	[0.05151]
Head are ethnic minorities	0.46009**	201.816**	-0.2292***	-0.2226***	-0.2144***	-0.2085***	-0.06507	-0.03533	-0.17266**	-0.13165
	[0.20674]	[80.053]	[0.03030]	[0.02872]	[0.03242]	[0.03076]	[0.06689]	[0.06328]	[0.08710]	[0.08175]
Head without education degree	Omitted									
Head with primary school degree	0.21616	100.707**	0.05858***	0.06485***	0.04610**	0.05178***	0.08051***	0.07863***	0.08857***	0.08598***
	[0.14518]	[39.289]	[0.01750]	[0.01658]	[0.02007]	[0.01902]	[0.02389]	[0.02306]	[0.03111]	[0.02979]
Head with lower-secondary school	0.18855	94.777*	0.07159***	0.07893***	0.06453**	0.07120***	0.05048	0.0522	0.05353	0.0559
	[0.20823]	[56.443]	[0.02336]	[0.02274]	[0.02709]	[0.02617]	[0.03539]	[0.03422]	[0.04609]	[0.04421]
Head with upper secondary school	0.06862	78.512	0.01621	0.02514	0.0324	0.04053	-0.01494	-0.02493	0.1128	0.09903
	[0.33266]	[74.836]	[0.03217]	[0.03192]	[0.03652]	[0.03641]	[0.05273]	[0.05090]	[0.06867]	[0.06576]
Head with technical degree	0.25615	134.53	0.05418	0.06447*	0.06126	0.07060*	0.01305	0.02872	0.03344	0.05505
	[0.29403]	[87.460]	[0.03740]	[0.03601]	[0.04309]	[0.04186]	[0.05457]	[0.05255]	[0.07107]	[0.06789]
Head with post-secondary school	0.02227	70.020	-0.04097	-0.03193	0.07073	0.07895	0.04389	0.04421	0.12076	0.12119
	[0.75258]	[120.820]	[0.05442]	[0.05263]	[0.05818]	[0.05636]	[0.10573]	[0.10225]	[0.13769]	[0.13211]
Ratio of hh. members younger than 16	-0.23796	4.98109	-0.3050***	-0.2934***	-0.3926***	-0.3821***	-0.2659***	-0.2251***	-0.3490***	-0.2927***
	[0.36338]	[97.206]	[0.03891]	[0.03895]	[0.04515]	[0.04496]	[0.06891]	[0.06790]	[0.08973]	[0.08773]
Ratio of hh. members older than 16	-2.2536***	-511.629***	-0.06528	-0.07156	-0.11052	-0.11602*	-0.2166***	-0.2342***	-0.1713	-0.19550*
	[0.54435]	[116.097]	[0.06300]	[0.06180]	[0.06868]	[0.06688]	[0.08105]	[0.07829]	[0.10555]	[0.10114]
Ratio of female hh. members	-1.1228***	-268.776***	0.02364	0.0276	-0.01855	-0.0148	0.07971	0.10467	0.15949*	0.19392**
	[0.29550]	[85.2953]	[0.03756]	[0.03763]	[0.04263]	[0.04249]	[0.06724]	[0.06580]	[0.08757]	[0.08501]

EXPLANATORY VARIABLES	DEPENDENT VARIABLES AND REGRESSION MODELS									
	First-stage regression		2SLS regression using VHLSS 2004 data				Fixed-effect with IV-2SLS regression using panel data			
	Participation in the program (Logit)	Size of the VBSP loans (OLS)	Log of expenditure per capita (2SLS)	Log of expenditure per capita (2SLS)	Log of income per capita (2SLS)	Log of income per capita (2SLS)	Log of expenditure per capita	Log of expenditure per capita	Log of income per capita	Log of income per capita
Household size	0.02186	-3.9105	-0.05567***	-0.05675***	-0.06592***	-0.06691***	-0.08444***	-0.08441***	-0.09748***	-0.09744***
	[0.04442]	[10.43856]	[0.00422]	[0.00430]	[0.00456]	[0.00469]	[0.00758]	[0.00733]	[0.00986]	[0.00946]
Ratio of members with lower secondary school	-0.30462	-109.579	0.20394***	0.19946***	0.14201***	0.13796***	0.15619***	0.18031***	0.15289**	0.18615***
	[0.35523]	[98.018]	[0.03872]	[0.03862]	[0.04511]	[0.04483]	[0.05558]	[0.05379]	[0.07238]	[0.06949]
Ratio of members with upper secondary school	-0.94723*	-199.118*	0.59964***	0.60717***	0.30663***	0.31361***	0.45986***	0.47918***	0.14544	0.1721
	[0.53967]	[117.468]	[0.05395]	[0.05581]	[0.06176]	[0.06294]	[0.08618]	[0.08333]	[0.11223]	[0.10765]
Ratio of members with technical degree	0.04468	97.20362	0.55934***	0.58286***	0.48470***	0.50617***	0.60099***	0.58462***	0.51800***	0.49543***
	[0.68728]	[212.636]	[0.07254]	[0.06753]	[0.08300]	[0.08040]	[0.10498]	[0.10145]	[0.13671]	[0.13106]
Ratio of members with post secondary school	-2.21345	-406.353*	1.1813***	1.1749***	0.9231***	0.9175***	0.8352***	0.8319***	0.63413**	0.62956***
	[1.57715]	[227.418]	[0.11716]	[0.11420]	[0.12038]	[0.11717]	[0.18949]	[0.18324]	[0.24676]	[0.23674]
Number of day-off due to sickness per a member	0.00264	1.18215	0.00232***	0.00239***	-0.00182***	-0.00176***				
	[0.00401]	[1.25583]	[0.00053]	[0.00053]	[0.00050]	[0.00048]				
Ratio of hh. members working in agriculture	-0.29808	-158.648*	-0.09653**	-0.10670**	-0.01937	-0.0286	-0.13881**	-0.14877**	-0.02907	-0.0428
	[0.50007]	[88.848]	[0.04899]	[0.04775]	[0.05067]	[0.04924]	[0.06239]	[0.06042]	[0.08124]	[0.07806]
Ratio of hh. members working in service	-0.32236	-98.8255	0.19715***	0.19801***	0.36350***	0.36434***	0.01101	0.00871	0.25646***	0.25330***
	[0.51487]	[91.2494]	[0.04968]	[0.04906]	[0.05100]	[0.05057]	[0.06684]	[0.06469]	[0.08704]	[0.08358]
Ratio of hh. members working in industry	-0.40004	-173.700*	0.09758*	0.08752*	0.35232***	0.34321***	0.00278	-0.00658	0.31586***	0.30297***
	[0.52256]	[93.134]	[0.05011]	[0.04916]	[0.05325]	[0.05213]	[0.06712]	[0.06516]	[0.08741]	[0.08418]
Being classified as poor hh. by commune authority	1.12824***	315.747***	-0.37879***	-0.39500***	-0.41910***	-0.43406***	-0.13200***	-0.13289***	-0.15574***	-0.15697***
	[0.14849]	[63.066]	[0.03029]	[0.03511]	[0.03336]	[0.03791]	[0.02526]	[0.02443]	[0.03289]	[0.03156]
Area of annual crop land (m2)	-0.00001	-0.00066	0.00001***	0.00001***	0.00001***	0.00001***	0.00001***	0.00001***	0.00001***	0.00001***
	[0.00001]	[0.00167]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]
Area of aquaculture water surface (m2)	-0.00004	-0.00132	0.00001***	0.00001***	0.00002***	0.00002***	0.00001*	0.00001	0.00002***	0.00002***
	[0.00003]	[0.00213]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00001]	[0.00000]
Area of perennial crop land (m2)	0	0.00079	0.00000**	0.00000**	0.00001**	0.00001**	0	0	0	0

EXPLANATORY VARIABLES	DEPENDENT VARIABLES AND REGRESSION MODELS									
	First-stage regression		2SLS regression using VHLSS 2004 data				Fixed-effect with IV-2SLS regression using panel data			
	Participation in the program (Logit)	Size of the VBSP loans (OLS)	Log of expenditure per capita (2SLS)	Log of expenditure per capita (2SLS)	Log of income per capita (2SLS)	Log of income per capita (2SLS)	Log of expenditure per capita	Log of expenditure per capita	Log of income per capita	Log of income per capita
	[0.00001]	[0.00273]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]
Domestic remittance (thousand VND)	-0.00007***	-0.00753***	0.00002***	0.00002***	0.00003***	0.00003***	0.00003***	0.00003***	0.00003***	0.00003***
	[0.00002]	[0.00229]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]
Foreign remittance (thousand VND)	-0.00002	-0.00239*	0.00001***	0.00001***	0.00002***	0.00002***	0.00000**	0.00000**	0.00001***	0.00001***
	[0.00002]	[0.00127]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]
Pension (thousand VND)	-0.00004	-0.00866*	0.00001***	0.00001***	0.00002***	0.00002***	0.00002***	0.00002***	0.00004***	0.00004***
	[0.00002]	[0.00462]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00000]	[0.00001]	[0.00001]
Commune variables										
Costal areas	Omitted									
Delta	0.32531	33.173	-0.04824*	-0.05253*	-0.07724**	-0.08120**				
	[0.27413]	[50.1917]	[0.02877]	[0.02935]	[0.03253]	[0.03305]				
Midland/hilly land	0.40957	95.916	-0.03633	-0.03118	-0.07964**	-0.07498*				
	[0.32581]	[75.917]	[0.03575]	[0.03543]	[0.04014]	[0.03982]				
Low mountainous areas	0.61908**	175.002**	-0.06274*	-0.05531	-0.06507	-0.05835				
	[0.31068]	[75.747]	[0.03575]	[0.03452]	[0.04086]	[0.03937]				
High mountainous areas	0.74407**	231.347**	-0.0317	-0.02054	-0.03571	-0.0256				
	[0.35545]	[96.639]	[0.04362]	[0.04252]	[0.04698]	[0.04552]				
Red River Delta	Omitted									
North East	0.61084***	142.554*	0.00946	-0.00931	0.04354	0.02627				
	[0.22582]	[74.173]	[0.03042]	[0.03439]	[0.03370]	[0.03767]				
North West	0.45585	107.497	-0.03475	-0.05001	0.00918	-0.00483				
	[0.29215]	[112.660]	[0.04109]	[0.04213]	[0.04390]	[0.04544]				
North Central Coast	0.32336	74.216	-0.08148***	-0.08376***	-0.13627***	-0.13838***				
	[0.22079]	[61.019]	[0.02339]	[0.02357]	[0.02654]	[0.02685]				
South Central Coast	0.48669**	167.516**	0.00503	0.01324	-0.01224	-0.00479				
	[0.22221]	[65.706]	[0.02764]	[0.02658]	[0.02925]	[0.02822]				
Central Highlands	-0.44008	-97.331	0.08472**	0.08974**	0.19328***	0.19791***				
	[0.35200]	[105.367]	[0.04230]	[0.04167]	[0.04481]	[0.04489]				
North East South	-0.54642*	-64.192	0.31966***	0.32573***	0.34068***	0.34627***				
	[0.30503]	[61.926]	[0.02930]	[0.02928]	[0.03382]	[0.03363]				

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EXPLANATORY VARIABLES	First-stage regression		2SLS regression using VHLSS 2004 data				Fixed-effect with IV-2SLS regression using panel data			
	Participation in the program (Logit)	Size of the VBSP loans (OLS)	Log of expenditure per capita (2SLS)	Log of expenditure per capita (2SLS)	Log of income per capita (2SLS)	Log of income per capita (2SLS)	Log of expenditure per capita	Log of expenditure per capita	Log of income per capita	Log of income per capita
Mekong River Delta	-0.51325**	-46.723	0.21762***	0.22605***	0.26731***	0.27505***				
	[0.23105]	[51.151]	[0.02399]	[0.02468]	[0.02658]	[0.02740]				
Have post-office	0.38880**	72.262*	-0.02148	-0.02309	-0.0032	-0.00472				
	[0.16797]	[37.417]	[0.01804]	[0.01802]	[0.01984]	[0.01979]				
Have inter-communal market	0.08498	30.943	-0.01879	-0.01904	-0.02554	-0.02579				
	[0.12503]	[33.622]	[0.01375]	[0.01395]	[0.01583]	[0.01590]				
Have non-farm enterprises	-0.12189	-28.605	0.03244**	0.03426***	0.01738	0.01905	0.01437	0.02045	0.02102	0.02941
	[0.12011]	[33.331]	[0.01317]	[0.01322]	[0.01497]	[0.01506]	[0.01581]	[0.01478]	[0.02059]	[0.01909]
Have irrigation plant	0.15559	30.107	-0.02406*	-0.02608*	-0.01564	-0.01749				
	[0.12801]	[32.297]	[0.01445]	[0.01453]	[0.01626]	[0.01632]				
Distance to nearest agriculture extension center	-0.00206	-2.121	0.00131	0.00119	0.00236**	0.00225**	0.00306***	0.00329***	0.00497***	0.00529***
	[0.00592]	[1.688]	[0.00099]	[0.00099]	[0.00093]	[0.00091]	[0.00090]	[0.00087]	[0.00117]	[0.00112]
Have national electricity network	-0.03421	-91.508	0.01348	-0.00902	0.0192	-0.00137	0.05796*	0.05125	-0.00288	-0.01213
	[0.33153]	[162.899]	[0.03977]	[0.03290]	[0.04949]	[0.04491]	[0.03451]	[0.03372]	[0.04494]	[0.04357]
Have primary school	1.81382	489.822***	-0.1893	-0.18811	-0.22999	-0.22911				
	[1.15382]	[163.326]	[0.13861]	[0.14540]	[0.18380]	[0.18732]				
Have lower secondary school	-0.31606	-81.818	-0.01578	-0.01617	0.01711	0.0168				
	[0.23977]	[79.154]	[0.02923]	[0.02891]	[0.03516]	[0.03528]				
Have upper secondary school	-0.16901	-35.951	0.04023**	0.04008**	0.04820**	0.04806**				
	[0.16951]	[40.745]	[0.01794]	[0.01803]	[0.01957]	[0.01958]				
With employment generation program	-0.13024	-15.927	-0.01624	-0.01312	-0.01103	-0.00817	-0.00502	-0.00947	-0.00674	-0.01288
	[0.14344]	[38.535]	[0.01530]	[0.01509]	[0.01701]	[0.01686]	[0.01546]	[0.01470]	[0.02014]	[0.01899]
With poverty reduction program	0.12268	14.021	0.00488	0.00029	-0.00398	-0.00819	-0.07296***	-0.07070***	-0.05674***	-0.05362***
	[0.11932]	[33.816]	[0.01444]	[0.01462]	[0.01598]	[0.01613]	[0.01374]	[0.01336]	[0.01789]	[0.01726]
With program on socioeconomic development and infrastructure	-0.03154	11.791	-0.02117	-0.0184	-0.02472	-0.02218	0.04493***	0.04527***	0.05160***	0.05208***
	[0.12644]	[32.867]	[0.01430]	[0.01420]	[0.01593]	[0.01581]	[0.01355]	[0.01311]	[0.01765]	[0.01693]
With education and culture program	-0.19651	-59.177*	-0.0023	-0.0045	-0.02554	-0.02752	-0.02677*	-0.02919**	-0.00338	-0.00672
	[0.12699]	[33.786]	[0.01544]	[0.01514]	[0.01703]	[0.01682]	[0.01419]	[0.01374]	[0.01848]	[0.01776]
With public health program	0.23785*	59.404	0.00484	0.00283	-0.01535	-0.01722	-0.00504	-0.00311	-0.03252	-0.02985
	[0.14268]	[43.113]	[0.01779]	[0.01825]	[0.02012]	[0.02051]	[0.01561]	[0.01511]	[0.02033]	[0.01952]
With environment and clean water	0.12684	60.184	-0.00392	0.00006	-0.0145	-0.01088	-0.03975**	-0.03627**	-0.02945	-0.02466

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| EXPLANATORY VARIABLES | DEPENDENT VARIABLES AND REGRESSION MODELS | | | | | | | | | |
| | First-stage regression | | 2SLS regression using VHLSS 2004 data | | | | Fixed-effect with IV-2SLS regression using panel data | | | |
	Participation in the program (Logit)	Size of the VBSP loans (OLS)	Log of expenditure per capita (2SLS)	Log of expenditure per capita (2SLS)	Log of income per capita (2SLS)	Log of income per capita (2SLS)	Log of expenditure per capita	Log of expenditure per capita	Log of income per capita	Log of income per capita
program										
	[0.14921]	[44.396]	[0.01818]	[0.01784]	[0.02044]	[0.02011]	[0.01773]	[0.01712]	[0.02309]	[0.02212]
With the program 135 that supports communes with difficulties	-0.11809	-28.616	0.03624	0.03559	0.03022	0.0296	0.03241	0.02917	-0.00655	-0.01102
	[0.17180]	[49.871]	[0.02369]	[0.02359]	[0.02186]	[0.02156]	[0.03573]	[0.03459]	[0.04653]	[0.04469]
Village variables										
have car road roads for cars?	-0.42724**	-118.248**	0.06698***	0.06399***	0.06169**	0.05901**	-0.02955	-0.02482	0.01491	0.02143
	[0.18084]	[51.770]	[0.02202]	[0.02127]	[0.02400]	[0.02304]	[0.02570]	[0.02493]	[0.03347]	[0.03221]
Distance to nearest town (km)	0.00454	0.2199	-0.00076	-0.00106	-0.00210**	-0.00237**	0.00215**	0.00180*	0.00126	0.00078
	[0.00775]	[2.366]	[0.00094]	[0.00092]	[0.00104]	[0.00099]	[0.00103]	[0.00100]	[0.00134]	[0.00129]
Distance to Commune People Committee (km)	0.0174	7.021	0.00187	0.00246	-0.00004	0.00049	0.00182	0.00128	0.00421	0.00346
	[0.02756]	[7.9442]	[0.00314]	[0.00313]	[0.00368]	[0.00367]	[0.00362]	[0.00353]	[0.00472]	[0.00456]
Distance to nearest daily market (km)	0.01383*	3.7630	-0.00188*	-0.00228*	-0.00257**	-0.00295**	-0.00142	-0.00085	-0.00011	0.00066
	[0.00776]	[3.171]	[0.00110]	[0.00117]	[0.00125]	[0.00133]	[0.00148]	[0.00142]	[0.00193]	[0.00184]
Distance to nearest periodic market (km)	0.00718	3.321	-0.00215*	-0.002	-0.00319**	-0.00305**	-0.00371***	-0.00379***	-0.00376**	-0.00387**
	[0.01077]	[3.689]	[0.00127]	[0.00126]	[0.00142]	[0.00139]	[0.00125]	[0.00121]	[0.00163]	[0.00156]
Distance to nearest whole-sale market (km)	-0.00636	-1.401	0.00039	0.00046	0.00115*	0.00121*				
	[0.00454]	[1.129]	[0.00054]	[0.00055]	[0.00063]	[0.00064]				
Distance to nearest primary school (km)	-0.01493	-2.9819	-0.00009	-0.00023	0.00586	0.00573	0.00588	0.00461	0.01169*	0.00993
	[0.05179]	[15.801]	[0.00638]	[0.00646]	[0.00648]	[0.00654]	[0.00518]	[0.00507]	[0.00675]	[0.00656]
Distance to nearest lower secondary school (km)	-0.02695	-11.796	0.00112	0.00019	-0.00095	-0.00178	-0.00235	-0.00316	-0.00533	-0.00644*
	[0.02553]	[7.7462]	[0.00313]	[0.00304]	[0.00343]	[0.00330]	[0.00271]	[0.00260]	[0.00353]	[0.00336]
Distance to nearest upper secondary school (km)	0.01702**	7.6567**	-0.0018	-0.00141	-0.00013	0.00023	0.00403***	0.00443***	0.00324*	0.00380**
	[0.00746]	[3.2317]	[0.00122]	[0.00115]	[0.00132]	[0.00126]	[0.00131]	[0.00126]	[0.00171]	[0.00163]
Distance to nearest regional health polyclinic (km)	-0.0026	-1.569	-0.00056	-0.00068	0.00014	0.00003	0.00056	0.00047	0.00192**	0.00179**
	[0.00398]	[1.2309]	[0.00044]	[0.00043]	[0.00049]	[0.00048]	[0.00061]	[0.00058]	[0.00079]	[0.00076]
Distance to nearest district hospital (km)	-0.00127	0.1692	0.00025	0.00023	-0.00011	-0.00012	-0.00250**	-0.00268**	-0.00236	-0.00262*

EXPLANATORY VARIABLES	First-stage regression		2SLS regression using VHLSS 2004 data				Fixed-effect with IV-2SLS regression using panel data			
	Participation in the program (Logit)	Size of the VBSP loans (OLS)	Log of expenditure per capita (2SLS)	Log of expenditure per capita (2SLS)	Log of income per capita (2SLS)	Log of income per capita (2SLS)	Log of expenditure per capita	Log of expenditure per capita	Log of income per capita	Log of income per capita
	[0.00667]	[2.0642]	[0.00080]	[0.00080]	[0.00086]	[0.00086]	[0.00111]	[0.00106]	[0.00144]	[0.00137]
Distance to nearest other hospital (km)	0.0008	0.2979	-0.00001	0.00001	0	0.00002	0.00041***	0.00040***	0.00038***	0.00037***
	[0.00076]	[0.2433]	[0.00009]	[0.00009]	[0.00011]	[0.00010]	[0.00009]	[0.00009]	[0.00012]	[0.00012]
Poverty ratio by commune authority (instrumental variable)	-0.03567***	-11.740***								
	[0.00952]	[2.481]								
Distance to nearest bank (km) (instrumental variable)	-4.41956***	-948.248***								
	[0.92742]	[213.722]								
Constant	-3.07500**	230.451	8.16279***	8.18328***	8.46117***	8.47992***	8.09135***	8.05034***	8.20999***	8.15344***
	[1.37008]	[248.688]	[0.15843]	[0.16378]	[0.20518]	[0.20753]	[0.13473]	[0.12982]	[0.17544]	[0.16772]
R-squared		0.05								
Pseudo R-squared	0.12									
Observations	6440	6440	6440	6440	6439	6439	5552	5552	5552	5552

Robust standard errors in brackets

***, **, and * represent statistical significance at 1%, 5% and 10%, respectively.

Results on other regressions can be provided by authors on requests.

Table A.3: Tests on weak instruments and over-identification of IV and endogeneity of the VBSP credit in IV regressions

	Expenditure equation	Income equation
Overidentification of IV: Hansen J statistic	$\chi_{(1)} = 0.10$ P-value = 0.76	$\chi_{(1)} = 0.11$ P-value = 0.74
Test of endogeneity of "Size of credit from the VBSP program": Durbin-Wu-Hausman statistic	$\chi_{(1)} = 8.21$ P-value = 0.004	$\chi_{(1)} = 6.47$ P-value = 0.01
Test of endogeneity of "Participation in the VBSP program": Durbin-Wu-Hausman statistic	$\chi_{(1)} = 8.80$ P-value = 0.003	$\chi_{(1)} = 6.97$ P-value = 0.01
Weak IV identification test: Cragg-Donald F statistic	24.74	29.99

Table A.4: Estimates of coefficients of interaction between the program variables and poverty status in 2002.

PROGRAM VARIABLES	DEPENDENT VARIABLES AND IV ESTIMATORS					
	Log of expenditure per capita			Log of expenditure per capita		
	2SLS	GMM	LIML	2SLS	GMM	LIML
Program variable is credit size						
Credit size	0.00012	0.00012	0.00022	0.00009	0.00013	0.00103
	[0.00014]	[0.00013]	[0.00028]	[0.00017]	[0.00017]	[0.00360]
Credit size * Poor 2002	-0.00002	-0.00003	-0.00013	-0.00004	-0.0001	-0.00121
	[0.00017]	[0.00017]	[0.00035]	[0.00022]	[0.00022]	[0.00454]
Poor in 2002	-0.2666***	-0.2621***	-0.2320**	-0.2410***	-0.2234***	0.1197
	[0.05335]	[0.05325]	[0.10587]	[0.07091]	[0.07017]	[1.39133]
Program variable is dummy participation one						
Program participation	0.59584	0.54332	1.44121	0.4826	0.64185	7.01572
	[0.66538]	[0.66388]	[2.05087]	[0.83109]	[0.82637]	[34.44045]
Program participation * Poor 2002	-0.21042	-0.21851	-1.15803	-0.27831	-0.52579	-7.8011
	[0.76496]	[0.76450]	[2.35550]	[0.98643]	[0.97672]	[39.79735]
Poor 2002	-0.25566***	-0.25446***	-0.17212	-0.23018**	-0.20901**	0.43364
	[0.06801]	[0.06796]	[0.20618]	[0.08960]	[0.08883]	[3.50167]
Number of observations	5552	5552	5552	5552	5552	5552

Figures in brackets are standard errors (Standards errors are corrected for sampling weights and cluster correlation).

5552 is the total number of observations in panel data VHLSS 2002-2004. The number of households in the panel data is 2772.

Source: Estimation from VHLSS 2002 and VHLSS 2004