THE EFFECT OF FINANCIAL POLICY REFORM ON POVERTY REDUCTION

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The paper estimates the effects of financial policy reform through the effect of loans on household expenditure as proxy for poverty by taking the endogeneity of loans into account. While many previous studies have attempted to estimate such effects based on a restrictive distributional assumption, this study applies a unique identification strategy to resolve the problem of endogeneity by applying 2SLS. In this identification strategy, the study uses LECS data collected before and after the policy change, and uses a unique instrument of the policy reform on state-owned commercial bank. The results show that financial policy reform leads to increase in amount of loans; and such amount of loans has positive effects on household expenditure. This evidence suggests that reforming the financial policy on state-owned commercial bank may have positive effects on household expenditure that may reduce poverty among the households.

1.   INTRODUCTION

The effect of the loan, especially the loan from state-owned commercial banks, have been seriously discussed when such loan has been considered as a way of promoting credit access among rural poor households. Most developing countries have attempted to meet poverty reduction objective by implementing a direct credit policy to provide low interest loans to poor households. Such policies are expected to improve credit access among poor households. However, these policies have been widely criticized since the 1970s for not encouraging formal financial institutions to provide financial services to rural poor households. Thus, many developing countries have considered reforming the financial policy on state-owned commercial bank by adopting market-oriented approach in rural financial markets and emphasizing the flexibility of interest rates.

The important question is whether this approach is the right way to correct for the failure of traditional agricultural credit policies if the rural poor in most developing

countries remain too poor to accumulate savings. Even though market-oriented finance has been adopted in many Asian countries, policy-based loan programs continue to be implemented in, for example, the Philippines (Izumida, 2001).

Therefore, the effects of such reform need to be seriously studied, to understand the problems and feasibility of switching from traditional finance to market-oriented finance. The adoption of this approach, leading to the elimination of subsidized loan programs, may produce negative effects on rural poor households if such loans have significantly positive effects on household incomes or expenditure.

This paper focuses on household expenditure as poverty reduction indicators affected by loan accessing in Lao PDR where the reform was occurred in 2004. The main obstacle to estimating the effects of such loan is the endogeneity of loans. Some previous studies (Feder et al., 1989, 1990; Sial and Carter, 1996; Duong and Izumida, 2002) have attempted to estimate the impact of credit programs in China, Pakistan, and Vietnam, respectively, by applying an endogenous switching regression model. The model accounts for unobserved heterogeneity between borrowed and non-borrowed households. They found that credit has a significantly positive impact on household outcome and agricultural production.

The endogenous switching regression model, however, has two limitations. First, the model relies heavily on distributional assumptions for identification. The distribution of the error term in the structural model depends on the distribution of the error terms in the regimes, and these error terms are assumed to be normally distributed. Second, the model does not account for farmer-specific unobserved heterogeneity, which is expected to be highly correlated with loan amounts.

This paper applies a distribution free identification strategy to resolve the endogeneity problem by using data from the third Lao Expenditure and Consumption Surveys (LECS 3, 2003) and (LECS 4, 2008) collected Lao Statistics Bureau. Because the financial reform policy affects the individual household's loan, but is not correlated with unobserved variables that determine the household income and expenditure, this policy is used as an instrumental variable for the loan amount. Two objectives are attempted to analyze including background of financial policy reform and effect of policy reform on household expenditure.

2. THE FINANCIAL POLICY REFORM AND A REVIEW OF PREVIOUS STUDIES

2.1. The Financial Policy Reform

Governments in many developing countries believe that access to credit could be used as a strategy for helping rural poor households escape the poverty cycle. Poor households especially farmers can utilize such loans for investing and purchasing modern farm inputs to increase farm productivity and income. In Laos, rural farmers

receive agricultural credit mainly from the Agriculture Promotion Bank (APB) under government supervision and subsidy.

The government has implemented several financial policies to promote the economic growth and encourage the loan access since 2000 (Table 1). The main elements of the reforms including implementation market-oriented finance to state-owned commercial bank by eliminating the agricultural promotion duty of APB in 2004, reduction the interest rate from 35 percent in 2000 to 5 percent in 2011, decrease the reserve requirement rate for Lao Kip (currency code for Lao Kip is LAK) deposits from 12 percent in 2002 to 5 percent in 2006 and for foreign currency deposits from 15 percent in 2002 to 10 percent in 2006, establishing the Open-Market Operations (OMOs) in 2006, and encouraging the interbank market in 2006. Furthermore, the Repo and Outright bond trade were implemented in 2010 in order to inject liquidity to banking system.

In term of the farm households have been encouraged to cultivate agricultural production not only for achieving stability and self-sufficiency, but also for commercialization. Under such policies, the APB becomes a major supporter in promoting the cultivation because it is the only formal financial institution providing loans to poor households in rural area. The APB makes subsidized-interest-rate loans to farm households.

However, government subsidies have been gradually reduced, while the APB has implemented its financial structural reform to improve commercial financial services by reducing the role of traditional financial policy. This led the APB to end its duty on promoting the agricultural sector and plays only the role of financial institution in 2004. This reform may reduce the poverty in the rural areas. Therefore, careful estimation of the effect of loan amounts on the poverty reduction is necessary to examine the effect of this policy change. Whether the change in policy has had a negative impact on the poverty reduction depends on the magnitude of the effect of loan amount on the household income and expenditure.

The main obstacle to estimating the effects of the loans is endogeneity. The amount of the loan is likely to be correlated with unobserved variables that affect the poverty reduction. Previously, such identification problems have been dealt with by applying alternative identification strategies. Many previous studies have applied the endogenous switching regression model to account for the bias that is due to the self-selection of borrowers into credit programs.
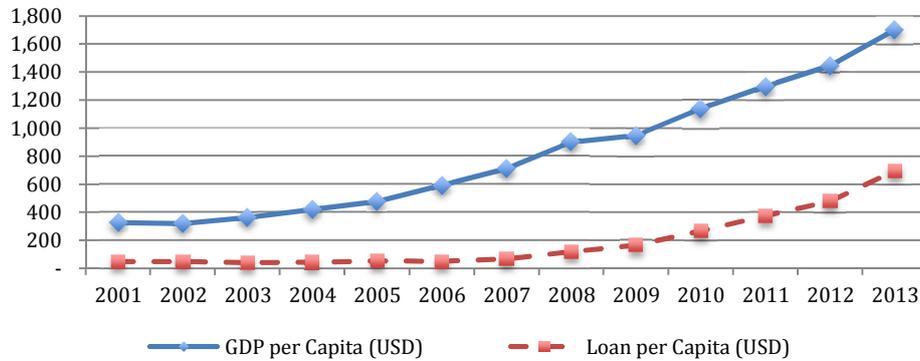
2.2.   The Financial Policy Reform and Poverty Reduction

Accessing to financial services, especially formal loan, is one of the key element to achieve the poverty reduction goal. Thus, to improve the financial access, numerous financial policies have been reformed as mentioned above. Such reformation has leaded to increase the amount of loans per capita. This improvement of loan access may somewhat increase in GDP per capital as shown in Figure 1.

Table 1.   Financial Policies Reform, 2000-2013

| Year	Financial policy reform
2000	• Introduced the high deposit interest rate 60 and 48 percent per year during the beginning and the ending year, respectively; • Limited reserves requirement ratio at 12 percent; • Applied short-run loan interest rate of commercial banks at 35 percent per year; • Operated the exchange rate management policy by maintaining the rate in the parallel market and the bank rate by less than 2 percent.
2002	• Reduced short-run interest rate Bank of Laos rate (BOL's rate) from 35 percent to 20 percent; • Reduced the reserve requirement rate on Kip account from 12 to 6 percent in February; • Increased reserve requirement on Kip accounts from 6 to 8 percent and foreign accounts from 12 to 15 percent at the end of July.
2003	• Issued short run bond of 50 billion from 09/2003 to 12/2013; • Expanded the credit of State-Owned Commercial Bank; • Applied reserve requirement ratios at 8 and 15 percent for accounts in LAK in foreign currency, respectively; • Maintained the intervention on the exchange rate as necessary by keep the rate in the parallel market and the bank rate by less than 2 percent.
2004	• Rediscounted the treasury bills from commercial banks facing with liquidity problem; • Maintained short-term interest rate (BOL's rate) at 20 percent for one week loan and 30 percent for more than one week loan; • Encouraged using kip in the market; and introduced market-oriented finance to state-owned commercial bank (APB).
2005	• Provided short term loans to commercial banks secured by treasury bills; • Encouraged borrow and lend activities among the commercial banks to alleviate their liquidity problems.
2006	• Limited the growth of monetary base not exceeding 14 percent; • Ensure the level of international reserve equivalent to more than 4 months of imports; • Continued to reform and strengthen the banking system toward financial soundness and modernization. • Reduced reserve requirement ratio from 8 to 5 for Kip and from 15 to 10 percent for foreign currency deposits; • Encouraged the active operation of interbank market to address shortage of liquidity; • Conducted Open-Market Operations (OMOs) to help support fiscal balance and overcome the shortage of liquidity of commercial banks; and • Encouraged commercial banks to adjust their interest rate consistently with the domestic economic conditions and the level of international interest rates.
2007	• Adjusted interest rate on short-run loan for Kip from 20 to 12 percent per annum; • Operated the interbank market to address short-run liquidity and support fiscal balance.
2008	• Reduced the BOL interest rate from 10 to 7 percent and adjusted the reserve requirement structure by allowing eligible bonds covering 2p percent of the total reserve requirement rate; • Established the OMOs facilities by setting mechanism such as Repo, Outright rate determination and the issuance of BOL bonds.
2009	• Reduced BOL's short-term interest rate for Kip from 7 to 4 percent; • Promoted the OMOs by issuing BOL bonds to mobilize fund to infrastructure development projects.
2010	• Increased BOL's interest rate maturity less than 7 days from 4 to 5 percent; • Providing regular liquidity injection to banking system by implementing Repo and Outright bond trade.
2011	• Maintaining the BOL's interest rate maturity less than 7 days at 5 percent.
2012	• Promoted the OMO by issuing the BOL bills; • Promoted an active inter-bank market operation for the purpose of liquidity.
2013	• Maintained the lending interest rate at 5 percent; • Keeping the reserve requirement ratio remain unchanged; • Continuing to promote the open market operations;

Source: Bank of Lao PDR.

Source: World Bank and Bank of Lao PDR.

Figure 1.   GDP and Loan per Capita, 2001-2013

Increasing in loan access is not only improving the household income, but also decreasing the poverty among the poor. Figure 2 and 3 show that after implement several financial policies reform, the financial institutions has improved provision the loan to the market. This may cause reducing in amount of poor villages and households. Such positive effect of financial policy reform on poverty reduction needs to be seriously investigated in following section in order to provide the properly results.
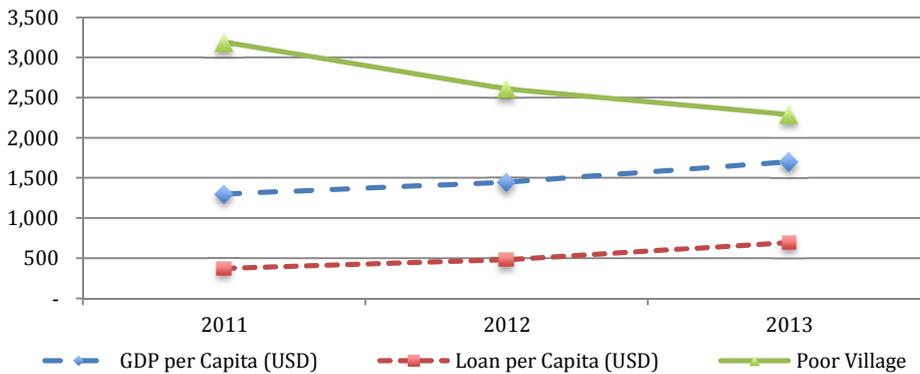
Source: World Bank and Bank of Lao PDR.

Figure 2.   GDP per Capita, Loan per Capita and Poor Villages, 2011-2013
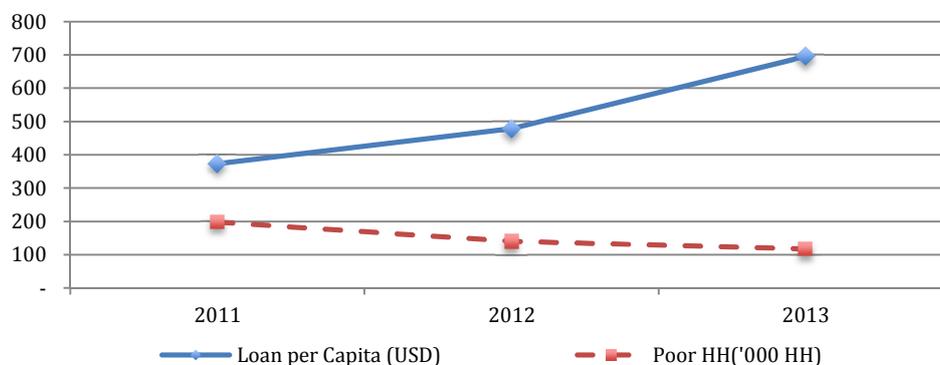
Source: Bank of Lao PDR.

Figure 3.   Loan per Capita and Number of Poor Households, 2011-2013

2.3.   The Review of Previous Studies

The effect of financial policy reform on household outcomes has been investigated by several previous studies which have found that it has positive effect on household outcome. Feder et al. (1990) and Duong and Izumida (2002) used the switching regression model with an endogenous criterion function to estimate the output supply by distinguishing between households that are and are not credit-constrained in the first stage of the estimation. They found a significantly positive correlation between liquidity and output supply. These studies, however, rely heavily on distributional assumptions for identification, and do not account for farmer-specific unobserved heterogeneity, which is expected to be highly correlated with loan amounts.

Pitt and Khandker (1998) estimated the impact of credit provided by the Grameen Bank in Bangladesh on a variety of individual and household outcomes, including schooling, labor supply, household expenditure and assets. They used an identification strategy that applies the loan eligibility criteria as a quasi-experimental survey design. Whether a household is classified as eligible or noneligible is based on landholding. They found that credit is a significant determinant of many household outcomes.

However, Coleman (1999), and Khandker and Faruqee (2003) have pointed out that it may be difficult to apply the identification strategy used by Pitt and Khandker in general because it relies on specific loan eligibility criteria. In many cases, most lending programs of formal financial institutions, including the APB, do not have such exogenous loan eligibility criteria.

Khandker and Faruqee (2003) attempted to apply a more general identification strategy to estimate the impact of farm credit in Pakistan on household outcomes by applying two-stage least squares estimation. They account for the endogeneity of credit by using competitors' characteristics, including household and village characteristics, as

instruments. They found that farm credit has a positive impact on household outcomes.

In this study, a unique identification strategy is applied to deal with endogeneity. We are concerned about the correlation between error terms (productivity shocks) and the amount of the loan. We overcome these two types of endogeneity problem by using data from LECS 3 (2002) and LECS 4 (2007) and a unique instrumental variable, the reform policy in 2004.

Generally, the income is used as an indicator for poverty. According to 7th Five-Year planning (2011-2015), the poverty line for whole country is 192,000 kip/person/month (about 24 USD/person/month), while it is about 180,000 kip/person /month (about 22.5 USD/person/month) and 240,000 kip/person/month (about 30 USD/ person/month) for rural and urban areas as respectively. However, due to insufficient income data from LECS 3 and 4 the expenditure data intended to be used as proxy for income and poverty indicator.
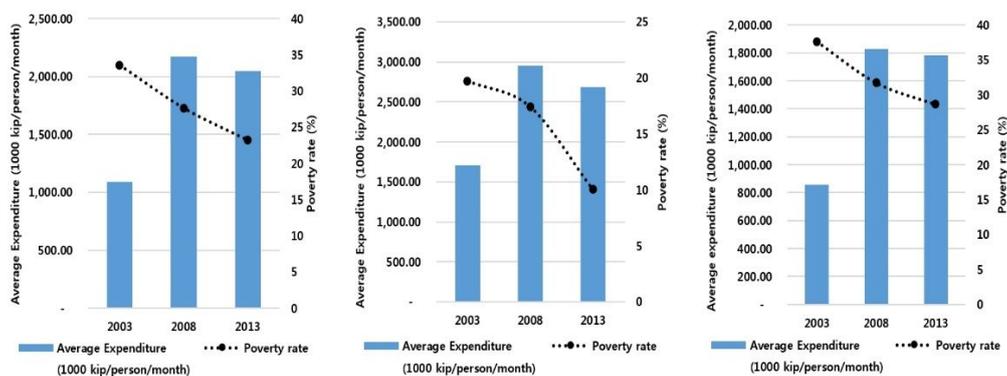
Sources: LECS 3, 4, 5. 2003-2013.

(a) Country   (b) Urban   (c) Rural

Figure 3.   Average Expenditure and Poverty Reduction, 2011-2013

3.   METHODOLOGY

Estimating the effects of loan amounts is difficult because of the endogeneity problems. To overcome this problem, we use distribution free identification strategy that uses data from LECS 3 and LECS 4 collected by Lao Statistics Bureau and uses the reform policy in 2004 as an instrumental variable. In this study, we used expenditure as a proxy of poverty reduction. It is unusual to use expenditure as the proxy of poverty reduction but it is widely used expenditure as a proxy of income, particularly in least developed countries. In the case of Laos, the government used household expenditure to calculated poverty line as well. Our simple model for the poverty reduction can be

written as follows:

$$Expenditure_{it} = \beta_0 + \beta_1 Ln_{it} + \beta_2 X'_{it} + \varepsilon_{it}, \tag{1}$$

where the dependent variable is the amount of expenditure ($Expenditure$) for household i at time period t. Ln_{it} is the amounts of loans made to household i at time period t. This paper focuses only on amount of loan that has been borrowed from formal and semi-formal financial institution such as banks, microfinance institutions, and saving groups or village funds. X_{it} is a vector of other explanatory variables of interest for household i at time period t, those includes education of household head, family number, the gender of the household head (1 if the household head is female, 0 otherwise), Status (1 if the household head is married, 0 otherwise), region, and ethnic. β_1 and β_2 are parameters of interest that measure the effect of the amounts of loans and other individual factors, respectively. ε_{it} is an error term, which is associated with productivity shocks and other disturbances.

We can estimate the empirical model in equation (1) by using alternative methods under various identification assumptions because the compound unobserved variable is expected to be correlated with the loan variables, which violated OLS assumption. OLS estimation requires the restrictive exogeneity assumption of no correlation between the error term (ε_{it}) and the explanatory variables, $E[\varepsilon_{it}|Ln_{it}, X_{it}] = 0$. For example, an increase in the household's ability or a positive productivity shock (an increase in ε_{it}) would increase the amounts of loan borrowed. As a result, OLS suffers from omitted ability variable bias.

This problem is resolved by using a fixed-effects estimator. This method assumes that the error term (ε_{it}) is uncorrelated with the explanatory variables or $E[\varepsilon_{it}|Ln_{it}, X_{it}] = 0$. Again, the error term (ε_{it}) is expected to be correlated with the loans. For instance, a households who expects to have a positive productivity shock in the current year (and hence a larger value of ε_{it}) may increase current borrowing. Therefore, the assumption behind the fixed-effects method may fail and therefore generate inconsistent parameter estimates.

The study accounts for the remaining endogeneity, which is caused by the correlation between productivity shocks (ε_{it}) and loan amounts, by applying a two-stage least squares estimator (2SLS). The financial policy reformed (FR_{it}) is exogenous to the individual households' loan amount because the reform policy affects the individual household's loan, but is not correlated with unobserved variables that determine the income. Hence, FR_{it} is used as an instrumental variable for the amounts of loan. The FR_{it} is a dummy variable that equals 0 and 1 before and after the financial policy reformed in 2004 or when the public bank implemented the traditional financial policy in 2003 and implemented market-oriented financial policy in 2008, respectively. In this case, equation (1) can be estimated under the identification assumption as follows:

$$E[\varepsilon_{it}|FR_{it}] = 0 \text{ and } cov(Ln_{it}, FR_{it}) \neq 0.$$

In the first stage, the amount of loan is regressed on the reform policy dummy variable and a vector of other explanatory variables of interest for household, as shown below:

$$Ln_{it} = \lambda_0 + \lambda_1 FR_{it} + \lambda_2 X_{it} + v_{it}. \tag{2}$$

The first-stage function can be written as follow:

$$\ln(Ln_{it}) = \lambda_0 + \lambda_1 FR_{it} + \lambda_2 X_{it} + v_{it}. \tag{3}$$

And, the second-stage function would be:

$$\ln(Expenditure_{it}) = \beta_0 + \beta_1 Ln_{it}^* + \beta_2 X_{it} + \varepsilon_{it}. \tag{4}$$

The second-stage regression estimates the expenditure models by using predicted amount of loans from the first-stage regression in place of the observed values of loans.

4. DATA

The research will mainly utilize data from Lao Statistics Bureau. It was the Lao Expenditure and Consumption Survey (LECS) that is the largest and most important survey undertaken in Laos. It is not only large in sample size, it also covers a wide range of subject matter areas related to household living situation, consumption, incomes, own production in agriculture and household related business, construction, access to services, social indicators, food or rice intake, and so on. Until now there are five LECS were carried out, started from 1992/1993, but this study used only LECS 3 (2003) and LECS4 (2008). There are 3,879 households and 3,875 households in LECS3 and LECS4, respectively. Four observations in 2008 are dropped due to outliner problem of total expenditure. From table 2, we can see clearly that before and after financial policy reformed the number of borrows are totally different. Therefore, the study employed policy reformed as IV variable

Table 2. The Sample Size

Item	Total	Borrower		Non-borrower	
	No. Household	No. Household	%	No. Household	%
LECS 3 (2003)	3,879	833	21.47	3,046	78.53
LECS 4 (2008)	3,875	241	6.22	3,634	93.78
Total	7,754	1,074		6,680	

Source: Authors' computations from LECS 3 and 4.

Table 3. Means and Standard Deviations of Main Variables

Variables	Mean	SD	Min	Max	Mean	SD	Min	Max
Before reform policy (2003)	Borrower (Observation: 833)				Non-borrower (Observation: 3,046)			
Expenditure (kip)	813,644	609,053	109,600	8,333,065	861,022.60	697,245.60	118,100	10,900,000
Ln(expenditure)	13.444	0.546	11.605	15.936	13.489	0.557	11.68	16.204
Loan (kip)	3,561,438	27,200,000	0	446,000,000	0	0	0	0
Ln(Loan)	12.975	1.662	8.517	19.916	-	-	-	-
Family number (person)	6.268	2.43	2	18	6.217	2.306	1	18
Age of the household head	42.792	12.464	18	79	43.276	12.292	18	93
Education of household head (year)	14.737	3.032	6	16	14.298	3.413	6	16
Gender of the household head	0.037	0.189	0	1	0.051	0.22	0	1
Status of the household head	0.387	0.487	0	1	0.406	0.491	0	1
Region	0.206	0.405	0	1	0.188	0.391	0	1
Ethnic	0.419	0.494	0	1	0.43	0.495	0	1
After reform policy (2008)	Borrower (Observation: 833)				Non-borrower (Observation: 3,046)			
Expenditure (kip)	1,629,303	1,176,964	355,683	9,581,833	1,633,029	1,343,346	64,666	16,300,000
Ln(expenditure)	14.111	0.603	12.782	16.075	14.123	0.563	11.077	16.608
Loan (kip)	6,291,784	10,600,000	50,000	70,000,000	0	0	0	0
Ln(Loan)	14.85	1.232	10.82	18.064	-	-	-	-
Family number (person)	5.45	2.06	1	12	5.873	2.317	1	20
Age of the household head	49.79	12.531	17	80	44.573	12.227	16	99
Education of household head (year)	6.871	1.991	6	15	7.037	2.193	6	15
Gender of the household head	0.095	0.294	0	1	0.049	0.216	0	1
Status of the household head	0.45	0.498	0	1	0.447	0.497	0	1
Region	0.286	0.453	0	1	0.237	0.426	0	1
Ethnic	0.992	0.091	0	1	0.958	0.2	0	1

Source: Authors' computations from LECS 3 and 4.

5.   RESULTS DISCUSSION

5.1.   Descriptive Analysis

Means and standard deviations of some key variables can be seen in some differences before and after the change in the financial policy, particularly for household expenditure and amount of loans from financial institution both from state-owned commercial and commercial banks.

The mean of household expenditure has double increased following the reform in financial policy, while the amount of loans has also twice augmented after reforming the financial policy in 2004 (Table 1a and 1b). This suggests that the financial policy reform may affect the increasing in average loan amount which may lead to enhance the household expenditure.

However, as the household expenditure has been changed not only among the borrowed households, but also non-borrowed, the improvement of lending from financial institution due to policy reform may not be significant factor affecting such a change. One main reason is that average of loan is slightly small amount with about 3.5 million kip (338 USD) in 2003 and about 6.3 million kip (740 USD) in 2008. Such small amount of loan may not be able to significantly contribute to household income generation activities, and hence it might have low effect on total expenditure of household.

Another point can be noticed that the number of household accessing to loan service has been declined from 833 in 2003 to 241 households in 2008 after reforming the financial policy. This financial policy reform mainly affects the APB lending activity because APB has eliminated the duty of agricultural promotion agency, and focused only on providing the cash loan rather that kind loans (such as fertilizer loan). Other reason is that APB is the only financial institution providing loan to agriculture activities especially in rural area, while our sample households of about 78 percent are from the rural areas. Thus, after policy reform, it may cause reducing in lending amount from APB to rural households. Therefore, the indebted investigation on such effect needs to be considered by applying the highly recognized method of two-stage least square and financial policy reform is used as instrumental variable.

5.2.   Empirical Results

The estimation results obtained from three specifications, OLS, fixed effects, and two-stage least squares (2SLS), are reported in Table 4. The OLS estimate shows that the loan amount significantly affects on household expenditure, when one percent increasing in loan amount leads to increase about 0.02 percent in household expenditure; the corresponding fixed-effects estimate is about 0.07 percent enlarging in household expenditure. A possible explanation for the effect of loans being small and statistically significant at low level in both OLS and fixed-effects model is that the farmer-specific

unobserved heterogeneity is not accounted for in the OLS model. Thus, the OLS estimates contain not only the effect of loans, but also confound the effects of household specific unobserved heterogeneity. This reflects the omitted variable bias in the OLS estimate. Although, the fixed effect model accounts for the household specific unobserved heterogeneity problem, the loans remain endogenous in the fixed-effects model.

The paper utilizes 2SLS estimation to resolve the remaining identification problem. In the first stage, we estimate functions for amount of loans by using the financial policy reform as instrumental variable. The estimation results from the first stage are reported in Table A1 (see Appendix). The financial policy reform significantly affects the amount of loans with positive effect about 1.8 percent increase following the policy reform, and the adjusted R-squared of 0.2 is reasonable in the regression for micro data.

The regression in the second stage is estimated by using the predicted values of loans from the first stage. Relative to the OLS and fixed-effects estimates, the 2SLS estimate implies a greater significant effect of loans on household expenditure after reforming financial policy in 2004 with a coefficient of 0.332. This effect is quite large compare with both OLS and fixed-effects estimates, while the standard errors are similar in all three models. Thus, the 2SLS estimate can be compared with the OLS estimate and the fixed-effects estimate.

The additional one percent loan amount would increase household expenditure by about 0.33 percent. This means that financial policy reform may have positive effects on enhancing the household expenditure because such policy reform significantly increases the amount of loan lent to the households by formal institution. Since financial policy reform has positively significant impact on household loan and expenditure and reduce poverty implicitly. Currently the BOL has paid attention to regulate and supervise banking system and turning commercial banking supervision system based on CAMELS and Basel I and Basel II principles. Furthermore, the BOL focused on various type of non-bank supervision to comply with laws and regulations, as well as improving regulation and disseminating, organizing the training and informing regulations to publish awareness.

The base on the BOL annual report (2016), both interest rate for deposits and loans of commercial banks continued to move down that promoted credit. For instance, short-term (one year) deposit interest rates dropped from 5.92 percent to 5.42 percent for the LAK, from 3.96 percent to 3.70 percent for the THB and from 4.11 percent to 3.68 percent for the USD. Short-term (one year) loan interest rate declined from 9.72 percent to 9.28 percent for the LAK, from 7.97 percent to 7.63 percent for the THB and from 7.91 percent to 7.54 percent for the USD.

Commercial banks credit to economy expanded by 23.72 percent compared to the same period last year and accounted for 46.21 percent of GDP. The contribution of subsection credit to overall credit growth consisted of 16.35 percent of industry and handicraft, 3.03 percent of commerce, 1.58 percent of services, 0.38 percent of agriculture, 0.47 percent of transportation and 3.68 percent of others subsection.

Overall, for the Lao economy is estimated to continuously grow by 7 percent with a lower inflation. To this end, the BOL will continue to conduct monetary and exchange rate policies to ensure price stability and supervise the financial system with safe and sound and modernity.

Other explanatory variables (family member, status of household head, region, and ethnic), except education of household head, gender of household head, and age of household head variables, are statistically significant after accounting for productive shocks or endogenous of loans. All those significant factors including household and village characteristics have positive effect on expenditure. The household having more members would likely to have high amount of expenditure; similarly to the case of the head of household who has been married may have greater amount of expenditure than who not married. The reason for these outcomes is all related to an increase of number of family member which leads to increase demand for not only food, but also non-food consumption for their leaving.

In case of the village characteristics, the household leaving in the urban area trends to have higher amount of expenditure than who leave in rural area. Urban household may have more ability to access to market and job opportunity leading to have high income and hence having high ability on spending, and this make urban households have lower poverty rate than among the rural households (Figure 3)

In the same way, the household being Lao Lum ethic may have larger amount of household expenditure than other ethics. The reason is that this ethic is the main ethic of the Lao PDR, and most of them leaving in the areas that are suitable for doing agriculture, business, and factories. This opportunity becomes key factor supporting those people to generate more income which make them having more ability on spending for their leaving than other ethic.

Table 4. Estimates of the Effects of Reform Policy on Poverty Reduction
Dependent Variable: Log expenditure

Explanatory variables	OLS		Fixed-effects estimator		2SLS estimator	
Ln(Loan)	0.020*	(0.010)	0.076*	(0.046)	0.332***	(0.012)
Education of household head	-0.041***	(0.004)	-0.054***	(0.016)	0.002	(0.002)
Family number	0.031***	(0.007)	0.054*	(0.029)	0.028***	(0.003)
Gender of the household head	0.045	(0.079)	-0.151	(0.302)	0.040	(0.028)
Age of the household head	0.002	(0.001)	-0.0003	(0.005)	0.0007	(0.0005)
Status of the household head	0.019	(0.035)	0.114	(0.125)	0.037***	(0.012)
Region	0.357***	(0.041)	-0.224	(0.198)	0.302***	(0.015)
Ethnic	0.133***	(0.038)	0.097	(0.175)	0.046***	(0.016)
Intercept	13.409***	(0.183)	12.926***	(0.761)	8.846***	(0.186)
Number of Observations	1,073		1,073		7,754	
F- test	35.13		8.13		429.98	
R-squared	0.209		0.586		0.308	
Adjusted R-squared	0.203				0.307	

Note: *, **, and *** denote significance at the 90%, 95%, and 99% levels, respectively. Standard errors are in parentheses.

6.   CONCLUSION AND IMPLEMENTATION

The study estimates the effect of loan amount on household expenditure by using the policy reform as a unique instrumental variable in order to deal with endogeneity problem due to correlation between the loan amount and productivity shocks. The estimation results show that the financial policy reform has leaded to increase in average amount of loan; and this amount of loans has a significantly positive effect on household expenditure.

A comparison of the OLS and fixed-effects estimates reveals the importance of controlling for household-specific unobserved heterogeneity that affects loan amounts. The OLS and fixed-effects estimates differ substantially. The OLS estimate of the effect of loans on household expenditure is small with low significant level, while the loans effect is somewhat greater in the fixed-effects model with high significant. This means that the OLS estimates might be affected by omitted variables bias. This evidence reflects the fact that small numbers of productive households receive loans from formal financial institutions, while large numbers of unproductive households may be excluded from formal financial services. Therefore, unlike poor households, productive households can afford to obtain fund from the financial market even without loans from the formal financial institutions.

Due to the minor effect of loan in the fixed-effects model, this model may face the endogeneity that arises because of a correlation between loan amounts and productive shocks which cannot be dealt with by using fixed-effects estimation. Thus, we applied two-stage least squares (2SLS) estimation by utilizing policy reform as a unique instrumental variable. We found that loans have a statistically significant positive effect on household expenditure. The magnitude of the effect is reasonable and implies that borrowing one additional percent raises household expenditure by about 0.33 percent.

This evidence implies that the cessation of loans may be one of the main reasons for the observed increase in household expenditure. Loans would strongly encourage households to improve their income generating activities which can enhance their income level leading to recuperate their ability of spending for food and non-food. This would help them to get rid of poverty condition. Therefore, encouraging financial service access, particularly loan access, of households is important, especially for those households who undertake insufficient capital investment and leaving in the rural areas.

One efficient approach for encouraging financial service access among households is adaptation of the market-oriented financial policy rather than focusing on direct credit policy which provides various subsidized loan program. However, subsidized-credit policy remains necessary for helping the rural poor households in order to reach poverty reduction goal in 2020; Lao rural financial authorities, therefore, face a great challenge to adopt market-oriented financial policy in order to improve both loan access and average loan amount per household.

APPENDIX

Table A1. First Stage Estimates of the Effects of Reform Policy on Loan Access
Dependent Variable: Log Loan

Explanatory variables	Coefficient	Standard error	P-value
Financial policy reform	1.796***	0.192	0.000
Education of household head	-0.013	0.017	0.455
Family number	0.014	0.020	0.497
Gender of the household head	-0.058	0.223	0.796
Age of the household head	0.007	0.004	0.852
Status of the household head	-0.112	0.099	0.257
Region	0.102	0.116	0.380
Ethnic	-0.026	0.112	0.818
Intercept	13.081	0.332	0.000
Number of Observations	1,073		
F- test	33.33		
R-squared	0.200		
Adjusted R-squared	0.194		

Note: *, **, and *** denote significance at the 90%, 95%, and 99% levels, respectively.

REFERENCES

Bank of Lao PDR (2000-2013), "Annual Report 2000-2013," Bank of Lao PDR, Vientiane Capital.

Carter, M.R. (1989), "The Impact of Credit on Peasant Productivity and Differentiation in Nicaragua," *Journal of Development Economics*, 31(1), 13-36.

Carter, M.R. and K.D. Wiebe (1990), "Access to Capital and its Impact on Agrarian Structure and Productivity in Kenya," *American Journal of Agricultural Economics*, 72(5), 1146-1150.

Coleman, B.E. (1999), "The Impact of Group Lending in Northeast Thailand," *Journal of Development Economics*, 60(4), 105-141.

Duong, P. and Y. Izmida (2002), "Rural Development Financial in Vietnam: A Microeconometric Analysis of Household Surveys," *World Development*, 30(2), 319-335.

Feder, G. (1985), "The Relation between Farm Size and Farm Productivity: The Role of Family Labor, Supervision and Credit Constraints," *Journal of Development Economics*, 18(2-3), 297-313.

Feder, G., L.J. Lau, J.Y. Lin and X. Lou (1989), "Agricultural Credit and Farm Performance in China," *Journal of Comparative Economics*, 13(4), 508-526.

_____ (1990), "The Relationship between Credit and Productivity in Chinese

Agriculture: A Microeconomic Model of Disequilibrium," *American Journal of Agricultural Economics*, 72(5), 1151-1157.

Izumida, Y. (2001), "The Impact of Financial Deregulation on Farm Credit: Implications from the Experience of the Philippines," Agricultural Credit in Asia and the Pacific. Report of the APO Symposium on Agricultural Credit held in Tokyo, 8-14 September 1999.

Khandker, S.R. and R.R. Faruqee (2003), "The Impact of Farm Credit in Pakistan," *Agricultural Economics*, 28, 197-213.

Ministry of Planning and Investment (2004), "The Third Lao Expenditure and Consumption Survey (LECSIII)," Vientiane Capital, Lao PDR.

_____ (2008), "The Fourth Lao Expenditure and Consumption Survey (LECSIV)," Vientiane Capital, Lao PDR.

_____ (2011), "7th Five-year planning (2011-2015)," Vientiane Capital, Lao PDR.

_____ (2014), "The Fifth Lao Expenditure and Consumption Survey (LECSV)," Vientiane Capital, Lao PDR.

Pitt, M.M. and S.R. Khandker (1998), "The Impact of Group-based Credit Programs on Poor Households in Bangladesh: Does the Gender of Participants Matter?" *Journal of Political Economy*, 106(5), 959-996.

Sial, M.H. and M.R. Carter (1996), "Financial Market Efficiency in an Agrarian Economy: Microeconometric Analysis of the Pakistani Punjab," *Journal of Development Studies*, 32(5), 771-798.

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