Determinants of credit accessibility of animal production households in Hai Duong province, Vietnam

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1 Introduction

Credit is an important policy instrument that can facilitate the use of modern technologies loading to increase in production especially in developing countries (Mittendorf, 1986). Credit is also important for modernization of small-scale agriculture, as well as commercialization being introduced into the rural economy (Hosseini et al., 2012). The rural credit markets in developing countries are often described as repressed, imperfect and fragmented. It is a common that segments of borrowers have different levels of access to certain types of loans and certain types of credit institutions (Hoff & Stiglitz 1990).

In Vietnam, the Vietnam Bank for Agricultural and Rural Development (VBARD), Vietnam Bank for Social Policies (VBSP), People Credit Funds (PCFs) belong to the financial formal sector. They are the main credit sources in the rural area. In the period 2001-2010, the annual growth rate of credit supply[1] from VBARD, VBSP and PCFs were 21.0%, 34.5% and 22.6% respectively (VBSP, 2004, 2010; VBARD, 2005, 2010; Mix Market, 2012). Those growths are resulted by the implementation of credit policies in responding to the agricultural and rural development in Vietnam. Besides, in the period 2003-2007, the Government of Vietnam invested 113 thousand million VND to the agricultural sector, roughly estimated to meet only 17% of the actual needed capital for this sector (Phong, 2010). Presently, 60% of labor still engages in agriculture (GSO, 2011). The agriculture has played a crucial role in the economic and social development of Vietnam. Many Vietnamese experts stated that the government's investment in the rural area and the credit provision to the agriculture have been still inappropriate. There is a relatively large gap between the economic contribution of agriculture to Vietnam's GDP and credit provision to agriculture (Anh, 2010; Ha, 2010; Phong, 2010).

Regarding to animal production, it is predominantly operated in small-scale household production units. Small producers supply the majority of meat in the market. About 80% of poor households in Vietnam raise animals and about 30% of total agricultural income of households come from animal production (Lapar et al., 2006). With its important role, the strategy for animal production for the period 2010-2020 defines that the improvement of small-scale of animal production is necessary to create a stable income source for farmers (DLHV, 2010). Given the limited financial capital of the poor and small producers, they cannot adopt new production technologies that demand higher investment and higher cost production (Lapar et al., 2006). To facilitate the animal production, a better credit access of animal producer would reduce capital constraints to farmers.

In previous studies on the rural credit in Vietnam, various topics were interested by researchers. However, the credit accessibility of animal production households from our knowledge is still limited. The questions being posted are: What factors affect participation of animal production households in the formal credit market? What factors have an influence on the amount of received loans? Therefore, it is crucial to explore factors determining credit accessibility of farmers. The results would lead to policy implication for a better access to credit of animal production households.

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[1] Inflation rates in Vietnam were 8.5 % in 2005, 22.1 % in 2008 and 9.2% in 2010 (GSO, 2011).

2   Research methods
2.1   The study site and data collection

Hai Duong locates in the Red River Delta of Vietnam with a high density population. In Hai Duong, the agricultural land significantly reduced due to the industrial process, 7.6% in the period 2006-2010. Currently, 81% of population lives in the rural area. The agriculture occupies 60% of the total labor (HDSO, 2011). The high population and main part of labor working in agriculture causes high pressures for rural area. Regarding to poverty, the poverty rate of Hai Duong (9.8%) was still higher than other provinces in the region (GSO, 2011). Therefore, poverty reduction, improvement on agricultural production and creation a stable income for farmers are main concerns of the local authority. The increasing demand on meat and fish of 3.8 million persons in Ha Noi capital, where is near Hai Duong, create a potential market for farmers in Hai Duong. Given limited agricultural land, improvement on animal production not only generates income but also create jobs for farmers, especially un-skill labors and the poor. Hai Duong is selected as the study site due to mentioned reasons.

For data collection, the primary data were collected using a semi-structured questionnaire for the household survey. The selection of surveyed households was made using both stratified and random selection. Firstly, four districts with different economic characteristic were selected. Then, in each district, one representative commune was chosen. Finally, 145 animal production households, who operated in the small-scale and had low income and medium income, were randomly selected for data collection in 2011.

2.2   The econometric model

It was realized that a farm household must pass an obstacle of participation in the formal credit market before it is observed with a positive loan amount. Therefore, the Heckman selection model (Heckman, 1979) is applied in this study. The reduced form of farmer household's decision on participation in the formal credit market and the equation for amount of received loan are presented as follow

$$P_{ij}^* = H_{ij}^p \gamma + u_{ij} \qquad (1)$$

$$P_{ij} = \begin{cases} 1 \ if \ P_{ij}^* > 0 \\ 0 \ if \ P_{ij}^* \leq 0 \end{cases}$$

$$L_{ij} = H_{ij} \beta + \varepsilon_{ij} \ if \ P_{ij} = 1 \qquad (2)$$

$$= 0 \ if \ otherwise$$

Where: P_{ij}^* is latent variable. P_{ij} is 1 if farm households decided to apply for credit and is 0 otherwise; L_{ij} is amount of received loan; H_{ij}^p and H_{ij} the vectors of household charactericstics (Table 1); γ and β are the coefficients to be estimated; u_{ij} and ε_{ij} are the error terms

Following suggestion of Heckman (1979), a two-step procedure is used in this model. The first step aims to estimate factors affecting the participation in formal credit market of households. The second step is then to estimate factors determining amount of received loans. It is assumed that participation in the formal credit market and loan amount obtained by households are independent, i.e. $\rho_{u\varepsilon} = 0$. Therefore, the participation process does not have effect on outcome of the credit amount equation (2). In other word, there is no sample selection problem. Hence, β can be consistently estimated by OLS using the selected sample of surveyed households.

In the first step, the Probit equation (1) is estimate by MLE and the sample selection correction term ($\widehat{\lambda}_{ij}$) was computed (the inverse Mill ratio). In the second step, the equation (2) is estimated by OLS including the correction term ($\widehat{\lambda}_{ij}$) as an additional regressor to correct for selection bias in modeling the sequential decision process of the borrower in the first step. It is to assume that $(u, \varepsilon) \sim N(0,0, \sigma_u^2, \sigma_\varepsilon^2, \rho_{ue})$ for MLE. The equation (2) can be re-written as

$$E\big(L_{ij} \big| H_{ij}, P_{ij} = 1\big) = H_{ij}\beta + \sigma_u \rho_{u\varepsilon} \ \widehat{\lambda}_{ij} \qquad (3)$$

Table 1: Explanatory variables in the equation (1) and (2)

Variable	Type	Description	Expected sign Equation (1)	Expected sign Equation (2)
AGE	Continuous	Age of household head in year	+/-	+/-
GENDER	Binary	Sex of household head: 1 if wife, 0 otherwise	+/-	+/-
EDUCATION	Continuous	Education of household head in year	+	+
WORKER	Continuous	Number of workers	+	+
GROUP	Binary	Wealth group :1 if poor household and 0 otherwise	-	-
ACTIVITY	Binary	Main income activity:1 if animal production and 0 otherwise	+	+
SOCIAL	Binary	Social relation: 1 if household has friend or relatives who are staffs of local mass organizations or banks and 0 otherwise	+	+
AREA	Continuous	Area of fish pond in 100 square meter	+	+
COLLATERAL	Binary	Collateral: 1 if household has land use certificate and 0 otherwise	+	Excluding
POULTRY	Continuous	Number of poultry in 100 heads	Excluding	+
PIG	Continuous	Number of pigs in head	Excluding	+

Source: Owned authors

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