The Factors Impact on the Formal Credit Access of Rural Households: The Case of Vietnam

Do Hong Nhung[1], Phan Thi Thanh Huong[2], Vu Thi Thuy Van[3] and Michel Simioni[4]

[1,2,3] The National Economics University, Vietnam
[4] SupAgro Montpellier University, France
[1] E-mail: nhungdh@gmail.com, [2] E-mail: phanthithanhhuong@gmail.com,
[3] E-mail: thuyvan1507@gmail.com; [4] E-mail: michel.simioni@infa.fr

Abstract

This paper examines the impacts of the rural formal credit market of rural households in Vietnam. Data of Vietnam Access Resource Household Survey (VARHS) in 2014 is used. There are two main players in the market, the Vietnam bank for social policy (VBSP) and the Vietnamese Bank for Agriculture and Rural Development (VBARD). Therefore, the data survey forcused on data lending to poorer households in Vietnam rural. By random forest, important factors were found out and classified. Our results show that factors with similar effects on access to formal credit include age, total land owned, membership of an association and distances to the local administrative center. Rural households which are possess poor certificates, are facing natural disaster and have an historical VBSP loan will have better access to credit from VBSP.

Keywords: rural credit, formal credit, household income, Vietnam

1. Introduction

In low income countries, the economic choices of poor households are often constrained by the inefficient operation of local financial markets (Banerjee and Duflo, 2007). A key issue is the extent to which households can access financial products, particularly in the formal sector. For example, providing access to borrowings that can be put to productive uses has the potential to lead to long term economic growth by helping farmers and investors build economies of scale in production and generate the profits necessary to lift themselves out of poverty. Throughout the developing world the typical response to this gap in the market has been the establishment of microfinance institutions. Morduch (1999) provides an insightful overview of the establishment of micro finance institutions and their role. These institutions, many of which operate on a not-for-profit basis, operate at the grassroots level providing small loans to people who otherwise would not be served by formal financial institutions. These institutions have been found to be effective in many settings but have been criticised on the grounds that they do not reach the very poor and also that they are not cost-effective (Cull et al., 2009).

Since the "the Doi Moi reform process" in 1986, Vietnam has come a long way to transform and achieve good performance in terms of economic growth. As a result, agricultural production and rural economic growth led to a large reduction in poverty. However, these improvements have not spread out throughout the country, especially in rural remote areas where ethnic minority groups tend to live. One of the most crucial tools for households to increase their income is credit access, which should be taken into account by researchers.

Credit is essential for households to develope their businesses and increase their incomes (Nguyen, 2014). Microcredit and other financial services would allow the poor to acquire assets, increase their income as well as decrease their vulnerability to economic shocks. However, commercial banks are generally not interested in poor rural clients because of insufficiencies in information and a shortage of collateral (Boucher, Carter, and Guirkinger (2008)). This lead to the Vietnamese Government and its donor community building credit programmes for the purpose of expanding rural households'access to credit with significant expansion forseen in the near future.

Access to formal credit for rural household is an essential part in the promotion of agricultural production and transformation. As mentioned by Diagne, Zeller and Sharma (2000), access to credit impacts household welfare in at least two main ways. It increases households´ risk bearing capacity and enables long term investments (Macary and Zeller, 2012).

A common characteristic of rural credit markets in developing countries is the coexistence of formal and informal credit markets (Anderson and Malchow-Moller 2006; Boucher and Guirkinger 2007; Barslund & Tapp 2008). Governments in many low-income countries have imposed interest rate ceilings on the formal credit market to promote formal borrowing and discourage informal borrowing as they recognize informal lending as usurious. Hence, this may limit the lending from formal credit markets to the poor because the poor are typically riskier and therefore more expensive for banks to lead to. On the other hand, some studies (Bell 1990; Hoff and Stigliz 1990) have stated that governments have likely failed to reach their objectives. This results in question of the effectiveness of the government role (Hoff and Stigliz 1993) in the formal credit sector.

While the two views mentioned above almost entirely focus on factors affecting the supply of rural credit, factors affecting credit demand were rarely discussed in the literature. The lack of attention to factors on the demand-side in the past analysis of credit rationing caused a number of researchers to argue that the magnitude of credit rationing in the formal credit market is likely to be overestimated (Kochar 1997). A number of factors have been identified by previous studies as the key factors determining rural households' overall demand for a formal credit sector.

Total savings or the total value of liquid assets relative to production and consumption scale were identified as an important factor determining household's overall need for credit. Covariate and/or idiosyncratic shocks would also affect the overall demand for credit. High interest rates and other transaction costs including tedious paper work, bureaucratic loan processes associated with formal loans (Foltz, 2004), collateral risk (Boucher and Guirkinger, 2007), asymmetric information & political reasons (Zander 1994), and the availability of formal credit institutions (He 2007, An and Ren 2005) have been identified as the main obstacles to the demand for formal credit markets.

Rural credit improves the poor rural economy in a variety of ways. Credit access can considerably increase the capacity of households with no or little savings to meet their financial needs for productive agricultural investments. Access to credit could also help rural poor households to adopt new technologies that bring more income (Rosenzweig and Binswanger 1993; Carter 1984). Finally, access to formal credit may permit rural households to support their consumption in times of personal economic distress, although credit is strictly rationed for poor households. However, while collateral is not required by microcredit programs, borrowers are selected by other eligibility benchmarks such as poverty status or repayment ability, often indirectly through peer groups. This paper contributes to the rural credit literature by presenting an empirical analysis of the impact of formal credit in Vietnam which emphasizes the rural households.

Vietnam is often mentioned as an example of a country successful in poverty reduction. Over the past decade, Vietnam has achieved a remarkable decline in poverty. According to the Vietnam Household Living Standard Surveys (VHLSS), the poverty rate decreased from 58% in 1993 to 29% in 2002, and continued to reduce to 16% in 2006. Our invetigations suggest the study of formal credit markets available to rural household has mostly been ignored in both the research and policy sectors in Vietnam, while the considerable size of the formal credit sector and its flexibility suggest that it is important area for the poor economy and country in general. Accordingly Quach and Mullineux (2007), found that total amount of formal credit helped increase household conditions by using the Vietnam Living Standard Surveys (VLSS) for 1993 and 1998, In addition, Nguyen (2008) stated that loans from the Vietnam Bank for Social Policies (VBSP) had positive effects on income and poverty reduction of borrowers in the rural areas using the VHLSS for 2002 and 2004.

On the other hand, Pham and Lensink (2008) drew an opposite conclusion which stated that microcredit did not improve family businesses, while *loans from commercial banks were likely to encourage households in developing their owned business*. T*hese studies show not only that the effect of credit may have changed over time but also that effect differs depending on the source of credit.*

Vietnam rural formal credit market: Formal credit markets are understood as credit market constructed by formal institutions. In Vietnam, formal credit is granted mainly by Vietnam's bank of social policy (VBSP) and Vietnam's bank of agriculture and rural development (VBARD), which makes up for 2/3 of farmers' credit (Đinh Phi Hồ, 2015). The formal credit sector accounts for around 75% of the rural credit market (Phan Dinh Khoi, 2002).

Vietnam has achieved good economic growth and poverty reduction over the past two decades. The poverty rate reduced significantly from 58 percent in 1993 to 20 percent in 2004 and 15 percent in 2010 (Nguyen, 2012).

The proportion of the population living below the national poverty line (using the General Statistics Office of Vietnam and World Bank poverty line) up to 13.5 percent in 2014 which reduced from approximately 60 percent in 1993. More than 40 million people escaped poverty over the last thirty years. A similarly strong trend is observed for people living on less than $1.90/day (in 2011 purchasing power parity terms), where the rate fell from above 50 percent

in 1993 to 2.8 percent in 2014. Poverty reduction has been done with significant improvements in shared wellfare, with the average consumption level of Vietnamese in the bottom 40 percent increasing by 6.8 percent annually from 1993 to 2014.

In the study, we provide a detailed review and an in-depth econometric analysis of how the rural formal credit market operates in twelve provinces of Vietnam, with a focus on basic characteristics the formal credit markets and paint a picture of formal credit access for rural households in Vietnam.

Research question: Vietnam remains a poor country. Around 70 percent of the population live in rural areas, with many people still working in subsistence agriculture. The objective of transforming the agricultural industry and the rural economy as a whole is still a serious challenge for policy makers. *Access to credit for farmers in rural areas is as elsewhere a key ingredient in the promotion and development of agricultural transformation, and it forms an essential element of any poverty alleviation oriented strategy for future development.* Little is known about the rural formal credit market, including both its degree of efficiency and the extent to which credit rationing exists. Appropriate development of market institutions based on well-formed policies is an essential key to success in Vietnam's ongoing transformation to a more market based economy.

2. Methodology

2.1. Data

Data on credit rationing were collected using very detailed questionnaires. Information on household and commune categories was collected and then aggregated into panel per household.

This paper relies on two data sets from the VARHS, which were conducted by the ILSSA in 2012 and 2014 covering 3,648 households for which data was available for both years. The samples of 2014 VARHS are presented in table below:

Table 1: Number of provinces

No	Province	District	Communes	Households
1	Ha Tay (Ha Noi 2)	14	71	589
2	Lao Cai	9	28	295
3	Phu Tho	13	49	385
4	Lai Chau	6	34	320
5	Dien Bien	9	33	317
6	Nghe An	20	69	228
7	Quang Nam	13	44	338
8	Khanh Hoa	8	29	108
9	Dak lak	14	41	350
10	Dak Nong	8	35	307

11	Lam Dong	10	24	78
12	Long An	14	43	333
	Total	**138**	**500**	**3648**

(Source: VARHS 2014)

2.2. Description of variables

Dependent variable: formal credit access of rural households.

The relationship between independent and dependent variables are estimated by logistic model with the following independent variables:

Independent variables: The independent variables represent impacting factors of households' income. Variables representing social factors are typically non-continuous, thus they are encoded as 0-1 while many papers applied linear function to assess factors impact to credit rationing (Nguyen (2012) and Phan (2012)).

Table 2: Independent variables

Variables	Interpretation
Age	Age of household head
hh_size	Size of household
EthnicMinority	1 = Kinh ethnicity
EthnicMinority	0 = other ethnic groups
NaturalDisasters	1 = Affected by disaster
NaturalDisasters	0 = Unaffected by disaster
GenderID	1 = Household head is male
GenderID	0 = Household head is female
AreaTotal	Land size
MarriedID	1 = Household with married couple (alive)
MarriedID	0 = Household without married couple
SectorID	1 = Household in urban areas
SectorID	0 = Household in countryside

Table 2: Independent variable (cont.)

Variables	Interpretation
PoorID	1 = Poor households
PoorID	0 = Not a poor household
DepositID	1 = Household with saving account
DepositID	0 = Household without saving account
OwnLandID	1 = Household with Registration book
OwnLandID	0 = Household without Registration book
LoanTotal	Total value of the loan
LoanTotalID	1 = Household with loans
LoanTotalID	0 = Household with no loans
LoanVBSP	Total value of the loan at VBSP
LoanVBSPID	1 = Household with loans by VBSP
LoanVBSPID	0 = Household with no loans by VBSP
LoanVBARD	Total value of the loan at VBARD
LoanVBARDID	1 = Household with loans by VBARD
LoanVBARDID	0 = Household with no loans by VBARD
LoanFormal	1 = Household with formal loans
LoanFormal	0 = Household with no formal loans
EducationID	0 = Household with no education diploma
EducationID	1 = Household with short-term education certificate
EducationID	2 = Household with bachelor or higher diploma
NumberGroup	The number groups that the household takes part in

(Source: Prepared by the authors)

2.3. Method

To assess the impact on income, ordinary least squares (OLS) in the linear regression model was used. The regression equation is as follows: $$Y = \alpha + \beta_i X_i + \varepsilon \quad (1)$$

Where Y_i is per capita income of rural household i. Y represents the income of each family in 2014; X_i is vectors of impacting independent factors; Variance of errors terms (ε).

For testing results of influential factors of household's income, it is necessary to estimate the level of of impact of each factor and household access to formal credit.

Single classification, regression trees and random forests: Random forest method in decision tree model is used to identify the importance of each factor for household's access to credit, in order to build up a logistic model to evaluate the influences of each factor on access to credit. Random forests algorithm (Breiman, 2001) is a classification and regression tree. The

Decision tree based on randomization of split in two at every node. At each node of the tree, sigle impact factor on credit assess of household. The value of each factor determines whether credit assess or not is considered next. The decision trees in the forest is suitable for the type of data (Milad Malekipirbazari and Vural Aksakalli, 2015). In the method, a forest of uncorrelated trees is built by using classification and regession tree analysis. Trees have some similarities, which used for regression and classification. However, trees also some diffirences to determine where to split. Steps of random forest procedure are as follows:

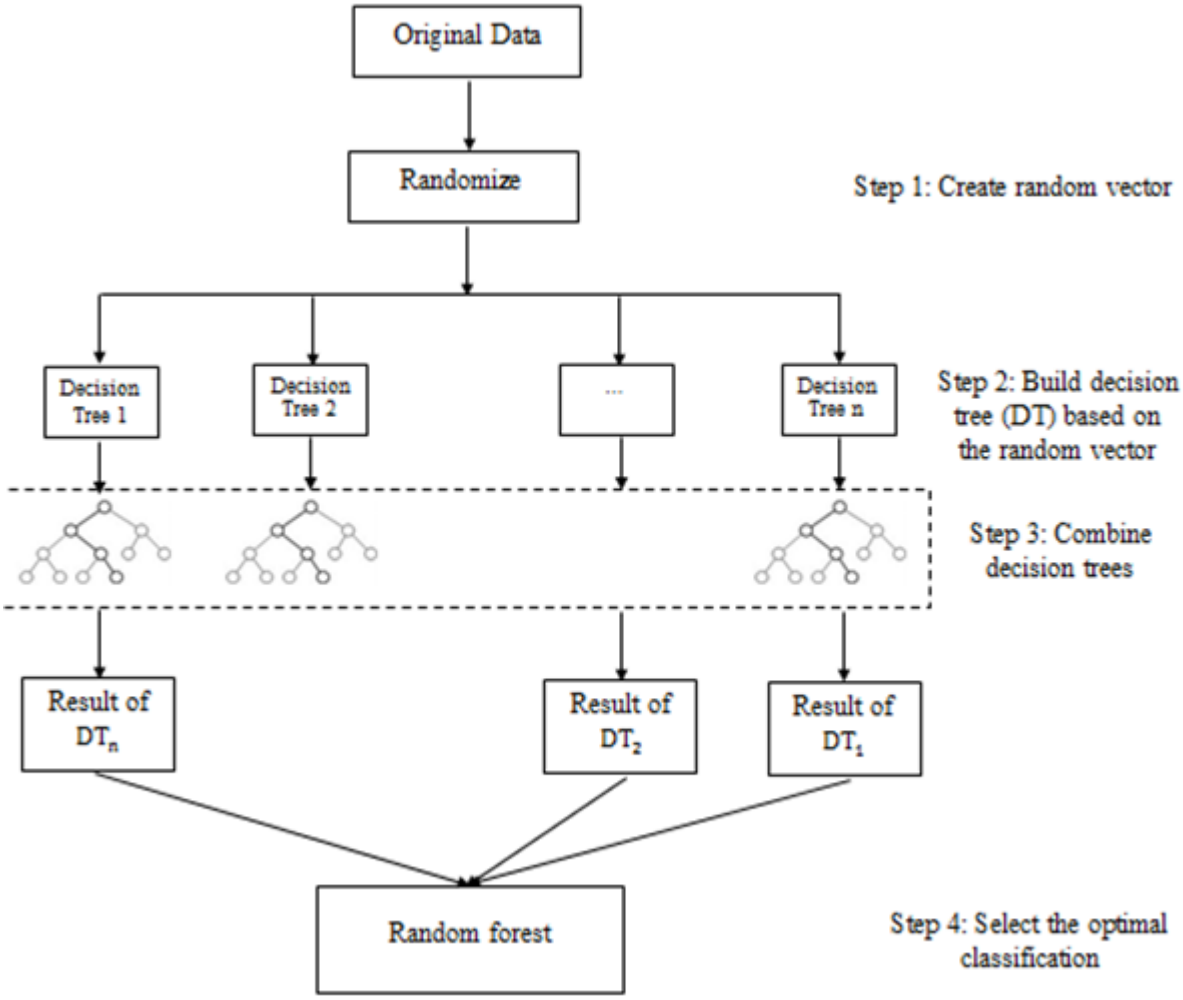

Figure 1. Demonstration of Random Forest methodology

In the next step, the Gini coefficient will be used to measure the contribution of the homogeneity of the nodes and leaves in the resulting random forest.

Mean Decrease Gini *(Mean Decrease Impurity importance (MDI)):* To evaluate the importance of a variable X_m, by the weighted impurity decreases $p(t)\Delta i(st, t)$ for all nodes for predicting Y. The importance of a variable X_m is also estimated by measuring the Mean Decrease Accuracy (MDA) of the forest (Breiman (2001, 2002)). The values of X_m are randomly permuted all nodes of the forest tree. The averaged over all nodes N_t in the forest, as follows:

$$I_{mp}(X_m) = \frac{1}{N_T}\sum_T \sum_{t\in T:v(st)=Xm} p(t)\Delta i(s_t, t) \quad (2)$$

When one variable is removed, the regression model returns an accuracy factor. By applying for other variables, which a variable gives the greatest accuracy decrease, the variable is the most important. Therefore, the variable affects to access credit of the household.

***Use logistic model how do independent variables impact on credit assess*.** (Trevor et al, 2008).

For research which includes non-linear variables (0-1), the Logistic model is used to estimate probability. In the model, dependent variabe Y can be code 0 or 1, with 1 indicating credit assess of household, with 0 indicating no credit. The model $P[Y_i = 1|x_i]$ shows that the probablity of given valued of factors X_i (i=1, …, n).

The relationship between influential factors of access to credit are described by the logistic method.

$$P[Y_i = 1|x_i] = \frac{e^{\alpha+\beta X}}{1+e^{\alpha+\beta X}} \quad (3)$$

Where Y is access to credit, X_i is vectors of impacting access to formal credit of households.

When estimating the parameters βi, for each specific household we can estimate how credit assess is based on important factors. From there, it is possible to classify credit assess of household with each important factor with a cutoff point. In this case, cut off point is used 0.5.

The regression model (3) is the non linear logistic of X. Logistic model is used to estimate the coefficients as follows:

$$l(\beta_0, \beta_i) = \prod_{i:y_i=1} P(x_i) \prod_{i':y_{i'}=0} (1-P(x_{i'} \quad (4)$$

To estimate the parameters βi, the maximum likelihood method is used. The coefficients β_0 and β_i are decided. The model (4) is used to find out β_0 and β_i via predicting probability of $\hat{P}(x_i)$ and thus $\hat{\beta}_0$ and $\hat{\beta}_i$ to estimate model (3). Therefore, finding β_i to maximize the rational function.

3. Results

3.1. Descriptive statistics

Figure 2 shown that owned land area is the most important factor influencing loan accessibility, followed by age, distance to the central area, loans in the past and household size. Other factor such as member of social associations, education, deposit, natural disaster, ethnic minority, poor certificate, gender or marital status do not play important role compared to the mentioned above.

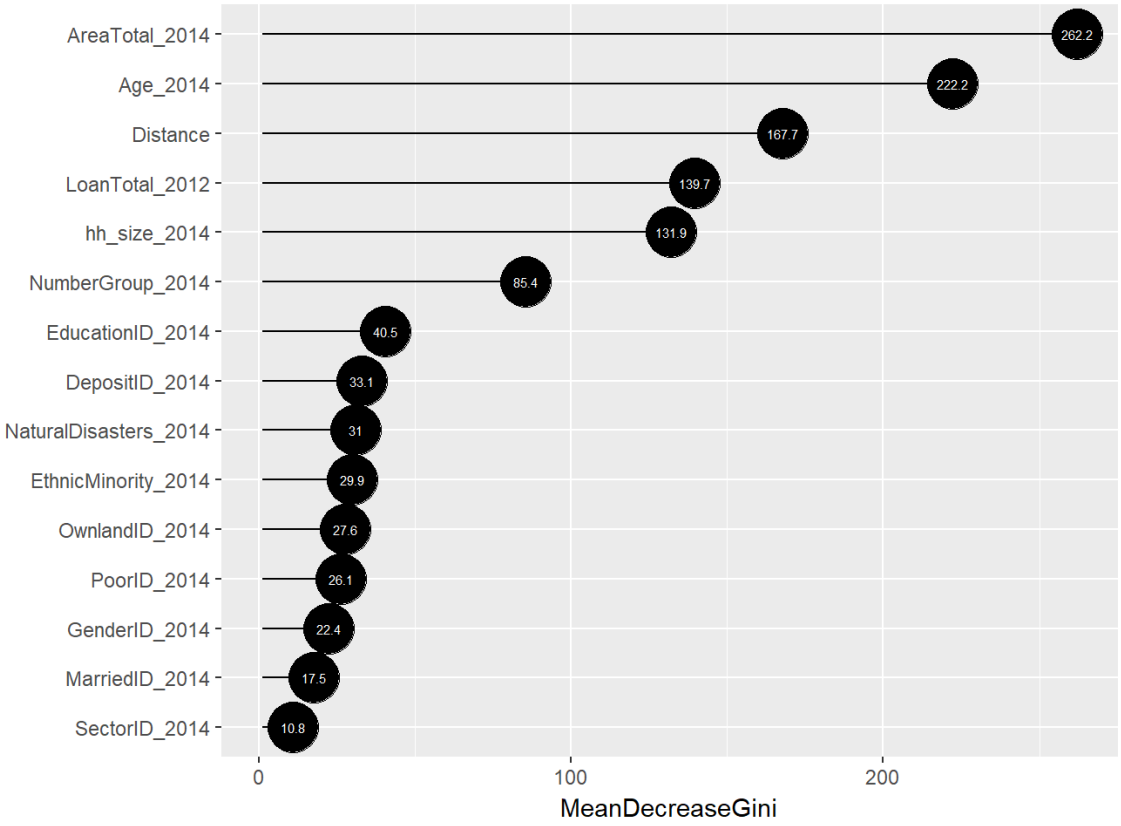

Figure 2. Gini index

Source: VARHS (2014)

Table 3 confirmed that Ha Tay is ranked first among provinces in the survey for loans offered to households, followed by Phu Tho, Daklak and Dak Nong. Those four leading provinces accounted for 69% of the loan segment.

Table 3: Households by value of loan obtained (2014)

Province	Households	Weighted Number of loan (%)	Value of loans (bn VND)
Ha Tay	188	23%	12,606
Lao Cai	39	1%	780
Phu Tho	104	19%	10,390
Lai Chau	60	3%	1,570
Dien Bien	114	5%	3,014
Nghe An	69	5%	2,891

Quang Nam	57	3%	1,893
Khanh Hoa	27	1%	799
Dak Lak	184	16%	9,045
Dak Nong	121	11%	6,196
Lam Dong	37	3%	1,852
Long An	84	8%	4,347
Total	**1,084**	**100%**	**55,382**

Source: VARHS (2014)

The formal loan structure in 12 provinces in Vietnam which were shown in Table 4. In northern mountain areas such as Lao Cai, Lai Chau and Dien Bien, the loan amount of household accounts for 86%, 92% and 93% total loan respectively, mostly funded by VBSP as the households in these provinces are widely targeted segments. For the Central Highland areas (Khanh Hoa, Daklak, Dak Nong, Lam Dong) the loan amount of household is from 56% to 64% while the VBSP still dominates the market. The remaining Ha Tay and Long An which are located very close to economic centers. Therefore, credit funded by VBSP decreased.

In the section we look in more detail at loans obtained in 2014. It is the most recent year from which data are available, and they provide the best up-to-date picture of the rural credit market in Vietnam. Table 4 (Formal loans) illustrates some subtle differences between loans obtained from different formal sources in the loan market such as VBARD and VBSP.

Table 4. Formal loan

Provinces	**VBARD**		**VBSP**	
	% households	**% value of loan**	**% households**	**% value of loan**
Ha Tay	50.82%	73.40%	49.18%	26.60%
Lao Cai	13.89%	17.77%	86.11%	82.23%
Phu Tho	58.57%	81.06%	41.43%	18.94%
Lai Chau	7.14%	8.40%	92.86%	91.60%
Dien Bien	6.33%	27.98%	93.67%	72.02%
Nghe An	42.86%	74.15%	57.14%	25.85%
Quang Nam	34.15%	59.44%	65.85%	40.56%
Khanh Hoa	26.09%	34.39%	73.91%	65.61%

Dak Lak	33.50%	43.59%	66.50%	56.41%
Dak Nong	21.32%	36.03%	78.68%	63.97%
Lam Dong	8.76%	9.29%	91.24%	90.71%
Long An	91.23%	97.43%	8.77%	2.57%

Source: VARHS 2014

The loan is obtained for many purposes, such as consumption and investment. Non-farm activities such as investing in land used right or real estate made up of 73% of volume and is critically important for the development of a market economy and for the efficiency of the economy in general. As land is widely used as collateral in Vietnam, it is therefore of interest to explore any interactions between the credit and land markets.

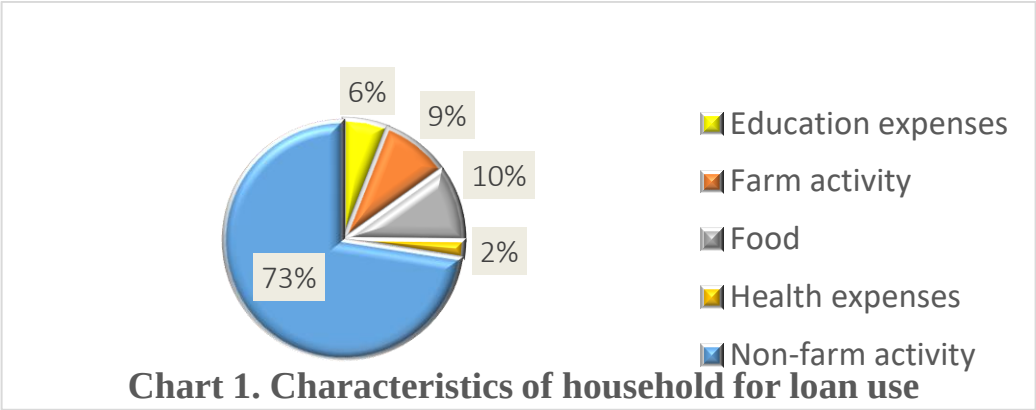

Chart 1. Characteristics of household for loan use

Source: VARHS (2014)

3.2. Testing of influential factors on formal credit access of households

The results also show that households can get loans (LoanTotal) has positive effect (+) on their income and these results are significant at the 1% level. Therefore, those households that can get loans can have higher income than those who do not, proving the positive impact of credit policy.

In addition, the household head's age has a positive influence on income (when the household heads are older, the household's income will rise), but when their age reaches 55 years old the income will start to fall, as the model shows that at such age the household's access to credit decreases (The regression coefficient of variable Age2 < 0). The age exhibits an inverse relationship with the credit demand in Vietnam. The finding is supported by Phan et al (2013), Tran (2015) and Nguyen (2004)

The household size (hh_size), land used right (OwnLand) also have positive and significant effects on income as well as access to credit (The beta coefficients of both hh_size and AreaTotal are positive and statistically significant in both 2 models). This supports similar findings by Tran (2015).

Based on the results above, it can be concluded that the ability to access to credit of each household is different. This leads to the fact that some households have demand for credit but

cannot access it, while those able to get credit may not have demand for credit in practice, which negatively affects the social efficiency of government-supported credit policy for rural households.

Due to unfavorable living conditions in their regions, such as more frequent natural disasters, underdeveloped transportation infrastructure, limited access to education, incomplete credit environment, many households have to take loans from informal credit sources instead of formal ones (VBSP, VBARD in their provinces). The informal credit is loans which borrowed fom friends, relatives, commercial credit, state-related debt (for example, tax and insurance). Therefore, to assess the influential factors of their access to credit, it is necessary to include the impact of formal credit, with VBSP and VBARD as two main organizations following government-supported credit program. The result is as follows:

Table 5: Households' access to formal credit

Variables	Formal credit			
	Coefficient	dF/dx	P value	
Age_2014	-0,021200	-0,003605	0,000000	***
hh_size_2014	0,108900	0,018512	0,000010	***
EthnicMinority_20141	0,146600	0,024596	0,162934	
GenderID_20141	0,057100	0,009615	0,715566	
AreaTotal_2014	0,000011	0,000002	0,000104	***
SectorID_20141	0,697200	0,097395	0,001441	*
PoorID_20141	0,268900	0,047873	0,024454	*
NaturalDisasters_20141	-0,100000	-0,016791	0,291594	
DepositID_20141	-0,533400	-0,099337	0,000002	***
OwnlandID_20141	0,540300	0,083658	0,000000	***
EducationID_20141	-0,002248	-0,000382	0,984595	
EducationID_20142	-0,109500	-0,018129	0,500999	
MarriedID_20141	-0,024840	-0,004243	0,886426	
NumberGroup_2014	0,203400	0,034583	0,000001	***
Loantotal_2012	0,000001	0,000000	0,004492	**
Distance	-0,026360	-0,004482	0,089707	.

'.' significant at 10%, '*'significant at 5%, '**' significant at 1%, '***' significant at 0.1%

Notes: The regressions include lag variable (loan 2012 and 2014)

The logistic regression model and marginal effect was used.

Source: Estimation from VARHS 2012 and 2014

Table 5 shows that for PoorID and EducationID formal credit is different from informal credit. The coefficients of PoorID and Education in the formal credit regression are positive and significant. These results include marginal effects. But the coefficients of PoorID and Education ID in the formal credit regression are negative and significant. Therefore, non-poor households do not access to informal credit. The same results apply to EducationID. The findings supported by Khoi et al (2013)'s results.

Based on the results above, the coefficient of Age is negative and significant at the 1% level. Indicating that the Age of the household head has a negative effect accessing to formal credit. The results suggest that an increase in age improves access to credit, but when the household head is over 55 years old, their access to credit becomes more and more limited.

Households with registration books for their land can borrow from banks easier than those without. It is also more difficult for households who have saving accounts to take loans from formal credit sources than those who do not. These results are consistent with Tuyen (2015) and Khoi (2013).

The amount of land owned also enhances a household's ability to access formal credit (the coefficients are positive in testing models). In addition, living areas only affect access to formal credit, as housesholds in urban regions have better access than those in the countryside.

Beside the regession results above, accessing to VBSP's and VBARD's credit of households is difference. The results show that rural households can access to credit of VPSB easier than VBARD. Since VBSP has preferential policies for rural households, the results are consistent with their missions in providing credit to this group. This is also supported by Do and Nguyen (2015).

Table 6 presents the determinants of accessibility to VBSP and VBARD in Vietnam, including marginal effects. The coefficients of EthnicMinority, OwnlandID, EducationID are negative and significant. The findings are totally consistent with the Vietnamese credit policies in reducing poverty and improving mountainous and rural areas in recent years. It is also consistent with Nguyen (2012) and Giang et al (2015)′s results.

The EducationID coefficient is negative and significant, suggesting that microcredit programs for education loans are supported by two banks. This implies that rural households tend to receive more formal credit from VBSP and VBARD than from other institutions.

In terms of household characteristics, the Age, hh_size, AreaTotal, MarriedID, LoanID coefficients are all significant and consistent between VBSP and VBARD. The results reflect the characteristics of the formal credit market in the country.

Table 6. Households' access to VPSB's and VBARD's credit

	VBSP				VBARD			
Variables	**Coefficient**	**dF/dx**	**P value**		**Coefficient**	**dF/dx**	**P value**	
Age_2014	0,009008	0,002048	0,171060		0,000085	0,000016	0,990335	
hh_size_2014	0,005302	0,001205	0,904640		0,092080	0,017204	0,045008	*
EthnicMinority_20141	-1,102000	-0,256960	0,000000	***	0,542700	0,096737	0,003344	**
GenderID_20141	0,065770	0,014855	0,819610		-0,373100	-0,073813	0,223717	
AreaTotal_2014	-0,000017	-0,000004	0,003040	**	0,000006	0,000001	0,190875	
SectorID_20141	0,269800	0,058732	0,633080		-0,065460	-0,012422	0,891127	
PoorID_20141	1,211000	0,289910	0,000000	***	-0,888700	-0,142550	0,000603	***
NaturalDisasters_20141	0,527900	0,123710	0,001010	**	-0,309800	-0,055651	0,088935	.
DepositID_20141	0,125700	0,028278	0,452150		-0,030520	-0,005724	0,863798	
OwnlandID_20141	-0,340100	-0,079535	0,071790	.	1,337000	0,196490	0,000004	***
EducationID_20141	-0,028930	-0,006559	0,883650		-0,053520	-0,009913	0,789191	
EducationID_20142	0,201800	0,046999	0,499660		-0,042740	-0,007911	0,888749	
MarriedID_20141	0,132100	0,029596	0,675780		0,814300	0,130350	0,019782	*
NumberGroup_2014	0,071280	0,016207	0,313210		-0,019630	-0,003667	0,787728	
LoanVBSP_2012	0,000038	0,000009	0,000012	***	0,000029	0,000005	0,000000	***
Distance	0,053830	0,012238	0,113500		-0,003858	-0,000721	0,920338	

'.' significant at 10%, '*'significant at 5%, '**' significant at 1%, '***' significant at 0.1%

Notes: The regressions include lag variable (loan 2012 and 2014)

The logistic regression model and marginal effect was used.

Source: VARHS 2012 and 2014

4. Discussion and Conclusion

This paper examines different factors which impact the effectiveness of credit outreach initiatives on household's ability to access formal credit sectors in rural Vietnam. The result confirms total land owned, household size and being a member of an association significantly affect accessibility to formal credit markets. Other factors such as education, amount of deposits held in banks, natural disasters, gender and poor certificates do not materially impact loan accessibility. It is therefore necessary to improve economic and social conditions of agricultural areas.

Factors with similar effects on access to formal credit include age, total land owned, membership of an association and distances to the local administrative center. Lending through a group or association is mentioned as an appropriate improvement for accessibility to a formal loan as it is cost saving tool to solve the problem of asymmetric information which individual lending faces. Rural households residing in areas with direct road access to a town center are likely to have better chance to access to a loan. In addition, agricultural land ownership positively increases credit demand; therefore, it is appropriate to offer loan to household having larger land.

In addition, the outreach for formal credit is also affected by the following factors: poor certificates, land with a registration book and being a household with historical credit. This can be considered a bias in the selection process, though improving accessibility to microcredit using a poor certificate is arguably a good social policy intervention. Once treated for endogeneity, a historical credit record positively influences the probability of borrowing from the formal credit sector. Microcredit providers can effectively ration credit to borrowers based on the borrowers' income level. Moreover, households which are possess poor certificates, are facing natural disaster and have an historical VBSP loan will have better access to credit from VBSP.

However, supports Amin, Rai, and Topa (2003) who concluded that microcredit successfully reached the poor, but was less successful at reaching the vunerable in Bangladesh. Their findings show the issue in microfinance researched by Armendariz de Aghion and Morduch (2005) about capital does not appropriate fund to the poor. This also addresses the issue of government need policy to intervene in their rural credit markets in order to better serve lower income households.

Our results provide policy implications with regarding to banking practice which will help to improve households'accessibility to credit. First, as rural households have lower income due to insufficient land and capital, banks and credit institutions should not only provide finance for farming activities but also for non-farm purposes such as job training programs, so borrowers can generate more income from non-farm activities or participate in other labor markets. Secondly, it is suggested that households actively participate in social associations and improve their education and work skills. This is critical as education and membership of an association add up to creditworthiness for borrowers and work skills improve repayment ability. Therefore, the government should also consider providing incentive programs to attract more investment in rural areas. This suggests that any one credit sector can be replaced by the other in the rural credit market (Li et al., 2011). Hence, merging these two credit sectors into a well-functioning rural credit market can effectively improve credit access for rural households.

5. References

Anderson T.B and Malchow-Moller N (2006), *Strategic Interaction in Credit Markets*

Boucher S.R.; Carter M.; and Guirkinger C. (2008), *Risk Rationing and Wealth Effects in Credit Markets: Theory and Implications for Agricultural Development*, American Journal of Agricultural Economics, Vol. 90, No. 2, 409–23.

Boucher, S.R.; Carter M.; and Guirkinger C. (2007), *Credit Constraints and Productivity in Peruvian Agriculture*, Working Paper No. 07-005. Department of Agricultural and Resource Economics, University of California - Davis.

Bell C.; Srinivasin T.N.; Udry C. (1997), *Rationing, Spillover, and Interlinking in Credit Markets: the Case of Rural Punjab*, Oxford Economic Papers. Oxford University Press. 4 (49), 557-585.

Diagne A.; Zeller M.; and Sharma M. (2000), *Empirical measurements of households' access to credit and credit constraints in developing countries*, Methodological issues and evidence. Discussion paper No. 90, Food Consumption and Nutrition

Breiman L. (2001), *Random forests*, Machine learning, 45(1), 5-32.

Breiman L. (2002), *Manual on setting up, using, and understanding random forests*, Statistics Department University of California Berkeley, CA, USA, Vol 3, 1.

Dinh Phi Ho (2015), *Tác động của tính dụng chính thức đến thu nhập của nông hộ ở Việt Nam*, Hochiminh City University of Economics, Journal of Economic development, 26(2), 65-82.

Gini C. (1909), *Concentration and dependency ratios" (in Italian)*, English translation in Rivista di Politica Economica, 87, 769-789.

Guirkinger C. (2008), *Understanding the Coexistence of Formal and Informal Credit Markets in Piura, Peru*, World Development, 36 (8), 1436-1452.

Hoff K and Stiglitz J. (1990). *Imperfect Information and Rural Credit Markets: Puzzles and Policy Perspectives*, World Bank Economic Review, 4(35), 235-250.

Nguyen Phan Nhu Ngoc and Pham Duc Chinh (2014), *The influential factors of An Giang's agricultural households's access to credit (Các nhân tố ảnh hưởng đến khả năng tiếp cận tín dụng chính thức của nông hộ tỉnh An Giang)*, Journal of Science and Technology development, 18, 28-39.

Nguyen Viet Cuong (2014), *Informal credit, usury or support? A case study for Vietnam*, The Developing Economies, Vol 52, No. 2, 154–78

Quach Manh Hao; Andy W. Mullineux; and Murinde V. (2003), *Microcredit and household poverty reduction in rural Vietnam*, DSA conference in Glasgow.

Tran Quang Tuyen (2015), *Socio-Economic Determinants of Household Income among Ethnic Minorities in the North-West Mountains Vietnam*, Croatian Economic Survey, 17(1), 139-159.

Website: Lerd statatics.com, online: *https://statistics.laerd.com/spss-tutorials/one-way-anova-using-spss-statistics.php*

Trevor Hastie; Robert Tibshirani; Jerome Friedman (2008), *The elements of statistical learning (2nd edition)*, Springer Public, 295-316