

Access to Rural Credit and Its Effects on Income Equality:

Study about rural households in Vietnam

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Abstract

This thesis uses Vietnamese household's surveys from 2006 and 2008 to assess income inequality in Vietnam and households access to credit in order to boost their income. Three econometric models are introduced to explain which factors affect income, household's value and loan value, all important factors in order to obtain loans in theory. The Vietnamese financial market is still underdeveloped where households can obtain loans through three different channels, formal market, informal market and micro credit programs. The Vietnamese government has been working to make credit more accessible to poor rural areas in order to encourage investment and move them out of poverty. The results show that poor households are receiving high loan amounts in 2006 resulting in a slight decrease in income inequality between the selected years. There is however no consistency between the years, along with that we see that there are many different obligations that households need to fulfill in order to be applicable for loans (both in the formal market and micro credit programs) indicating that there is not equal access to credit for households.

Key words: Vietnam, household survey, rural credit, income inequality

Foreword

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1. Introduction

1.1 Background

The Vietnamese economy has been growing at a great pace in the last decades or approximately at the rate of 8% per year, along with this poverty rate has been reduced from 37,4% down to 14,2% in 2010. However, during this time income inequality has been rising with distribution of wealth being very uneven giving Vietnam a fairly high Gini coefficient of 35,6 in 2008 compared to Sweden's 25,0 (World Bank, 2012). In an effort to reduce this gap the Vietnamese government has tried to stimulate access to credit for rural households both through policies that encourage financial institution to ease access for rural households as well as supporting micro credit programs. An example of that is The Vietnam Bank for Social Policy which was established by the government to help provide credit for poor households. Accesses to credit are of great importance especially for poorer households in order to help increase their income and thus move them out of poverty. With credit households are able to borrow against future income and use it for investment in machinery and equipment which in turn gives them higher return.

Understanding inequality is of key importance for designing an effective inequality reduction strategy, various efforts have been made to analyze the relation between economic growth, inequality and poverty reduction (Fritzen, 2002; Bruno et al., 1996). These studies are mostly based on qualitative sources and accumulated statistics. This thesis is the results of an effort to analyze household's access to credit and its effects on income using econometric modeling of income, household's value and loan value obtained by households using two detailed datasets, the Vietnam households living standard survey from 2006 and 2008. This survey provides detailed data for studying determinants of income, household's value and loan value obtained.

1.2 Research objective

Income inequality is a large problem in the world, the need to find methods in order to minimize income inequality between areas in countries and increase the living standard for the population is great. The motives for this thesis comes from the interest of exploring the effects of rural households access to credit and its impact on their income and if it does reduce income inequality in the country. The objective of this thesis is three fold:

- To describe and measure the effects on rural households access to credit and its impact on income.
- To elaborate on the relationship on access to credit and income inequality.
- Compare households under poverty line and others in respect to access to credit and its impact on income.

1.3 Research questions

This thesis aims to explore patterns of inequality in rural Vietnam using income and access to credit, in order to fulfill the objective of this thesis the focus will be on two specific research questions;

1. Has income inequality been reduced between 2006 and 2008 within rural Vietnam?
2. Is there equal access to rural credit regardless of poverty classification?

Answers to these questions can have insightful information for policy making if the government aims to improve access to credit for poor rural households in order to reduce income inequality. Three hypotheses are put forward to help answering the two research questions. Using data from Vietnamese household's surveys from 2006 and 2008 three econometric models are introduced and analyzed to answer the three hypotheses. The results from the econometric models and hypothesis are then related to the two research questions put forward.

1.4 Disposition

The first introducing chapter gives prerequisite for understanding the broad context of the thesis with background, objectives and research questions. Chapter 2 gives deeper background of conditions that rural households are living with in Vietnam. Chapter 3 explains the methodology behind the thesis. In chapter 4 the theoretical framework is shaped. Chapter 5 explains the methods used for analyzing the data. Chapter 6 describes the data in use. In chapter 7 the empirical analysis is presented. The final conclusions are structured in chapter 8. Bibliography and appendix is positioned at the end of the thesis.

2. Rural credit in Vietnam

This chapter is aimed at explaining the conditions that rural households are living with in Vietnam, to be able to better understand the results from the regression presented in chapter 7 it is important to familiarize with the Vietnamese living conditions and how they have developed since the introduction of Doi Moi in 1986.

2.1 Agricultural development

The history of Vietnam from the 1950 (and before) is portrayed with internal and external conflict, the country was recognized for its war torn history, poverty and slow economic growth. It was not until December 1986 that the Vietnamese Communist party made the important decision to move towards a market oriented socialist economy under state guidance, often referred to as Doi Moi.

Since the introduction of Doi Moi Vietnam has gone through great transitions and has followed a classic policy scenario to improve their development. Ravallion and van de Walle (2003) explain how Vietnams agrarian transition went through the two classic steps, first step is the privatization of main agricultural land use right and legalization of a free exchange of land. This meant that previously collectively farmed land was allocated by administrative means within each commune. This did however lead to inefficiency in land allocation where some households had too much land while others had too little. The second step in the transition was to reform land laws to create framework for market in agricultural land use rights. From 1988 farmers where given land use right and they were allowed to buy and sell inputs and outputs as well as decide what to produce and with the introduction of the land law in 1993 they were given the right to transfer, exchange, inherit, rent and mortgage their land.

Despite these changes all land was a property of the state, with the land law the government was hoping to eliminate the inefficiency in land allocation. The outcome however is not clear, there has been a big discussion regarding the welfare distributional impacts of these major economic changes. In their paper Land in transition: Reform and Poverty in Rural Vietnam Ravallion and van de Walle (2008) suggested that these impacts could be distributed in two poles. Firstly, by creating market with equally distributed land use rights should lead to a market

led reallocation of decollectivized land, with more efficient farmers expanding their control over land and production, resulting in increased output and a more sustained accumulation. Secondly, there were important equity implications, since Vietnam is a country with more than 90 million inhabitants and where approximately 70% are living in the countryside this development has resulted in reallocation of land from the comparatively less efficient to the more efficient which in turn results in higher possibilities of rising landlessness as well as unequal waged labor. On the other hand Akram-Lodhi (2010) criticizes this approach indicating that the reform has exacerbated long term poverty by promoting rural landlessness and wage labor believing that it is making the farmers worse off. To react to the problems of unequal waged labor and excessive differences in living standards the governments has introduced policies that stimulate access to credit from state owned banks in cooperation with non-governmental organizations (NGO's) often referred to as micro credit program which will be discussed in more details later in this thesis.

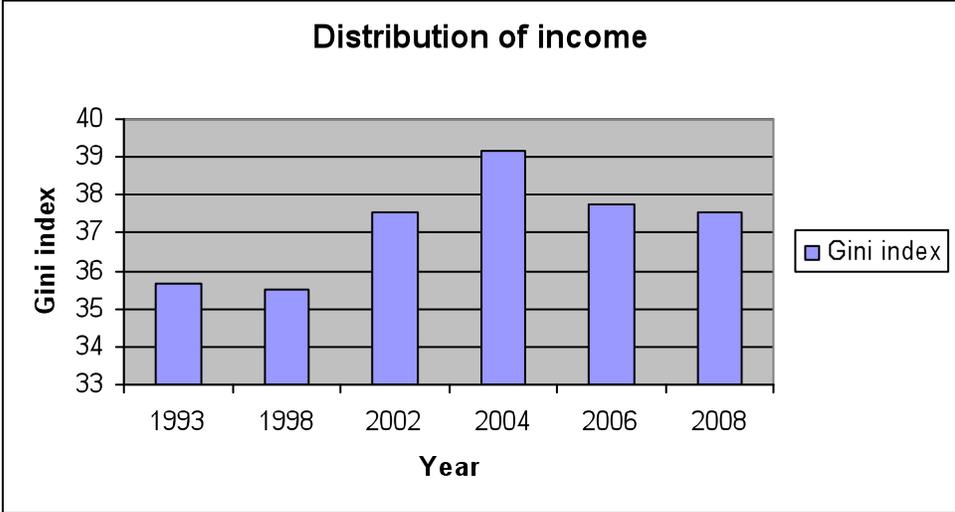
2.1.1 Inequality

When countries experience constant economic growth and economic development the issue of inequality and poverty within the country are often raised. Inequality is a great issue in many developing as well as developed countries. In Vietnam the rising landlessness and changes in the land ownership system resulted in greater disparity in wealth throughout Vietnam's rural community (Smith and Binh, 1994) Although economic development is always considered a good thing for countries it has its problems as well, distribution of the wealth is one of the most challenging problems that governments face.

With increased economic growth, income starts to rise for the people in the country but it does not rise at the same pace for everyone, creating gap between the high class and the low class that is difficult to decrease once established. A common statement in regards to economic growth is that people are better off after couple of years constant economic growth and it can be seen that people's income is increasing during this period. That is the case in Vietnam, people's income is increasing but it is important to consider other factors that affect the purchasing power. Rise in commodity prices usually follows along with inflation struggle, these two factors have

much to say in regards to peoples purchasing power. When viewing the Gini index¹ in Vietnam (Figure 1.) from 1992 we see that there is a rise from 35,68 in 1992 to 37,57 in 2008.

Figure 1. Development of Gini Coefficient in Vietnam.

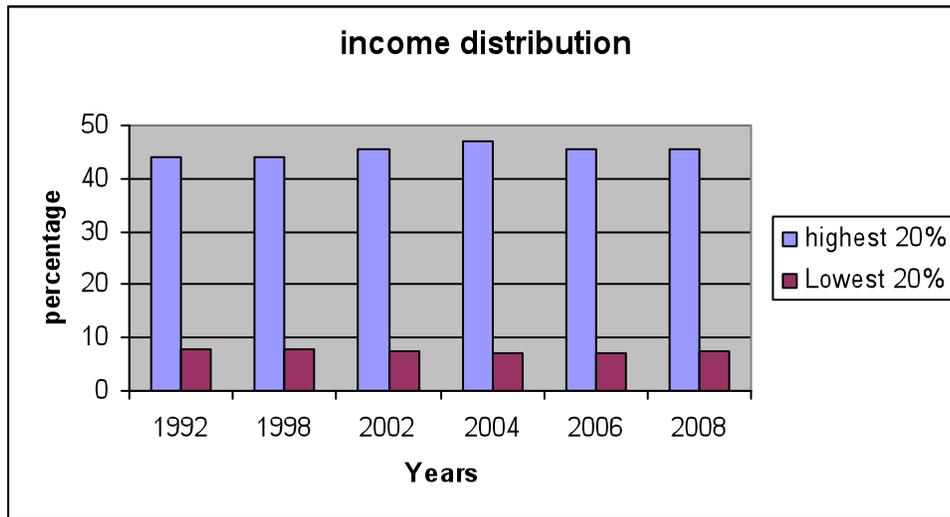


(Trading Economics, 2012)

The Gini index shows that there is a rise in the income gap in Vietnam from the beginning of their reform although there is slightly decreasing between 2004 and 2008. When looking more thoroughly into these results by viewing how large proportion of the income is shared by the highest 20% of the country and the income share of lowest 20% of the Vietnamese people we see that in 2008 the share of the lowest 20% of the people is only 7,33% of total income while the highest 20% are holding 45,43%. Figure 2 shows the development of these two groups respectively.

¹ Gini index measures the distribution of income within a country among individuals and/or households. Gini index with the value 0 indicated perfect equality while 100 indicates perfect inequality (World Bank, 2012).

Figure 2. Distribution of income in Vietnam.



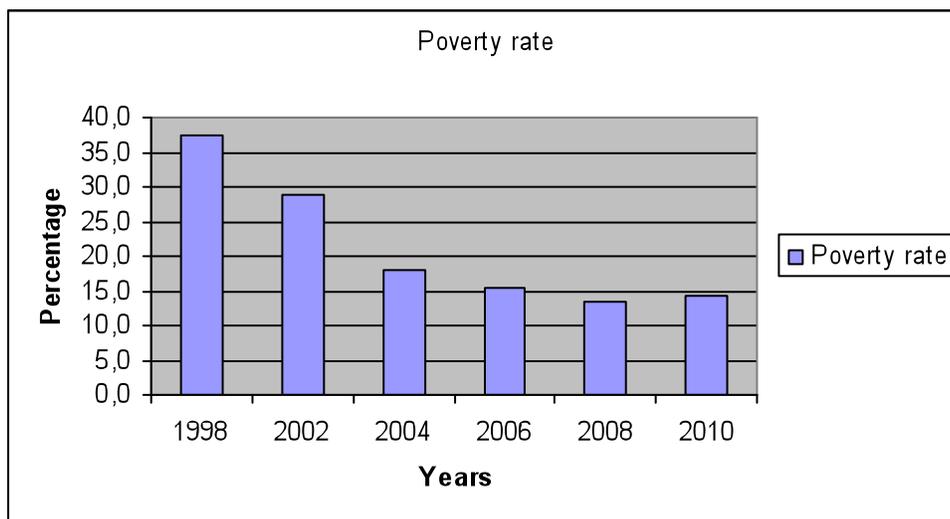
(Trading Economics, 2012)

This shows that almost half of all the income in Vietnam is going to the highest 20% of the country's population, there is no doubt that those people are better off than they were before. However, there is a question if the lower income population could be considered better off. With Vietnam's extensive inflation of 14% in the first quarter of 2012 (after reaching almost 28% by the end of 2008) the income increase for the lowest 20% of the country does not seem to be substantial.

2.1.2 Poverty reduction

Steady growth in recent years has fuelled Vietnam's ambition to move up to become a middle income country. Along with that the government has worked towards reducing the extensive poverty that the country was experiencing during the 1990's. Since 1998, the Vietnamese government has managed to reduce poverty in the country from 37,4% down to 14,2% in 2010. Figure 3 shows the poverty reduction in the country from 1998 to 2002.

Figure 3. Poverty rate development in Vietnam.



(General statistic office of Vietnam, 2012)

As can be seen in this figure the reduction has been fairly impressive. However, it is important to note that these numbers are not in line with the official 1,25\$ poverty line, but a poverty line calculated by the government and will be explained in details later in the thesis. This poverty line has received criticism from scholars and is considered by many not to be representing the poverty in Vietnam in a neutral way. After interviewing different people and organizations working with poverty in Vietnam it became apparent that they believed poverty to be more serious than the numbers presented in figure 3. One of the biggest challenges that the government is facing is to keep people out of poverty, the government has managed to move many households out of poverty, however they are just barely over the poverty line and are just as likely to drop back into poverty as they are to stay out of poverty. Thus there is a great challenge for the government to have sustainability in their efforts otherwise there are many individuals/households that might fall right back into poverty.

2.1.3 Summary

After viewing the development of the Gini coefficient, income distribution and poverty rate we can not establish any major changes in income distribution, the Gini coefficient is decreasing from 2004 but the income distribution does not change in accordance. Along with that the

poverty rate is decreasing substantially, when viewing these numbers it becomes apparent that the government is focusing on poverty reduction without considering the income distribution of the country.

2.2 Financial market in Vietnam

In 1986, Vietnam started the process of reforming the financial market. The first couple of years were one of the most unstable duration of micro economy, during this period the government was printing money to counterbalance the budget deficits resulting in hyperinflation. In the 1990 the government moved away from their one level banking system towards a two level banking where the state bank played the role of the Central Bank of Vietnam and commercial banks where the second level (Quy, 2010). This opened up the financial sector, commercial joint stock banks were established, foreign banks were allowed to participate in joint ventures with domestic banks and the Social Policy Bank was established in 1995². The current structure of the State Bank of Vietnam is presented in table 1.

Table 1. Division of financial institutions in Vietnam

Institution	Number
State owned credit institution	5
Joint stock commercial banks	35
Branches of foreign banks	50
Joint ventures	4
Wholly foreign owned banks	5
Finance companies	18
Leasing companies	12
Representative office of foreign bank	51

(The State bank of Vietnam, 2012)

In the last decade the Vietnamese banking system has been an active participant in integrating the international economy in the field of finance. Currency was successfully implemented through national monetary policy and the Social Policy Bank has contributed to national program for hunger abolition and poverty reduction, creation of job and providing

² Was established as Bank for the Poor but changes its name in 2002.

student loans (Vietnam Bank for Social Policy, 2012). Since the focus of this thesis is on rural credit a closer look will be taken on that.

2.3 Rural credit

Access to credit is vital for the development of agricultural households, it allows for investment in agricultural technology which offers the potential to increase households output and thus income. It also helps households to level income fluctuations. Property rights play a significant part in household's access to credit, property rights imply rights to land use, rights to make decisions about altering, right to make profit and the right to sell. Having all these rights would allow households to invest in their land and production in order to increase income. In Vietnam there are some barriers to household's property rights, all land is owned by the government and is rented out to households usually for 20 years at a time. In 1993 land use certificates (LUCs) started to be issued by the government to strengthen the property right of individuals rights over the land, it allowed them to use their LUCs as a collateral and thus gave households better access to credit from formal credit institutions which are not as expensive as credit from informal sources (Kemper and Klump, 2010). There are three main sources of capital that rural households can access in Vietnam, first is through commercial banks such as the Agribank, second through micro credit programs from organizations like TYM women union and Social Policy Bank and third from informal sources such as money lenders.

2.3.1 Formal credit market

The formal credit market consists of banks and other financial institutions that act in accordance to other western financial institutions. Before granting loans to households the Agribank for example evaluates the civil legal capacity and civil act capacity of the household, the purpose of the borrowing, financial capacity of the household (measured by income and expenditures), the feasibility and viability of the capital borrowing project and plan and reviews the collateral (Agribank, 2012³). The formal market does in general not have different policies for customers who are coming from poor areas and for those who are not, as long as households can fulfill the capital borrowing requirements they can take out loans. As can be seen by this there are limitations for households in order to obtain loans from formal sources, for many poor

³ For full list of questionnaire see appendix table 1

households it might be difficult to fulfill all the requirements thus limiting their possibilities of loans from these sources.

2.3.2 Micro credit

Since not all households are able to obtain loans from formal sources the introduction of micro credit programs in Vietnam has been of great value. Micro credit is a pro-poor financial service that offers loans to poverty stricken households in order to reduce poverty (Putzeys, 2002: Hop et al., 2008). Although this is a pro-poor program there are conditions that households need to fulfill in order to obtain these loans. Most notable is the evaluation of household's financial capacity and the usage of the loan something that is not unlike the process used in the formal sector. The main differences between the formal sector and micro credit program is that households are not required to give collateral and there is a limit to the amount that they are able to obtain (is usually around 25-30 million VND depending on the institution). Instead households need to be listed as poor by the local commune and needs to be a member of a savings and credit group, these groups are selected by commune leaders within household's area. The need to be a part of a credit group introduces new difficulties for many poor households, since it is the commune leader that chooses which households to include in the credit group social capital becomes important for them. There are no rules regarding how the commune leader chooses which households to select and which to exclude so the selection becomes subjective evaluation by the commune leader. The commune leader is responsible for his credit group and he might exclude households who might otherwise be good candidates for lending for various reasons built on his/her personal evaluation (Vietnam Bank for Social Policy, 2012: Vlaamse Interuniversitaire Raad, 2012).

2.3.3 Informal credit market

Because of these limitations the informal credit market remains an important source for poor households (Cuong and Van den Berg, 2008). The informal market usually has no specific requirements of the households, therefore households are able to use the loans from the informal sector as they please, not only to invest in certain projects. Moneylenders are usually only concerned about their own interest and charge much higher interest rates than the two alternatives mentioned above. Although the informal credit market is considered a problem for

the Vietnamese government it can also have good impact on households if they use their loans wisely. The informal credit market is not only moneylenders thinking about their own profits, it can also include loans from family members at low interest used for certain project or for consumption during difficult times.

2.3.4 Summary

The most significant difficulties that formal credit institutions and micro credit programs face is the transaction cost of making sure that the loans are in fact used for the purpose that they are loaned for. To monitor all investments of rural households is very costly and time consuming and in many cases poorly performed. If a large part of the loans are being used for other intentions that might leave them with high amount of none performing loans producing losses which in turn affects their earnings (Vietnam Bank for Social Policy, 2012: Vietnam Woman's Union, 2012). In a study by Pham and Lensink (2008), they show that micro credit was not affecting household's self-employment profits while credit from commercial banks seemed to be helping, indicating that the impact of the credit differed depending on its sources. Since the formal sector has collateral behind their loans, households have higher incentives to reimburse those loans, leaving more problems to micro credit programs. Even though they are nonprofit organizations they need to show that they are influencing poverty reduction and thus make sure that loans are being used in proper ways.

3. Methodology

3.1 Core assumptions

The study of this thesis is based on descriptive research design of rural household's access to credit in order to describe and measure effects on rural household's access to credit and its impact on income and inequality. The issue of inequality is raised in connection to access to credit, opportunities and income. Inequality here is defined as the lack of access to credit, opportunities and differences in income because of household's location and/or government classification.

There are many factors that affect household's chances of obtaining loans and they will be discussed in details later in the thesis. Household is defined here as a group of people that live under the same housing and the definition of a poor household is a group of people that live under the same housing and are earning an income below poverty line. The poverty line that is used is set by the government of Vietnam. There are two official poverty lines in Vietnam, the General Statistical Office (GSO) defines poverty line based on the expenditures required to obtain 2100 calories per person per day. In 2006 the poverty line from GSO was equivalent to 7,011 Vietnamese Dong (VND) per day. This poverty line is however based on a food basket which was first estimated in 1993 and has been updated by inflating food prices and food components by the relevant price indexes (Vu and Baulch, 2010). This is the poverty line that is used in the data in this thesis, however there is an alternative poverty line presented by the Ministry of Labor, Invalids and Social Affairs (MOLISA) which is equivalent to 6,575 VND for rural areas, this poverty line is administratively determined and updated periodically to reflect changes in both cost of living and living standards (Vu and Baulch 2010). There is an ongoing debate about the poverty line in Vietnam, this gives the limitation of the poverty line and makes comparison between countries difficult since the definition of the poverty line in the data could be considered as pro-poor because of its lower value than the 1,25\$ poverty line usually used. However, this does give valuable information about the inequality between areas in Vietnam and is therefore used in this thesis. The data used for analyzing this subject is a household survey data from 2006 and 2008 which was obtained during field studies in Hanoi in 2012. These two

datasets are collected by the same institution and use the same questionnaire which allows for a non-biased comparison.

The fundamental paradigm which lays the basis for this thesis is a structuralism perspective which is often related to a perspective of the world which priorities the troubles of the poor, marginalized and the oppressed. The theory of structuralism is that global economic relations are structured to benefit certain social classes thus resulting in a system that is fundamental unjust (Steans et al., 2010).

Structuralism has many resemblances with other perspectives such as realism and liberalism, which both could in a way be applied to the subject of this thesis. However, structuralism provides important critique of both liberalism and realism. In a way, structuralism resembles realism since both perspectives state that conflict is structural because of the framework where international relations take place. Structuralism also stresses the profound interrelated nature of international economic relations and the importance of actors outside of the state similar to liberalism. However, as Steans et al. (2010) explains, structuralism shows the importance of the conflictual nature of the global economy and structural correlation of domination and dependency rather than anarchy of the state system or complicated independence. Importantly, structuralism also explains the importance of connection between politics and economics. To understand the relationship between political power and the economic outcomes from them is important, Wallerstein (1987) explains how power of world economies and empires constrain and dominate actions of individuals, companies and other smaller systems is the most dominant reality of the social universe.

3.2 Ontological paradigm

The ontological paradigm of this paper builds on the constructionism perspective, meaning that social phenomena and their meaning are continually being accomplished by social actors. This suggests that social phenomena and categories are not produced only through social interaction but they are in constant revision (Bryman, 2004). What this means for my study is that it is not possible to take the credit market or rural households in Vietnam as a pre-given category. There are many factors that affect them and even though there are some rules and regulations regarding the credit market there are factors such as the informal credit market and relationships (social capital) that play important part and it is not possible to confirm a pre-given structure of them.

3.3 Epistemological paradigm

The technique used to understand the development of rural credit markets and income inequality in Vietnam comes from a positivism epistemology. The reality is objectively given and can be described as measurable. The doctrine about positivism is difficult to pin down, in this thesis epistemological position referred to as deductivism is used. The principle of deductivism explains how the purpose of the theory is to generate hypothesis that can be tested and therefore will allow for explanations of laws to be assessed (Bryman, 2004). When relating this back to the thesis, 3 hypotheses are put forward which are tested to find out if there is any correlation between household's income, household's value and loan value. These results can then be used as a guideline by the government to restructure its policies towards rural credit.

3.4 Methods

The research will be constructed through quantitative methods. "The scientific method of quantitative approach can be explained in broad term as entailing the collection of numerical data and as exhibiting a view of the relationship between research and theory as deductive" (Bryman, 2004, pp.62). The research will be a combination of descriptive and explanatory research. The descriptive part will consider what factors are influencing rural household's income, household's value and loan value of households while the explanatory gives an overview of the development of Vietnam's rural settings, income inequality, poverty reduction and the financial market with focus on rural credit.

The quantitative part uses secondary data from a Household survey for the years 2006 and 2008 from Vietnam. The data is released by the General Statistic Office of Vietnam which has published similar data for previous years which have been used for analysis by scholars such as Dominique van de Walle and Martin Ravallion in their articles; Does landlessness signal success or failure for Vietnams agrarian transition (2008) and Breaking up the Collective Farm (2001), Nguyen Viet Cuong and Marrit Van den Berg in their article Informal Credit, Usury or Support? Case study for Vietnam (2006) and Mikkell Barslund and Finn Tarp in their article Formal and Informal Rural Credit in four provinces of Vietnam (2007), all respected scholars in their field, indicating that the data used should be considered reliable and precise. Further explanation of the data will be presented in chapter 6. A cross sectional analysis of the data will be performed

using STATA data analysis and statistical software. Cross sectional studies measure units from a sample of the population at one point in time, in this thesis it is used to find out if there is correlation between three independent variables (household income, households value and households access to credit), and numerous variables explained later in the thesis.

The need to confirm my findings is important in order to show their significance, the results from the cross sectional analysis will be applied to previous researches as well as results from interviews with individuals working in the financial sector, micro organization and other scholars gathered during field studies in Vietnam in February 2012.

The interviews used were a semi structure interview, where a list of questions on specific topics referred to as an interview guide, were used to ask the interviewee (Bryman, 2004). This was done to give room for flexibility, since the interviewee might have a perspective not previously discussed, his or her input might give valuable information about the income inequality and/or access to credit in Vietnam. The interviews were performed in English, when facing the problem of poor English skills of some of the interviewees a translator was present to help. During the interview a tape recorder and a note book were used to gather information and the findings were analyzed immediately after the interview.

To be able to describe and measure the effects on rural household's access to credit and its impact on income inequality within Vietnam, proper methods are needed. This section explains the methods used to fulfill the research objective and answer the questions put forward in introduction. Regression analysis explained in 3.5 is primarily used in this thesis to find empirical indicators of income, household's value and loan value used in a regression model which is explained further in 3.6. The program used to estimate regression is Stata 11 data analysis and statistical software.

3.5 Regression analysis

The purpose of regression analysis is to determine the values of parameters for a function that cause the function to best fit a set of data observations provided or to measure the effects of change in one variable (x) on another variable (y). Regression analysis is often used to explain trends or historical dependences or sometimes both (Hill, Griffiths and Lim, 2008). The two main analysis methods are a time series analysis and cross sectional analysis, the data used in

this thesis are Vietnam household's living standard surveys from 2006 and 2008 (explained in details in chapter 5) and since the objective for the thesis is to measure effects and describe impact the later one is applied.

3.6 Multiple regression models

Economic model that takes more than one explanatory variable into corresponding economic mode is referred to as a multiple regression model. The models introduced in this thesis are multiple regression models. The bases for the empirical model used here is given in equation 1, each model is explained in more details in later sections.

Equation 1. The multiple regression model:

$$y_i = \beta_1 + \beta_2 x_{i2} + \beta_3 x_{i3} + \dots + \beta_k x_{ik} + e_i$$

Where y_i is the dependent variable, x_i are the explaining independent variables and e_i is the random variable (or residual). β_i is the intercept and explains the impact of each independent variable on the dependent variable y_i .

There are two additional variables that have been included in the models used in this thesis, first, a dummy variable (δ), dummy variables can be used to answer a rich variety of questions, however it is important to note that dummy variables are independent of any other qualitative factor and thus a reference group is used in order to interpret the results given by dummy variables. Example of a dummy variable used in a model is a variable that distinguishes between an area being poor on non-poor, the different categories are given values 0 or 1, then one group is excluded from the model and used as a reference group, in this example if non-poor area is a reference group the results of poor area need will be compared with non-poor area. Second variable is called a polynomial, a polynomial is used to describe relationships that are curved with one or more peaks. Polynomials can be used to explain flexible nonlinear relationship between variables, for example when looking at income, the impression would be that with increased education income should rise, however at some point in the educational process the tradeoff between more education and income becomes negative (Hill, Griffiths and Lim, 2008).

Polynomials are used to find this crossing point in order to give information about how much should be invested in education. Equation 2 shows the calculations of this intersection:

Equation 2. Polynomials.

$$y_i = -\beta_2 / 2\beta_3$$

Where y_i is the dependent variable and β_2 is the independent variable in question (in the example here above it would be education) and β_3 is the independent variable squared.

This formulation is attractive since it gives interesting information about the influence between different characteristics in a fairly simple way, the model is easy to use and has been widely used by scholars in many different sectors such as Dong et al., (1998) and Cox and Wohlgenant (1986).

3.7 Limitation of regression models

Although cross sectional analysis is well respected in the world of academia, and is perhaps the best way to determine the prevalence of characteristics as well as identifying associations that can be more accurately studied it has some limitations. The main limitation of a cross sectional analysis is that it does not explain the causality of the findings and thus can rare findings not be explained by using only cross sectional analysis but would need further deeper examinations. However you should not dismiss these findings because of these limitations, there is a great deal of information that is presented through these analyses which can be used to make important findings within rural households.

3.8 Ethical consideration

The interviews were conducted in the area of Hanoi. All interviewees are anonymous and therefore it should not be possible to trace any answers directly to the persons or households. Interviewees participated in their own will and before the interview it was stated that they would be anonymous and would not be traced back to them.

3.9 Field studies

The interviews performed took place during field studies in Hanoi in February 2012. The decision to perform the field studies in Hanoi was twofold, firstly because there were many organizations and researchers (scholars) located in Hanoi which could provide valuable information for my thesis. Secondly, there are many financial organizations (banks, NGO's and other organizations) in Hanoi that are helping rural households in the area to obtaining credit to help their development and move them out of poverty.

Because of time limitations during the stay in Vietnam it was not possible to meet all interviewees, however there were a couple of them who agreed to answer questions through e-mail. There are limitations to the results from these e-mail interviews since they did not allow for any flexibility and/or any further discussion. However, since the respondents answered the main questions (the same questions for all e-mail respondents) needed for the thesis the information received are too valuable to neglect and assume useless and are therefore used along with the other interviews. The interviews performed during the field studies included persons from the bank sector, financial sector, Non-Governmental Organizations, scholars that have been working on the subject of rural credit, policy makers along with persons from other different organizations. Appendix table 2 shows the full schedule of the field studies in Hanoi

3.10 Limitations

The decision of using cross sectional studies rather than longitudinal studies lies with the data. Even though the data is collected by the same institution, the respondents are not always the same between years, thus the data cannot be considered panel data which is required for longitudinal studies. The regression model used to evaluate the determinant of inequality in Vietnam allows for assumptions to be made about the strength of the relationship between independent variable (household's income, household value and loan value) and the dependent variables (various variables). However, it should be noted that the model presented does not prove causality, therefore before the econometrics exercise there is a discussion about income, access to credit, household's value and inequality from a theoretical perspective.

4. Theoretical framework

In the empirical development literature the most straight forward way of thinking about inequality measures is perhaps to use the mean, median or mode representing the central tendency and numerous measures of dispersion (Deaton, 1997). However, a more conceptual clarity comes from a more theoretical approach, by relating measures of income, household's value and loan value to various self-contained characteristics in a regression framework. By doing that researchers are able to differentiate the significance of each inequality determinant chosen for the analysis, which in turn can be used to identify the main determinant affecting inequality and draw up conclusion regarding possible policy adjustments or changes in order to decrease or diminish inequality. Before starting any analysis of such inequality measures there are a number of theoretical considerations that need to be addressed. These concerns for a theoretical justification of the dependent and independent variables in the econometrics model as well as the econometrics estimation methods and the interpretation of the results.

4.1 Theoretical considerations

The way that the empirical model is designed requires some considerations. When analyzing the determinants of income, household's value and loan value the choice of basic units to be used need justification. In developing countries where agriculture and small scale businesses are primary sources of income and where consumption is shared among different members of a household it is reasonable to use household as the unit of analysis (Andersson et al., 2006).

An understandable issue concerning data choice is the selection of dependent variables, the decision to use income rather than expenditures will be further discussed later in the chapter. When choosing which independent variables to include in the analysis of households income, households value and credit value it is important to consider what are the potential deterrents of them? The availability of certain variables in the data set is not sufficient justification for including them in the model. In general, variables should be chosen by outlining a theoretical model for how income, household value and loan value are determined. The structure of the models used is based on endogenous growth theory and economic development theory.

4.1.1 Endogenous growth theory

Endogenous growth theory involves two different ways of interaction between technology and economic life. The purpose of this theory is to seek understanding of the interplay between technological knowledge and various structural characteristics of the economy and the society and how these interactions result in economic growth (Aghion and Howitt, 1998). It is clear from this theory that income and consumption possibilities of individuals and households are related to their production capacity.

Before continuing the discussion of economic growth it is important to explain what drives economic growth and what countries need to adapt in order to have sustainable economic growth. In general, economic growth is considered the increase in the amount of goods and service produced by an economy over time measured in countries Gross Domestic Production (GDP). When looking more thoroughly into what drives GDP of a developing country there are many different factors that need to be considered and they might differ from country to country. For many western countries consumption plays an important part of economic growth, before the financial crisis hit the globe the US consumption spending was approximately 70% of the country's GDP, in Japan it was approximately 55% and in China around 37%. These numbers show the importance of consumer spending, for individuals and/or households to consume in the local market they need to have enough income to spend on their necessities as well as to spend on additional products.

As mentioned earlier, growth theory shows that the income of individuals and households are related to their production capacity and production capacity depends largely on household's access to various production factors such as land, labor, capital and technology along with the quality of these production factors. To be able to further increase the income of a household the household needs to move as close as possible to reaching economy of scale, that means investing the right amount in production factors in order to increase efficiency. It is important to note here that although investment is important for households in order to increase their income, households need to make sure not to over invest in production factors. Investment always reaches the point where constant investment in one production factor will eventually lead to a decrease in total income, an example would be a household that invests heavily in its living area in order to hire more employees to work, however since the household only has a restricted

amount of land constantly increasing employees will at a certain point result in underemployment where there are too many workers working on too little land.

As mentioned before, income is shared among household's members, along with that the data collected is in many cases collected at the household level and it is difficult or even impossible to separate the precise income level of each household member. This motivates the inclusion of additional characteristics regarding the household such as household's size which indicates how much room there is for individuals and workers and can indicate possibilities for increase in production by adding additional workers to the extra space. The number of household members plays an important role in production capacity within a household and needs to be considered in regards to income and production.

As mentioned here above, endogenous growth theory seeks to understand the interplay between technological knowledge and various other variables. Investment plays an important part in all technological knowledge, when talking about technological knowledge it does not only refer to highly skilled expensive technology, it refers to the innovation of technology to improve the current status of households and/or companies in order to gain competitive advantage (Aghion and Howitt, 1998). Although most poor household's preliminary goals are not to gain competitive advantage over other households in the area the investment in technology automatically (if invested properly) leaves them better off, giving them higher possibility to improve their production which in turn increases their income. The need to include what kind of technology households are using can thus give important information about the household's production.

A critical factor for all investment is having access to capital to support investment. Credit is considered an important tool for households for further development of their production and business and can play a vital role for relieving poverty. Credit allows households to borrow against future income, this means that with access to credit households are able to invest for example in machinery that increases the household's productivity which in turn increases the household's income and thus helps it to move out of poverty. Without access to credit many households, especially those in poorer regions, are not able to invest in machinery or other equipment since they are not able to save up enough money. The problem is that a large part of the world that lives with poverty is lacking access to credit and when looking at the factors needed to fulfill in order to obtain loans from financial institutions it is fairly obvious that poor

rural households with low income do not have high possibilities in obtaining loans. Financial institutions are not always willing to lend out money, they need to have information about the households, individuals or the company that is seeking the loan (Shimek and Sengupta, 2007). Therefore it is important to add characteristics such as savings, asset value, interest rates of loans, payment of loans and usage of loans which are among the information's that financial institutions require before granting a loan, this should be done in order to understand the motives behind the loan granting.

4.1.2 Economic development theory

Economic development theory adds interesting aspects to the previously mentioned endogenous growth theory, while the endogenous growth theory focus on traditional economic factors such as GDP, income, expenditures etc, economic development theory focuses also on factors such as living standards, health care, education and equal rights opportunities. Joseph Schumpeter was one of the first scholars to introduce economic development theory, in his book *The Theory of Economic Development* which was first published in 1911 Schumpeter explains the importance of innovation and technology in economic process and puts great emphasis on the role of credit in economic development. He explains how bank credit has always plaid an important role in detaching the needed productive resource from their established place in the circular flow to the new combinations (Hansen, 1936). Although Schumpeter's book was published almost a century ago, many of his thought are still appropriate today as shown with the example of credit. Throughout the years the economic development theory has itself developed itself into a more holistic look at all the different elements that make up a healthy society. Hoff and Stiglitz (2001) explained how development is no longer seen as a primarily as a process of credit accumulation but a process of organizational change. The importance of credit has already been described in previous chapter and applies for both theories.

What economic development theory adds to the endogenous growth theory is the focus on roles such as inequality, poverty and health and their effects on economic development. The role of human capital in form of education and health can be influential on household's income or production and thus contribute towards economic growth, the need to include those characteristics in models aimed at explaining income, households value and loan value is great, they give ideas about the skill and ability that households workers have. The general assumption

regarding education and health care are that the more education and the better health care that a person has should give higher output (Auster, et al., 1969 and Mantzavinis et al. 2006). It is important to note here that education for rural farmers should not be restricted to how many years they stayed in school, since farmers often do not have time or possibilities to attend school in developing countries it is important to observe how much they are spending on education. This education includes sending their children to school as well as taking courses themselves. By using total expenditures on education and health care, the possibility to see the return rate of their investments becomes clearer.

Environmental location of a households operation can have great influence on a households production process, firstly land area where households are located has much to say in regards to what the household is able to produce and how they are able perform their production. Being located at a mountainous area for example might limit the use of technology available for irrigation procedures. Secondly, the degree and nature of market competition is influenced by the location of households, population and market opportunities can differ between locations and thirdly, institutions and public policies can have an influence on the conditions for economic activities in their area and in many countries they vary between locations. Other location characteristics are also important, living in an area that is classified as a poor area can have an influence on the access to important goods and service such as raw materials, credit etc. Similar ideas could be mentioned about the differences in living in agrarian or non-agrarian areas (Chaudhuri et al., 2002). The inclusion of these characteristics in a model gives information about the possible discrimination and/or inequality in access to important goods in order to boost possibilities of development.

These growth determents and standard production introduced in these two theories outline the basic model that can then be adjusted according to the specific research issues at hand. It is also important to realize that there is a gap between theoretical concepts like inequality, capital and technology and the empirical data available. Although it might be simple to define inequality in theory it is usually more difficult to measure it with accuracy. Therefore it is necessary to make the best of the available data and settle for imperfect proxy variables.

4.2 Stylized Model

When choosing dependent variables it is important to make sure that they are well represented and give valuable information for the task at hand, the decision of using more than one model requires the choice of more than one dependent variable. When working with more than one model it is important to make sure that each model supplements the next one. The dependent variables used in this research are total income, household's value and loan value. These variables were chosen since all of them play an important part in financial institutions decisions in giving out loans, the first two (income and households value) represent important characteristics in the decision period while the third one (loan value) represents the amount that households have been able to obtain. The following paragraphs discuss the strengths and shortcomings of these chosen variables.

Both income and consumption expenditures can be justified as a measure of welfare since both measure a households possibilities in obtaining goods and services. In many cases the measurements should produce similar results (Deaton, 1997). The decision to use total income instead of total consumption expenditures is motivated by several considerations.

First, the income of households plays important part for financial institution decision in lending. Income is the most important characteristics in credit rating since it determines the possible debt burden for lenders and thus has great influence on the reimbursement of the loan, a factor that is very critical for financial institutions. Using income therefore gives better estimations regarding possible loan value for households than total expenditures.

Second, one criticism of income opposed to expenditure is regarding the fluctuation, it is often considered that income fluctuates more than consumption, if households are taking in more income in one time period they do not necessarily spend it all during that period, but might rather save it to use over time on their expenditure. Since this is a yearly data that is used in this research the fluctuation should be minimum, there is a certain cycle that households experience during one year but it should even out within the 12 months given data.

Third, it is always difficult to assess the accuracy of total income and total consumption expenditures. According to Deaton (1997) consumption is more likely to be underestimated then overestimated, having underestimated consumption indicates that the income that households have to spare is not as great as suggested, which in turn can have major influence on the households credit rating and debt burden. Similar story can be told about income, income is often

considered to be undervalued in surveys, the more accurate that these variables are the better but having undervalued income is perhaps superior option from having undervalued consumption expenditures. From a financial institutional point of view it is considered superior to have undervalued income then to have undervalued consumption.

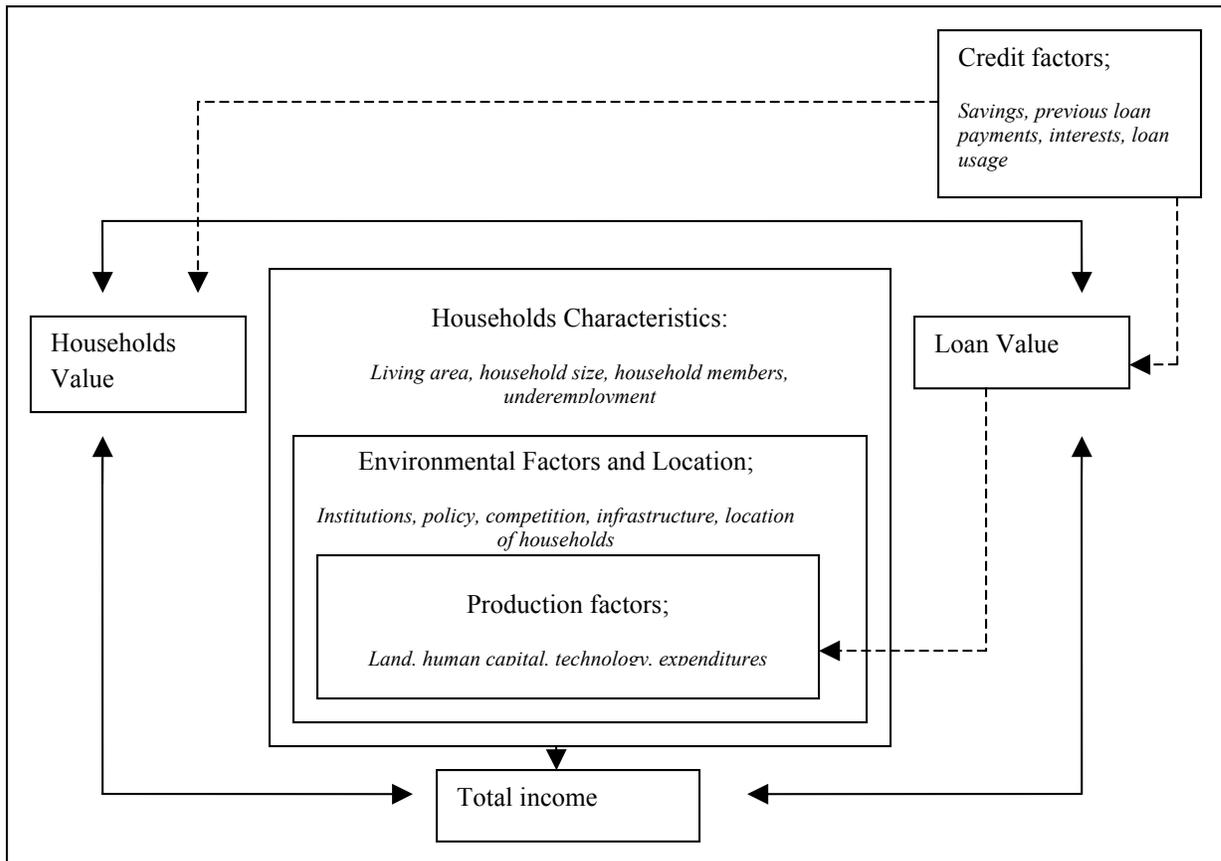
Household's value is another subject that plays an important role in financial institutions when making decision about lending. Collateral is used by financial institutions to protect the loan given out, before lending to a households it is common that financial institution (bank etc.) take a collateral in the household (usually the house itself but can also be other assets), by having a collateral in the house the bank is guaranteed to get back the value of the loan given out. If everything goes as planned the debtor will reimburse the loan over a previously decided time period. If the debtor however does not pay of the loan the financial institution can claim the collateral in the house and force the owner to sell the house in order to pay back the loan. Needing to give out collateral in their house creates great incentives for household members to pay back the loan, otherwise they are risking losing their home. In general, having a higher household value should give you possibilities in obtaining higher credit from a financial institution given that the house has not been leveraged over the top.

Using loan value as a dependent variable then gives valuable information on which characteristics are significant when obtaining a loan. As previously explained it should be considered that a household that has a higher income and a higher households value should have easier access in obtaining loans and/or obtain higher loans then the ones with a lower income and a lower household value. Using loan value as a dependent variable also gives the option of seeing what projects financial institutions are lending to, the expected results should indicate that the loans are mostly going towards investment in the household's production or investment in the household's assets. Households that are receiving loans for the previously mentioned should then be able to increase their household's value and/or their household's total income and thus contribute towards a country economic growth.

To summarize the theoretical considerations presented in the previous chapters figure 4 represents a stylized model of the determinant of income, loan value and household's value. At the center of the model are productions factors that households use to generate income, the productivity of these factors can be influences by environmental characteristics that might vary

between the locations of the households. Since the model is represented at a household level household's characteristics are used to further explain the household's level.

Figure 4. Stylized Model of Determinants of Total Income, Household's Value and Loan Value.



As has been highlighted in this discussion each one of the chosen dependent variables are supplementing each other and creating a circular flow. By taking out loan and investing it either in the household's production or the household's assets should lead to an increase in income and value of the household. A common way of investing is not necessarily to invest heavily from the start but rather to take investment in steps and thus increase the income and value of the household gradually. In addition to the production factors there is a possible effect in loan value that comes from credit factors. The credit history of the households can have influence on the value of the obtained loan for households in different ways which will be further discussed in a later section.

Although this theoretical model of determinant of income, household's value and loan value is stylized, it is important to highlight the importance of the interpretation of the results from the regression analysis based on the Vietnam household's living standard survey data's. The results from a regression estimation can at best prove that there is a significant relation between variables, but hypothesis regarding casual links need to be drawn from theory. Thus the objective of the empirical analysis is to test if the empirical data are dependent with the theoretical hypothesis summarized in figure 4.

5. Data

This study relies on two datasets from Vietnams households living standard surveys (VHLSS), which were conducted by the General Statistical Office of Vietnam (GSO) with technical support from the World Bank and United Nation Development Programme for the years 2006 and 2008. The GSO has performed the VHLSS for many years and from 2002 until 2010 it has been performed every two years. There have been some adjustments in the survey throughout the years, however for the two selected years there were no changes in the questionnaire which makes comparison between the years easier.

The survey was conducted nationwide involving a sample scale of 39,071 and 38,253 household's observations for 2006 and 2008 respectively. The sample scale involved over 3,000 communes/wards representative for the whole country, 8 regions and urban and rural area and provinces.

5.1 Sampling

The sampling size used in this study is different between models. Since the goal of this study is to measure the effects on rural households access to credit and its impact on income, to elaborate on the relationship on access to credit and income inequality and compare households under poverty line with others it was important to start with models that explained which factors were influential on households income and households value. The sample size for all models were carefully selected, independent variables used needed to have theoretical significance towards income and households value, the chosen variables are all considered to have influence on income, households value and loan value in developed countries. The dummy variables in each model are focused on the Vietnamese environment, the inclusion of them is important to show the differences within rural and poor areas. Table 2 summarizes the sample sizes of the models for each year.

Table 2. Sampling of models.

Sample	2006	2008
Model1	7,262	7,398
Model2	7,262	7,398
Model3	4,233	3,591

Since model 3 is focusing on more contracted information (loan value) there are fewer observations available. Model 3 moves into deeper consideration about loans and access to loans and since all households do not have loans or are in need of loans there is nothing unusual about reduced availability of observation.

The data available in this dataset is not faultless, problems of accuracy and availability within certain variables can limit the use of the data as well as make the results difficult to interpret. However you should not dismiss this dataset because of these difficulties, there is a great deal of information within this data which can be used to make important findings within Vietnamese household's, both within rural areas and between rural and urban areas.

5.2 Factors of production

The intention of the variables in this category is to reflect on the production capacity of households and include the influence of land, human capital, production technology and expenditures. All these variables have an effect on household's production:

Land, the area of land holding is an important factor in determining the production capacity of rural households. The size of the land area determines how great the total production of a household can reach and thus has great influence on possible income and household's value. The land variable is measured in squared meters for households. When interpreting the results from land it is important to acknowledge who actually owns the land, if it is owned by the household itself or if it is owned by the government or any other party.

Human capital is measured in educational expenses and health care expenses. The education is not related to the educational level of household members but rather the total expenses paid for education, including education for children, adults and separate classes for the adults. The investment in education and health care does not necessarily represent welfare level of household but shows the rate of return of their investment in connection with household's income which in turn affects household's value and loan value.

Production technology, shows the influence of different machinery in production for households. There are four categories of production types included in this thesis; gravity machinery, pumps, manual and no irrigation. Gravity and pumps are two different kind of machinery technology used to provide water for crop areas. Manual indicates that watering is done by hand and no irrigation refers to areas that are not working with irrigation as their main income source.

Expenditures, play significant role regarding credit rating, the total expenditures of a households can influence the loan value that a household is able to obtain. This variable represents all expenditures of a household (including education and health care) to show the effects of total consumption on household's income, and thus influence a possible loan value.

5.3 Environmental factors and location

The environmental and location factors are intended to capture the possible inequality within areas in Vietnam. Being located in an agrarian area and/or a poor area indicates that there might be weak infrastructure and or difficulties in obtaining important raw material in the located area. The variables that are used to reflect on rural household's inequality are:

- Agrarian location or not, a dummy variable is used indicating the differences between households that are located in agrarian location and households that are not located in agrarian area.
- If area is classified as a poor area or not, a dummy variable is used to distinguish between these areas. Here it is important to note that the areas are classified as poor by the Vietnamese government by their classification and not official poverty lines as explained in core assumptions.

5.4 Household characteristics

Since the data gives observation at the household level it is important to try to control for the composition and size of the household, the data provides several variables that can be used to explain the household more thoroughly:

Household's size is measured in number of individuals living in the households; the trouble here is that it is not distinguished between adults, children or old people. Therefore it is

important to take that into account once interpreting it and perhaps give more focus on underemployment.

Underemployment, explains the amount that a household needs to pay in replacement of compulsory public labor. The higher amount that a household is paying indicates that they do not need extra workers in their production showing that they have enough labor within their household.

Living area, gives information about the size of the house that the household is living in measured in squared meters. The living area of a household plays a vital part in regards to the household's value, indicating that larger living area should result in higher household's value and higher household's value should give households more possibilities in obtaining higher credit value.

5.5 Credit factors

Since credit is not solely given out to households in accordance to their income and households value it is important to include variables that describe the loan. The data offers variables that are well suited in describing credit value:

- Saving is measured in Vietnamese Dong (VND) and represents the amount that households deposit in savings accounts.
- Previous loan payments show how much households have been paying on previous loans from financial institutions.
- Interest value describes what the interest rates are on previous loan, given in percentages and measured as principle interest rate.
- Loan usage, this is a dummy variable used to explain what households where doing with previously obtained loans.

Summary of the dependent and independent variables and their definition is presented in table 3 below.

Table 3. Variable definitions.

Variable	Defenition and comment
Dependent variables	
Total income	Log total income of household in 1000 VND
House value	Log predicted house value in 1000 VND
Credit value	Log principle value of the loan in 1000 VND
Factors of productivity	
Total land area	Total land area of household in squared meters
Education expenditures	Expenditure on education in 1000 VND
Health care expenditures	Expenditure on health care in 1000 VND
Total expenditures	All expenditures of households in 1000 VND
Irrigation technology	0 if households have gravity technology, 1 if households have pump technology, 3 if they have manual technology and 4 if households have no irrigation.
Households Characteristics	
Household size	Number of household members
Underemployment	Amount paid in replacement of compulsory public labor in 1000 VND
Total living area	Total size of the living area of household in squared meters
Environmental and location factors	
Agrarian area	1 if household is located in agrarian area; 0 otherwise
Not agrarian area	0 if household is not located in agrarian area; 1 otherwise
Classified as poor area	1 if household is classified as a poor area; 0 otherwise
Not classified as poor area	0 if household is not classified as poor area; 1 otherwise
Credit factors	
Savings	Deposits by households into a savings account in 1000 VND
Paid of loans	Payment by households in the last 12 month on outstanding loans
Interest value	The principle interest value of outstanding loans in 1000 VND
Loan usage	0 if loan is used as a production capital; 1 if loan is used as capital investment; 3 if loan is used as debt repayment; 4 if loan is used for house purchase; 5 if loan is used for wedding or funerals; 6 if loan is used to invest in studies; 7 if loan is used for medical purchase; 8 if loan is used for general consumption; 9 if loan is used for food consumption; 10 if loan is used to buy durable goods; 11 if loan is used for investing in water supplies; 12 if loan was used to improve sanitation; and 13 if used for other things

6. Empirical analysis

6.1. Variable summary

Summary statistics for dependent and independent variables are presented in tables 4-6 below, the summary is divided into the 3 models presented in this chapter. The increase in mean and standard deviation between the two years is noteworthy in the three dependent variables. The mean suggest that there is an increase in these variables between the years which should be a positive signal, however an increase in the standard deviation indicates that the amounts in these variables are spread out over larger range of value. It should also be noted that the chosen variables are not correlated with each other in any significant degree.

Table 4. Statistical summary of Model 1.

Model 1				
Year	2006		2008	
Observations	7263		7399	
	Mean	Std	Mean	Std
Total income	33460.38	35611.95	46583.07	64785.44
Total land area	827.2588	1399.792	820.4891	1270.355
Education expenditure	1398.097	2499.609	1752.946	3503.332
Health expenditure	1386.13	3518.273	2018.96	6405.858
Households size	4.251274	1.673519	4.165563	1.666187
Total living area	62.51838	35.92521	67.26328	39.53509
Gravity technology*	.4140162	.4925852	.4149209	.4927417
Pump technology*	.3448988	.475368	.3720773	.4833915
Manual technology*	.1071183	.3092848	.0883903	.2838809
No irrigation technology*	.1334159	.3400471	.1246114	.3303001
Classified as poor area*	.125981	.3318508	.1458305	.3529601
Not classified as poor area*	.874019	.3318508	.8541695	.3529601

Table 5. Statistical summary of Model 2.

Model 2

Year Observations	2006		2008	
	Mean	Std	Mean	Std
Households value	14303.13	242464	193511.5	296213.8
Total Income	33460.38	35611.95	46583.07	64785.44
Total land area	827.2588	1399.792	820.4891	1270.355
Total living area	62.51838	35.92521	67.26328	39.53509
Health expenditure	1386.13	3518.273	2018.96	6405.858
Education expenditures	1398.097	2499.609	1752.946	3503.332
Underemployment	68.19923	122.6911	1183.908	5310.276
Agrarian household*	.4531185	.4978316	.4706041	.4991689
Non agrarian household*	.5468815	.4978316	.5293959	.4991689
Classified as poor area*	.125981	.3318508	.1458305	.3529601
Not classified as poor area*	.874019	.3318508	.8541695	.3529601
Gravity technology*	.4140162	.4925852	.4149209	.4927417
Pump technology*	.3448988	.475368	.3720773	.4833915
Manual technology*	.1071183	.3092848	.0883903	.2838809
No irrigation technology*	.1334159	.3400471	.1246114	.3303001

Table 6. Statistical summary of Model 3.

Model 3

Year Observations	2006		2008	
	Mean	Std	Mean	Std
Loan Value	14229.54	42976.1	22834.76	136503.3
Total Income	29361.34	30881.14	47285.06	76285.88
Households Value	132689.7	235875	194818.4	317244.6
Total living area	58.0888	30.64839	67.12528	40.7965
Total land area	536.3392	566.7733	822.9794	1310.801
Saving	1235.618	9424.747	1538.103	20144.88
Interest value	11954.27	38554.98	18927.43	132866.9
Household size	4.165801	1.610092	4.194878	1.680526
Total expenditures	21640.53	16773.73	29032.14	23859.54
Payment of previously borrowed	2608.26	16726	5734.529	50789.14
Classified as poor area*	.1350968	.3418673	.1514477	.3585346
Not classified as poor area*	.8649032	.3418673	.8485523	.3585346
Agrarian household*	.3783656	.4850367	.4729955	.4993397
Not agrarian household*	.6216344	.4850367	.5270045	.4993397
Gravity technology*	.421351	.4938339	.3958797	.4891069
Pump technology*	.3854511	.4867592	.3947661	.4888685
Manual technology*	.1502126	.3573219	.0935412	.2912299
No irrigation technology*	.0429854	.2028481	.1158129	.320045
Production capital*	.2784601	.448294	.2241091	.4170523
Capital investment*	.1846953	.388096	.1650891	.3713126
Debt repayment*	.0805385	.2721572	.0854677	.2796153
House purchase*	.1228153	.3282639	.127784	.3338956
Wedding and funeral expenses*	.0144072	.1191762	.0141982	.1183238
Study*	.0444025	.2060119	.0810134	.2728936
Medical*	.0640057	.2447919	.0709911	.2568457
Consumption*	.1025035	.3033452	.0993875	.2992233
Food consumption*	.0054322	.0735118	.0038976	.0623173
Durable goods*	.0427492	.202315	.0437082	.2044736
Investment in water*	.0030704	.0553324	.0086303	.0925105
Investment in sanitation*	.0073217	.0852631	.0116927	.1075135
Other*	.0495985	.2171396	.0640312	.2448426

* Dummy variables

The models presented below have all been examined for collinearity⁴, the validity of the models can also be seen with the high values of the R-square⁵ of each model, ranging from 0,2338-0,5350.

The review of the rural credit market in Vietnam led to the creation of three hypotheses aimed to help answer the two research questions put forward in the thesis. After viewing the general requirements for loan in the western world the hypotheses created are aimed at explaining income and investment factors, household's value and influencing factors and access to credit value. The dependent variables from the first two hypotheses are then applied to the third one to try to explain their effects on access to rural credit.

6.2 Hypotheses 1

Households who invest in human capital (education and health care) and their properties (land, household, machinery) have higher income than the once who do not invest.

The importance to view which characteristics are affecting rural household's income is great, that way it is possible to pin point what is driving income, and if households improve these characteristics it should lead to increased income. In order for households to develop they need to maximize their income and work towards more efficiency, the model used for this hypothesis for both years 2006 and 2008 is the following:

6.2.1 Model 1

$$\ln(\text{Total income}) = \alpha_1 + \beta_1 * \text{total land area}_i + \beta_2 * \text{education_expenditures}_i + \beta_3 * \text{education_expenditures2}_i + \beta_4 * \text{healthcare_expenditures}_i + \beta_5 * \text{healthcare_expenditures2}_i + \beta_6 * \text{Householdsize}_i + \beta_7 * \text{Total living area}_i + \beta_8 * \text{total living area2}_i + \delta_1 * (\text{gravity technology})_i + \delta_2 * (\text{pump technology})_i + \delta_3 * (\text{manual technology})_i + \delta_4 * (\text{classified poor})_i + e_i$$

Where $\ln(\text{Total income})$ is the dependent variable in logarithm, the reason for making it a logarithm is to better predict the finding, having the dependent variable a logarithm generates all results to be interpreted in percentage. β_1 - β_8 are independent variables or explanatory variables, the variables $\text{education_expenditures2}$, $\text{healthcare_expenditures2}$ and $\text{total living area2}$ are

⁴ For full tables of collinearity examination view appendix tables 3-8

⁵ R-squared is defined as the ratio of the sum of squares explained by a regression model, a value of 1,0 gives perfect prediction value of another term.

polynomial, since it is assumed that it is not possible to constantly invest in education, health care and living area and always get higher income as explained before. $\delta 1-\delta 4$ are dummy variables explaining effects of different water technology used for irrigation by the households. As explained before dummy variables always have one reference group in which the other variables are measured against. In the first model there are two different dummy variables, the first one $\delta 1-\delta 3$ are the variables gravity technology, pump technology and manual technology and the reference group which they are measured against is no irrigation. The second dummy variable $\delta 4$ is the variable classified poor with the reference group not classified as poor areas.

The results from the regression of both surveys for years 2006 and 2008 are shown in table 7 and table 8.

Table 7. Regression of Model 1 for year 2006.

Sources	SS	Degrees of freedom	MS
Model	1472.82711	12	122.735592
Residuals	2674.42199	7250	368885792
Total	4147.2491	7262	571089108

Number of observations	7263
F(12,7250)	332.72
Prob > F	0.0000
R-squared	0.3551
Adj R-squared	0.3541
Root MSE	.60736

Dependant variable	Coefficient	Standard Error	P > t
log Total Income			
Independent variables			
Total land area	.0000172	5.26e-06	0.001*
Education expenditure	.0001221	5.61e-06	0.000*
Education expenditure2	-3.39e-09	3.68e-10	0.000*
Health care expenditure	.000044	3.16e-06	0.000*
Health care expenditure2	-3.17e-10	5.53e-11	0.000*
Households size	.1308681	.0043743	0.000*
Total living area	-.002575	.0004781	0.000*
Total living area2	7.72e-06	2.05e-06	0.000*
Gravity technology	-.1304258	-5.70	0.000*
Pump technology	-.187434	-7.89	0.000*
Manual technology	-.1660217	-5.55	0.000*
Classified as poor area	-.6843661	-31.18	0.000*
constant	9.694834	273.74	0.000*

* Statistically significant at 99% confident level

Table 8. Regression of Model 1 for year 2008.

Sources	SS	Degrees of freedom	MS
Model	1905.61308	12	158.80109
Residuals	2919.18957	7386	395232815
Total	4824.80265	7398	652176623

Number of observations	7399
F(12, 7386)	401.79
Prob > F	0.0000
R-squared	0.3950
Adj R-squared	0.3940
Root MSE	62868

Dependant variable	Coefficient	Standard Error	P > t
log Total Income			
Independent variables			
Total land area	1.40e-06	6.03e-06	0.817
Education expenditure	.0000538	2.88e-06	0.000*
Education expenditure2	-4.36e-10	6.25e-11	0.000*
Health care expenditure	.0000219	1.83e-06	0.000*
Health care expenditure2	-7.29e-11	9.98e-12	0.000*
Households size	.1356517	.0045339	0.000*
Total living area	.0073673	.0004344	0.000*
Total living area2	-9.86e-06	1.61e-06	0.000*
Gravity technology	-.1124097	.0243141	0.000*
Pump technology	-.1770759	.02502	0.000*
Manual technology	-.2234889	.0331046	0.000*
Classified as poor area	-.6329624	.0215306	0.000*
constant	9.494341	.0349403	0.000*

* Statistically significant at 99% confident lev

6.2.2 Results from model 1

When looking at the regression we see that all variables except total area in 2008 are significant within 99% confident level. Between the years there are some changes regarding total land area, this can tell us that in 2006 total area was significantly contributing to income for rural households while in 2008 there seems to be less emphasis on household's area size regarding income. This is very interesting since one might think that households that have larger areas would have more possibilities to increase their production and thus generate higher income, as is indicated by Ravallion and van de Walle (2008) that with the land being marketable it was felt that households could use it as a collateral in order to obtain credit for further investment or to cope with unexpected shocks. But these results indicate that the land size does not have any significance on the household's income and thus implying that income relies on other factors.

When looking at other factors of production it becomes apparent that by investing both in the household's property and the human capital is giving higher income then for households that do not make these investments. By investing one unit in education (one unit is 1000 VND) and health care in 2006 is giving increased income of 0,012% and 0,0044% respectively. The

changes between the years shows that in 2008 investment in education and health care decreases giving an increased income of 0,0054% for education and 0,0022% for health care.

As mentioned earlier it is not possible to constantly invest in education, health care and living area and expect higher income, to calculate the point where these variables are starting to have negative effects on income the following equations are used:

$$\text{INCOME} = -\beta_2/2\beta_3 \text{ (for education)}$$

$$\text{INCOME} = -\beta_4/2\beta_5 \text{ (for health care)}$$

$$\text{INCOME} = -\beta_7/2\beta_8 \text{ (for living area)}$$

Table 9 shows the changes of certain variables of factors of productivity and households characteristics between 2006 and 2008.

Table 9. Summary of Factors of Productivity and Households Characteristics.

Variables	2006	2008	Changes	
Education expenditure	0,012%	0,005%	-0,007%	
Health care expenditure	0,004%	0,002%	-0,002%	
Total living area	-0,258%	0,737%	0,994%	
Households size	13,080%	13,562%	0,482%	
Intersection				
Education expenditures ²	18009	61697	43688	*
Health care expenditures ²	69401	150206	80805	*
Total living area ²	167	374	207	**

* amount in thousands VND

** size in m²

As can be seen in table 9 the intersection for investment in education and health care rises substantially between years, however it is also important to note that the benefits of investing in education and health care decreases as well, this might indicate that there are more possibilities in regards to health care and education but on the contrary the remuneration from this investment is not very high. The households characteristics total living area and household size are giving households more remuneration to their investment, if we look at total living area in 2008 we can see that with an investment in every squared meter (m²) will increase the income of the household by 0,737% until the household reaches the size of 374 m². The households size is a

variable that is more difficult to assess since it counts all persons living in the household, it does not differentiate between age of household members nor the sex of the households members, therefore it should be interpretive with care, the results show that by increasing household by one member the income will increase by 13,56% for the year 2008. Because of the uncertainty around both age and sex of the household member's one might suspect that this increase would indicate that the additional household member would need to be at a working age. Therefore it will not be considered as a critical factor regarding household's income.

When looking at the factors of productivity concerning irrigation, gravity, pump or manual technology they are giving much lower income then in households that are not producing in agriculture at all. Table 10 summarizes the outcome between the years.

Table 10. Summary of Irrigation Technology and Location Factors for Model 1.

<u>Variables</u>	<u>2006</u>	<u>2008</u>	<u>Changes</u>
Gravity technology	-13,04%	-11,24%	0,018016
Pump technology	-18,74%	-17,71%	0,010358
Manual technology	-16,60%	-22,35%	-0,05747
Classified as poor area	-68,44%	-63,30%	0,051404

As can be seen living in a households that works in irrigation gives considerable lower income then for the households that are not working with irrigation ranging from 11,24-22,35% lower income in 2008. However, it is also interesting to see the differences within the households in irrigation, the ones that are using more developed methods are receiving considerable higher income then the ones who are working manually. The households that invest in gravity or pump technology can increase their income from 4,64-11,11% respectively with more benefits coming if investing in gravity technology.

Finally, when viewing the differences in environmental and location factors we see that areas classified as poor by the government and the ones that are not considered poor have great difference in income. Areas that are classified poor in 2006 where receiving 68,44% lower income then households which are not classified poor and even though there is a decrease between the years we see that poor regions are still receiving 63,30% lower income then non-poor regions in 2008. This shows how great the inequality is within regions in Vietnam, even though there is improvement between the years the inequality is still extensive and should be

something that the Vietnamese government should be worried about since approximately 70% of their population is living in rural areas.

After reviewing these results we can see that households that invest in their human capital and their properties do have higher total income than the ones who do not invest, therefore we are able to accept hypothesis 1. However it is important to note that the results imply that it is more important to invest in households' properties than in their human capital since it is giving households a considerably higher return than when investing in their human capital.

After finding out which factors are having effects on household's income we need next to have a similar approach towards households' value. The household's value can be very important when looking at investment opportunities and access to credit, thus we put forward our second hypotheses.

6.3 Hypothesis 2

Value of households working with agrarian production is lower than value of households not working with agrarian production.

The importance of being able to locate which factors are affecting the household's total value is great in order to understand where households need to invest or make changes. There are many factors that need to be considered when trying to maximize the total value of households, factors such as production efficiency, production possibilities, total land area, living area and the location of the household in general should contribute greatly towards households' value. As mentioned before all land in Vietnam is owned by the government, households are able to rent land usage rights usually for 15-20 years (Ravallion and van de Walle, 2003). Knowing this we might expect that total land area would not contribute towards households' value, the model that we use for hypotheses 2 is the following:

6.3.1 Model 2

$$\begin{aligned} \ln(\text{household value}) = & \alpha_1 + \beta_1 * \text{total_income}_i + \beta_2 * \text{total_land_area}_i + \beta_3 * \text{total_living_area}_i + \\ & \beta_4 * \text{total_living_area2}_i + \beta_5 * \text{health_expenditures}_i + \beta_6 * \text{health_expenditures2}_i + \\ & \beta_7 * \text{education_expenditures}_i + \beta_8 * \text{education_expenditures2}_i + \beta_9 * \text{underemployment}_i + \\ & \beta_{10} * \text{underemployment2}_i + \delta_1 * (\text{non_agrarian_household})_i + \delta_2 * (\text{classified poor})_i + \delta_3 * (\text{gravity} \\ & \text{technology})_i + \delta_4 * (\text{pump technology})_i + \delta_5 * (\text{manual technology})_i + e_i \end{aligned}$$

Here the dependent variable is logarithm of households value, β_1 - β_{10} are the independent variables with `total_living_area2`, `healthcare_expenditures2`, `education_expenditures2` and `underemployment2` as polynomials. δ_1 - δ_5 are dummy variables, δ_1 is households not working in agrarian production and has the reference group agrarian household, indicating households that are working in agrarian production. δ_2 is households classified as poor and the reference group is households not classified as poor. δ_3 - δ_5 show different technology in water provision as explained in hypothesis 1, the reference group is no irrigation referring to households that are not working in irrigation. In this model there are 2 different dummy variables representing households location, the reason to include both is to be able to make general assumption about difference between agrarian areas and non-agrarian areas (δ_1) as well as being able to make distinction within agrarian areas as well (δ_3 - δ_5). The inclusion of underemployment variables is to show the importance of efficiency, as mentioned before this variable is also set up as a polynomial to find the intersection where it starts giving negative effect on the household's value. Table 11 and table 12 show the regression for both years 2006 and 2008.

Table 11. Regression of Model 2 for year 2006.

Sources	SS	Degrees of freedom	MS
Model	2745.31946	15	183.021297
Residuals	4995.003	7247	.689251138
Total	7740.32246	7262	1.06586649

Number of observations	7263
F(15, 7247)	265.54
Prob > F	0.0000
R-squared	0.3547
Adj R-squared	0.3533
Root MSE	.83021

Dependant variable	Coefficient	Standard Error	P > t
log Households value			
Independent variables			
Total Income	9.21e-06	3.05e-07	0.000*
Total land area	9.04e-06	7.21e-06	0.210
Total living area	- .0050334	.0006577	0.000*
Total living area2	.0000111	2.81e-06	0.000*
Health care expenditure	.0000422	4.36e-06	0.000*
Health care expenditures2	-5.04e-10	7.56e-11	0.000*
Education expenditures	.0001439	7.69e-06	0.000*
Education expenditures2	-5.84e-09	5.00e-10	0.000*
Underemployment	.0013686	.0001215	0.000*
Underemployment2	-2.53e-07	4.31e-08	0.000*
Non agrarian household	.1231915	.0198331	0.000*
Classified as poor area	- .5915398	.0303963	0.000*
Gravity technology	- .0741561	.0313608	0.018**
Pump technology	- .0563657	.0326018	0.084***
Manual technology	- .1216426	.0410039	0.003*
constant	10.94739	.0462961	0.000*

* Statistically significant at 99% confident level

** Statistically significant at 95% confident level

*** Statistically significant at 90% confident level

Table 12. Regression of Model 2 for year 2008.

Sources	SS	Degrees of freedom	MS
Model	3205.50025	15	213.700017
Residuals	3913.91044	7383	.53012467
Total	7119.41069	7398	962342619

Number of observations	7399
F(15, 7383)	403.11
Prob > F	0.0000
R-squared	0.4502
Adj R-squared	0.4491
Root MSE	.7281

Dependant variable	Coefficient	Standard Error	P > t
log Households value			
Independent variables			
Total income	2.75e-06	1.42e-07	0.000 *
Total land area	6.46e-06	6.99e-06	0.355
Total living area	0.170277	.0005011	0.000 *
Total living area2	-.0000257	1.86e-06	0.000 *
Health care expenditure	.0000136	2.14e-06	0.000 *
Health care expenditure2	-.589e-11	1.16e-11	0.000 *
Education expenditures	.0000511	3.34e-06	0.000 *
Education expenditures2	4.97e-10	7.22e-11	0.000 *
Underemployment	-.721e-06	2.93e-06	0.014 **
Underemployment2	5.91e-11	2.38e-11	0.013 *
Non agrarian household	.027842	.0170368	0.102
Classified as poor area	-.5056182	.024976	0.000 *
Gravity technology	.0610491	.0282309	0.031 **
Pump technology	.1009304	.0290559	0.001 *
Manual technology	.0805896	.0384648	0.036 **
constant	10.38674	.0380597	0.000 *

* Statistically significant at 99% confident level

** Statistically significant at 95% confident level

** Statistically significant at 90% confident level

6.3.2 Results from model 2

When looking at the regression for both the years we can see that total area is the only variable that is insignificant for both years, confirming what was suspected that since the households do not own the land they live on it does not have influence on the total value of the household. There are two other variables that are not significant within 95% confident level, the dummy variables pump in the year 2006 and non-agrarian households in 2008 are not significant within 95% confident level either. When looking at their significance we can see that pump in the year 2006 is within 90% confident level and non-agrarian household is on the border showing 10,2 (we can therefore say with 89,80% certainty the affects it has on total households value). When looking at the changes between the years for the dummy variables interesting changes become apparent, table 13 summarizes the changes.

Table 13. Summary of Irrigation Technology and Location Factors for Model 2.

<u>Variables</u>	<u>2006</u>	<u>2008</u>	<u>Changes</u>
Non agrarian household	12,32%	2,78%*	-9,53%
Classified as poor area	-59,15%	-50,56%	8,59%
Gravity technology	-7,42%	6,10%	13,52%
Pump Technology	-5,64%*	10,09%	15,73%
Manual Technology	-12,16%	8,06%	20,22%

* 90% significance

** 89,80% significance

As can be seen there are great changes between the years, the value of the households working in non-agrarian area decrease from being 12.32% higher than the agrarian area to being only 2,78% higher than households working in agrarian production. Along with this we see enormous changes when looking at types of irrigation within agrarian working households in comparison to non-agrarian production, where the households producing with gravity, pump and manually moving from being 5,64%-12,16% lower than non-irrigation area towards having 6,10%-10,09% higher household value then non-irrigation area. These results indicate that areas that are working in agrarian production might be catching up to other areas that are non-agrarian and when looking at the changes between poor and non-poor area we see that although the poor areas still are valued at 50,56% lower than the non-poor there is an decrease in the value gap from 2006 of 9,53%.

However, there seems that there is some mismatch between these results, since non-agrarian areas are valued higher than the agrarian areas (2,78% higher) it then seems confusing why irrigated areas with gravity, pump or manually are valued higher than non-irrigated areas. However, what this indicated is that households that are located in agrarian area and are working in agriculture are valued higher then households that are located in agrarian area but not working with agriculture. This should not be confused with rural urban comparison.

When looking at the rest of the factors of productivity and households characteristics in the model it is interesting to see how low impact they are having on the households value. Table 14 summarizes the changes in these variables along with the intersection of selected variables.

Table 14. Summary of Production Factors and Households Characteristics for Model 2.

Variables	2006	2008	Changes
Total income	9,21E-06	2,75E-06	-6,46E-06
Total land area*	9,04E-06	6,46E-06	-2,58E-06
Total living area	-0,005033	0,017028	0,022061
Health care expenditures	4,22E-05	1,36E-05	-2,86E-05
Education expenditures	1,44E-05	5,11E-05	3,67E-05
Underemployment	0,001369	-7,21E-06	-0,001376

* insignificant variable

Intersection			
Total living area ² **	227	331	105
Health care expenditure ² ***	41865	115450	73585
Education expenditure ² ***	1232	51408	50176
Underemployment ² ***	2705	60998	58294

** in squared meters

*** in thousand VND

When looking at the variables Total living area, health expenditures, education expenditures and underemployment it comes as a surprise to see how little effects they have on the household's value and even though there are changes between the years the values are still very low and cannot be considered economically significant. It is only living area that has any economic significance in the year 2008 showing that by investing in one additional squared meter in your household will result in 1,7% increase in value of the household. However it does only apply until the household has reached the size of 331 m² after that any further investment will result in negative effects on the household's value.

After looking at the results from the model we can accept hypotheses 2. Households working with agrarian production have lower value than households that are not working with agrarian production. Even though the differences in value are perhaps not as great as first suspected this indicates that the gap between poor areas and non-poor areas are decreasing in consideration to household's value as is shown in the model.

After these results note that there have been positive changes for rural households from 2006 and 2008, therefore we should expect that rural households should have fair access to credit. As discussed earlier, credit plays important role in development for rural households as well as poor areas. Thus we put forward our third hypothesis to see how much credit rural households obtain, do they have satisfying opportunities to access credit to further invest in their land/household and

therefore increasing its value and income? What factors are significant for lenders in order to give out loans to rural households? The results from our previous models should indicate that rural households in poor areas and rural households working in agrarian production should be experiencing rise in loan value between 2006 and 2008 since the gap between income and poverty has been decreasing.

6.4 Hypothesis 3

Rural households in areas classified as poor and rural households working in agrarian production experienced a rise in loan value between 2006 and 2008.

As has been mentioned before access to credit can be extremely vital for households to be able to develop their households and move out of poverty, there is however always some preconditions that financial institutions want debtor to fulfill. As explained above lenders usually prefer to lend to individuals that have a steady income and have assets behind them.

The same can be said about the value of the household, individuals with larger households have more collateral to offer which should increase their possibilities in obtaining a loan. Since the financial market in Vietnam is fairly underdeveloped compared to the markets in the western world it is interesting to see if those general assumptions apply. The model that we use for hypothesis is the following:

6.4.1 Model 3

$$\begin{aligned} \ln(\text{Loan Value}) = & \alpha_1 + \beta_1 * \text{total_income}_i + \beta_2 * \text{households_value}_i + \beta_3 * \text{total_living_area}_i + \\ & \beta_4 * \text{total_living_area2}_i + \beta_5 * \text{total_land_area}_i + \beta_6 * \text{savings}_i + \beta_7 * \text{interest_value}_i + \beta_8 * \\ & \text{householdsize}_i + \beta_9 * \text{total_expenditures}_i + \beta_{10} * \text{payment_of_previously_borrowed}_i + \delta_1 \\ & * (\text{classified_poor})_i + \delta_2 * (\text{agrarian_household})_i + \delta_3 * (\text{pump_technology})_i + \delta_4 * (\text{manual} \\ & \text{technology})_i + \delta_5 * (\text{no_irrigation})_i + \delta_6 * (\text{capital_investment})_i + \delta_7 * (\text{debt_repayment})_i + \delta_8 \\ & * (\text{house_purchase})_i + \delta_9 * (\text{wedding_funerals_expenses})_i + \delta_{10} * (\text{study})_i + \delta_{11} * (\text{medical})_i + \delta_{12} \\ & * (\text{consumption})_i + \delta_{13} * (\text{food_consumption})_i + \delta_{14} * (\text{durable_goods})_i + \delta_{15} * (\text{investment_water})_i \\ & + \delta_{16} * (\text{investment_sanitation})_i + \delta_{17} * (\text{others})_i + e_i \end{aligned}$$

This model is a little bit more complex than the other two, the main reason for that is the inclusion credit factors. In this model the dependent variable is the logarithm of loan value. β_1 – β_{10} are the independent variables with total living area2 as a polynomial. As can be seen the model is using many of the variables previously used, the inclusion of credit factors are

important since they represent the interests paid of loans and how well the household has paid of loans in the past, savings and loan usage all important factors for financial institutions while evaluating if they should lend to households.

The dummy variables ($\delta 6$ – $\delta 17$) are aimed at explaining why households are borrowing from financial institutions and what they are spending their loans on. The reference group for those dummy variables is production capital, the reason for choosing production capital as a reference group is because for households that are trying to invest and develop their household it is important to have enough production capital to be able to maintain production. Other dummy variables are familiar from the other models, $\delta 1$ is the variable classified as poor where the reference group is not classified as poor area. $\delta 2$ is the variable agrarian household with the reference group non-agrarian household and $\delta 3$ – $\delta 5$ are irrigation production types. In this model unlike the other two the reference group is gravity technology. The reason for that is for interpretation reasons, having gravity as reference type simplifies the interpretation. Table 15 and table 16 show the regression for the two years.

Table 15. Regression of Model 3 for year 2006.

Sources	SS	Degrees of freedom	MS	Number of observation: 4234	
Model	3149.56718	27	116.650636	F(27, 4206)	179.25
Residuals	2737.10022	4206	.65076087	Prob > F	0.0000
Total	5886.6674	4233	1.39066086	R-squared	0.5350
				Adj R-squared	0.5320
				Root MSE	.8067

Dependant variable	Coefficient	Standard Error	P > t
log Loan Value			
Independent variables			
Total Income	-1.54e-07	5.42e-07	0.776
Households Value	-7.54e-08	6.81e-08	0.268
Total living area	.0329204	.0009412	0.000*
Total living area2	-.0000933	4.24e-06	0.000*
Total land area	-.0000577	.0000221	0.009*
Saving	-4.00e-07	1.37e-06	0.770
Interest value	.00001	3.70e-07	0.000*
Household size	-.0115153	.0081557	0.158
Total expenditures	5.10e-06	1.13e-06	0.000*
Payment of previously borrowed	7.52e-06	7.98e-07	0.000*
Classified as poor area	.0629697	.0378749	0.096***
Agrarian household	.0738499	.0259938	0.005*
Pump technology	-.2703797	.0280816	0.000*
Manual technology	-.1273329	.0377031	0.001*
No irrigation technology	-.1231731	.0630992	0.051***
Capital investment	.0631748	.0372649	0.090***
Debt repayment	-.0405864	.0498066	0.415
House purchase	.0534567	.042777	0.211
Wedding and funeral expenses	-.271247	.1061295	0.011**
Study	-.3219757	.0635672	0.000*
Medical	-.4560285	.0546815	0.000*
Consumption	-.6319802	.045555	0.000*
Food consumption	-1.028845	.1702522	0.000*
Durable goods	-.2675906	.0646675	0.000*
Investment in water	-.2640575	.2254704	0.242
Investment in sanitation	-.2354422	.1471473	0.110
Other	-.0352588	.0605464	0.560
constant	7.253451	.0614396	0.000*

* Statistically significant at 99% confident level

** Statistically significant at 95% confident level

*** Statistically significant at 90% confident level

Table 16. Regression of Model 3 for year 2008.

Sources	SS	Degrees of freedom	MS	Number of observation: 3592	
Model	1124.78001	27	41.6585189	F(27, 3564)	40.27
Residuals	3686.50586	3564	1.03437314	Prob > F	0.0000
Total	4811.28587	3591	1.33981784	R-squared	0.2338
				Adj R-squared	0.2280
				Root MSE	1.017

Dependant variable	Coefficient	Standard Error	P > t
log Loan Value			
Independent variables			
Total Income	2.65e-07	2.61e-07	0.311
Households Value	-2.81e-09	6.90e-08	0.968
Total living area	.000206	.0009403	0.827
Total living area2	-3.07e-06	3.08e-06	0.320
Total land area	-.000012	.0000136	0.377
Saving	-2.56e-08	8.55e-07	0.976
Interest value	1.95e-06	1.35e-07	0.000*
Household size	-.004966	.0107793	0.645
Total expenditures	6.01e-07	9.53e-07	0.528
Payment of previously borrowed	4.27e-06	3.52e-07	0.000*
Classified as poor area	-.0340403	.0498584	0.495
Agrarian household	.0024089	.0341974	0.944
Pump technology	-.1284875	.0386699	0.001*
Manual technology	-.1070012	.0619815	0.084***
No irrigation technology	-.0016044	.058569	0.978
Capital investment	.0952702	.0553629	0.085***
Debt repayment	-.1493371	.0684451	0.029**
House purchase	.3279974	.0598329	0.000*
Wedding and funeral expenses	-.487814	.1470385	0.001*
Study	-.340406	.0698043	0.000*
Medical	-.6211345	.073254	0.000*
Consumption	-.7602101	.0650108	0.000*
Food consumption	-2.010921	.2748349	0.000*
Durable goods	-.2999517	.0891046	0.001*
Investment in water	-.8433956	.1864945	0.000*
Investment in sanitation	-.621977	.1621224	0.000*
Other	.3497654	.0761785	0.000*
constant	9.197597	.0731187	0.000*

* Statistically significant at 99% confident level

** Statistically significant at 95% confident level

*** Statistically significant at 90% confident level

6.4.2 Results from model 3

When looking at the regression we can see that there are many insignificant variables, including variables that we might have expected to have influence on the loan value, factors of production

such as total income, household's value, total living area and credit factors like savings are all statistically insignificant for both years except total living area in 2006. This gives us the assumption that these variables are not the ones that are affecting financial institutions' decisions of loan making. This raises the question what are then the main variables or cause for financial institutions to lend. When looking at the year 2006 we see that the variables poor and agrarian households are significant with 90% confident level (poor) and 95% confident level (agrarian household) and the irrigation type is significant as well while the dummy variables that are representing why households borrowed are largely insignificant.

Households located in poor areas were in 2006 receiving 6,29% higher loans than households located in non-poor areas, along with this agrarian households were receiving 7,38% higher loans than non-agrarian households. This might explain why income, households values, savings and living area are not significant, the Vietnamese government was during this time trying to offer rural households in poor and/or difficult areas better access to credit, through policy changes and micro credit programs in order to help them move out of poverty.

When looking at the division between production factors of irrigation type, areas with gravity irrigation production are receiving considerable higher loan amount or 12,3-27,03% higher amount than the other irrigation types (pump, manually or no irrigation). When looking at the result in 2006 there seems to be some policy in the lending procedures which could be summarized as the financial institutions are lending to poor areas and agrarian areas as previously mentioned. These results do not come as a surprise after viewing the results from the two previous models for the year 2008, where we could see a decrease in income inequality between poor and non-poor areas as well as a decrease in the gap of household's value.

What is surprising is that the lending pattern does not persist between the years. In 2008 we are not able to say with any significance that financial institutions are lending more to poor or non-poor areas, or if they are rather lending to agrarian or non-agrarian households. The lending decision seems to be more decided on credit factors such as what person is doing with the loan, interest rates of the loan and how the households has paid of previous loans, which is a satisfying approach in many perspectives, however when viewing what investments are receiving the highest loan amounts it raises some doubts. Investments in houses are receiving the highest loan amount (after the variable others) or 32,79% higher amount than production capital (reference group) while investment in water and sanitation are receiving 84,34% and 62,19% less than

production capital. This should be worrying since water is vital for agrarian production and sanitation is at great importance for households living standards.

The changes from 2006 to 2008 are great when looking at the access to loans, in 2006 there seem to be a policy regarding lending with focus more on lending households located in areas classified as poor and households that are working in agriculture. That seems to change in 2008, then there are no indications that financial institutions are focusing on lending poorer areas or agrarian households, the lending seems to be more randomly decided which by itself does not necessarily need to be considered a problem, what is troubling is that there is no indication that financial institutions are evaluating who is best suited to have loans by focusing on evaluating households income, house value, living area etc. like is common by financial institution around the developed world. The only variables that have influence on loan amount are the interest rates value and the history of payment. This should be worrying, if financial institutions are not lending any more to poor areas and agrarian areas it is likely that the inequality will start to rise again. Given these results we are not able to accept hypothesis 3, since there is no significance in lending characteristics in the year 2008 we cannot say with any certainty that rural households in agrarian and region classified as poor have been experience rise in loan value between 2006 and 2008.

6.5 Summary of results

When relating these results back to the research questions put forward in this thesis, we are able to say that there has been a reduction of income inequality in Vietnam between the two chosen years, from 2006 to 2008 we saw that the gap between income for poor areas and non-poor areas was decreased by 5,14%, a fairly impressive results but it is important to note that the income inequality is still high, with poor areas having 63,29% lower income then non-poor areas in 2008. If the government of Vietnam wants to fight against inequality they must make sure that poor areas and agrarian areas have sufficient access to credit in order to continue their development. Thus, it is important for the Vietnamese government to continue helping the poorer regions, they have managed to help through micro credit programs and policies stimulating access to credit for poor rural households. However, they need to note that these programs are not the sole solution to decrease inequality in the country, they are helping but they are perhaps not doing as much as they previously thought. The problem with micro credit (as well as other

credit) is that it is difficult to make sure that the obtained credit is used for the projected it was intended for, instead these loans in many cases seem to be going into increased consumption for the household. Supervision of the usage of credit is a factor that needs improvement especially for micro credit programs where the incentive for reimbursement is not as high as for commercial banks.

Along with this we see that the lending pattern does not persist between the chosen years, that as well as all the obligations that households need to fulfill in order to obtain loans from financial institutions such as collateral, financial capacity etc. or micro credit organizations (credit groups, financial capacity etc.) it is not possible to say with any significance that households have equal access to rural credit.

7. Conclusion

This thesis examined the effects on rural household's access to credit and its impact on income and income inequality, as well as compared households under the Vietnamese poverty line with others in respect to access to credit and its impact on income. It did not come as a surprise that households that invest in human capital and their properties do experience increase in their income compared to the ones who do not invest, with households that have gravity or pump irrigation technology having significantly higher income than the ones only using manual labor. What was interesting is that investment in households characteristics were giving considerable higher return than investment in human capital, along with that the gap of income inequality between areas classified as poor and others decreased by 5,14% between 2006 and 2008. Although this sounds like a positive development it is important to note that despite this decrease there is still a great differences between the two areas with poor areas in 2008 receiving 63,30% lower income than others, confirming Fritzen (2002) study where he shows the effects of growth on inequality. This should be a great concern for the Vietnamese government since approximately 70% of the population is living in rural areas.

Along with this it was shown that the value of households in agrarian areas and areas classified as poor was lower than households in other areas. However the gap between the areas was perhaps not as great as one might suspect indicating positive changes for rural households between the years, because of this decrease one might expect that there had been an increase in loan value for agrarian and poor households between 2006 and 2008. Our regression showed that in 2006 households classified as poor were receiving 6,29% higher loans than others non-poor areas and agrarian households were receiving 7,38% higher loan than non-agrarian. After viewing the decrease in income inequality and household's value from 2006 to 2008 this is perhaps not surprising, households seem to be using their loans to invest in production and household. What is troublesome is that the lending pattern does not persist between the years, in 2008 it is not possible to say with any significance that financial institutions are lending more to areas classified as poor or non-poor areas, or agrarian or non-agrarian areas. After viewing these results as well as viewing the obligations that households need to fulfill from financial institutions (collateral, financial capacity etc.) and other micro credit organizations (credit

groups, information regarding loan usage etc.) in order to obtain loans it is difficult to state that households have equal access to rural credit. This is in-line with previous research by Cuong (2008) where he showed that non-poor households are receiving higher amounts of credit than the poor areas.

There was a lot of progress made in 2006 which was apparent in 2008 however it seems that financial institutions are moving back to previous pattern making it more difficult for households in poor areas to obtain loans. It is important for the Vietnamese government to continue stimulating access to credit for rural households through policies and micro credit programs, it is however important to realize that these are not the sole solutions in order to decrease inequality in the country, there is for example the question of how extensive is the return rate of the micro credit programs, something that will be left for future researchers to discover.

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9. Appendix

Appendix table 1.

Questions 1

How does the bank act against non-performing loans?

- a. For households in poor areas
- b. For households in non-poor areas

Answer

AgriBank has different solutions for each specified causes that lead to non-performing loans, as:

- If the causes are objective such as natural disaster or diseases, AgriBank may consider restructuring loan term, rescheduling the loan, frozen the loan.
- If the causes are subjective, AgriBank will sue the customers and dispose the collaterals.

Questions 2

What factors of a household are evaluated in order to decide how much loan a household can get?

Answer

Factors of a household that Agribank evaluates to decide how much loan a household can get are:

- The need of capital (Determined on revenue cost, working capital turnover ratio)
- Owner's capital.
- Other capitals.
- Limit of collateral loans or non-collateral loans.

Questions 3

Do you monitor what households do with their loan?

Answer

AgriBank always monitors how households do with their loans by:

- Frequently evaluating the progress and the effectiveness of the capital borrowing plan and project
- Frequently re-checking how household use the loans differ from the agreed purposes on the contract.
- Illustrating the financial condition and status of the customers or the projects.
- Examining the payment of principal, fees and interest.
- Examining the status of the collaterals (Depreciation, reduce in price...) and re-defining the price of the collaterals.
- Defining the unforeseen risks.

Questions 4

Are there any differences in processes for loans for households who are referred to as poor and households who are not poor

- a. Do they need to fulfill the same obligation?

Answer

Agribank has the same process for loans for poor household and not-poor household. The process follows 6 steps:

- Evaluating the civil legal capacity and the civil act capacity of the households.
- Evaluating the purpose of the borrowing purposes.
- Evaluating the financial capacity of the households.
- Evaluating the feasibility and the viability of the capital borrowing project and plan.
- Evaluating the collaterals.
- Reviewing Agribank's benefits.

Questions 5

Does the structure of the household matter regarding loan application?

- a. That is size of the household (household members)
- b. Size of the house
- c. Age of head of the house
- d. Education of the households head
- e. Anything else

Answer

Structure factors of house hold influence the loan application are:

- The size of the household.
- The size of smaller group within the household
- The number of members who currently borrowing capital.
- The number of smaller groups.

Questions 6

How important Is social capital for household, that is credit groups, are poor households able to obtain loans without being a part of a credit group?

- a. What about non-poor household?

Answer

AgriBank doesn't have different policies for customers who are in poor and those are not. Any customers that can satisfy the capital borrowing requirements of Agribank can borrow.

Questions 7

What is the main cause for rejecting loan application?

- a. What condition is not fulfilled?

Answer

Agribank only rejects loan application when customers can not satisfy the capital borrowing requirements of Agribank.

Appendix table 2.

Time	Activities	Address	Responsible persons	Note
Saturday 11 Feb	Arrival			
Sunday 12 Feb				
12:00 – 17:00	Lunch and Introduction of research stay	CWD Hotel 20 Thuy Khue-Tay Ho	Magnus Andersson	Meeting
18:00-20:00	Welcome Dinner			
Monday 13 Feb				
10:00-12:00	Meeting with IPSARD	16 Thuy Khue-Tay Ho	Magnus Andersson/ Tran Cong Thang	Meeting
Tuesday 14 Feb				
10:00-11:00	<i>IRC, Mr Nguyen Viet Cuong</i>	Room 1701 cland tower 156 Xa Dan 2,Dong Da	MA&Hongye, David and Spencer	Meeting
14:00-16:00	<i>Visit at CIEM</i>	68 Phan Dinh Phung Street	Mr. Ngo Minh Tuan	Meeting
16:00-19:00	Reflections	CWD Hotel 20 Thuy Khue-Tay Ho	Magnus Andersson	Meeting
Wednesday 15 Feb				
16:00-17:00	Vietnam Academy for Policy and Development	Room 204, 65 Van Mieu	Dr. Dao Hung	Meeting
Thursday 16 Feb				
	Meeting with Dr Tam	POSTPONED		
Friday 17 Feb				
09:30-12:00	Vietnam Economics University	207 Giai Phong Road, Hai Ba Trung District	Dr. Vu Thi Minh	Meeting
Saturday 18 Feb				
14:30-15:30	Supervision Meeting	CWD Hotel 20 Thuy Khue-Tay Ho	Magnus Andersson	Meeting
Monday 20 Feb				
10:00-17:00	IPSARD			Self Study
Tuesday 21 Feb				
14:00-15:00	Vietnam Bank for Social Policy	CC5 , Ban Dao Linh Dam, Hoang Mai, Hanoi, Vietnam	Nguyen Viet Cuong (IRC)	Interview
Wednesday 22 Feb				
10:00-17:00	Work t World Bank library			Self Study
Thursday 23 Feb				
10:00-11:00	Dr Tam		POSTPONED	Data Collection/discussion
13:00- 18:00	Working from home			
Friday 24 Feb				
10:00-17:00	Working at IPSAR			
Monday 27 Feb				
	Working at Home			Self study
Tuesday 28 Feb				
10:00-17:00	Work at IPSARD	16 Thuy Khue-Tay Ho	Ms. Thanh Huyen	Self Study
Wednesday 29 Feb				
14:00-15:00	Meeting with ms Tran from IPSARD	IPSARD	Ms. Thanh Huyen	Discussion
Friday 02 Mar				
14:30-15:30	Meeting with Vietnam Woman's Union	20 Thuy Khue		
16:00- 17:00	Meeting with Ms Tam rural credit expert	Hich thech cafee	David Ellertsson	Interview/discussion

Appendix table 3. Correlation matrix, Model 1 year 2006.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Log total income	1,00												
Total land area	0,06	1,00											
Education expenditures	0,36	0,00	1,00										
Education expenditures2	0,23	0,02	0,85	1,00									
Health care expenditures	0,19	0,02	0,04	0,04	1,00								
Health care expenditures2	0,08	0,01	0,00	0,00	0,76	1,00							
Householdsize	0,34	0,00	0,17	0,08	0,05	0,02	1,00						
Total living area	-0,06	0,03	-0,04	-0,02	0,00	0,03	-0,02	1,00					
Total living area2	-0,04	0,01	-0,03	-0,02	0,01	0,04	-0,01	0,91	1,00				
Gravity technology	-0,01	0,00	-0,02	-0,02	-0,01	-0,01	-0,02	0,11	0,06	1,00			
Pump technology	-0,03	-0,11	0,04	0,03	0,00	0,00	0,03	-0,15	-0,10	-0,61	1,00		
Manual technology	-0,02	-0,08	-0,01	-0,02	-0,03	-0,02	0,00	0,00	0,03	-0,29	-0,25	1,00	
Classified as poor area	-0,35	-0,03	-0,14	-0,07	-0,05	0,01	0,04	0,00	0,01	0,00	0,04	-0,02	1,00

Appendix table 4. Correlation matrix, Model 1 year 2008.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Log total income	1,00												
Total land area	0,05	1,00											
Education expenditures	0,30	-0,01	1,00										
Education expenditures2	0,11	0,00	0,66	1,00									
Health care expenditures	0,15	0,02	0,03	0,01	1,00								
Health care expenditures2	0,05	0,01	0,00	0,00	0,78	1,00							
Householdsize	0,36	0,01	0,15	0,04	0,06	0,03	1,00						
Total living area	0,40	0,04	0,16	0,06	0,09	0,04	0,17	1,00					
Total living area2	0,30	0,02	0,12	0,04	0,08	0,04	0,12	0,90	1,00				
Gravity technology	0,03	0,00	-0,01	-0,01	-0,01	-0,01	-0,02	0,01	0,01	1,00			
Pump technology	-0,05	-0,14	0,01	-0,01	-0,01	0,00	0,04	-0,02	-0,01	-0,65	1,00		
Manual technology	-0,05	-0,08	0,02	0,03	-0,01	0,00	-0,02	-0,04	-0,03	-0,26	-0,24	1,00	
Classified as poor area	-0,36	-0,03	-0,13	-0,03	-0,04	-0,01	0,02	-0,20	-0,13	-0,04	0,06	0,00	1,00

Appendix table 5. Correlation matrix, Model 2 year 2006.

Variable	(1)																		
Log Households value	1,00																		
Total Income	0,47	1,00	(3)																
Total land area	0,02	0,04	1,00	(4)															
Total living area	-0,14	-0,06	0,32	1,00	(5)														
Total living area2	-0,10	-0,04	0,01	0,91	1,00	(6)													
Health care expenditure	0,15	0,17	0,02	0,00	0,01	1,00	(7)												
Health care expenditures2	0,04	0,09	0,01	0,03	0,04	0,76	1,00	(8)											
Education expenditures	0,33	0,32	0,00	-0,04	-0,03	0,04	0,00	1,00	(9)										
Education expenditures2	0,20	0,25	0,02	-0,02	-0,02	0,04	0,00	0,85	1,00	(10)									
Underemployment	0,25	0,25	-0,02	-0,04	-0,03	0,08	0,03	0,17	0,12	1,00	(11)								
Underemployment2	0,08	0,08	-0,01	-0,02	-0,01	0,10	0,05	0,04	0,04	0,72	1,00	(12)							
Non agrarian household	0,07	-0,01	-0,09	-0,10	-0,06	0,00	0,01	0,01	0,00	0,01	0,01	1,00	(13)						
Classified as poor area	-0,31	-0,20	-0,03	0,00	0,01	-0,05	0,01	-0,14	-0,07	-0,12	-0,02	-0,01	1,00	(14)					
Gravity technology	-0,03	-0,01	0,00	0,11	0,06	-0,01	-0,01	-0,02	-0,02	0,01	0,01	-0,01	0,00	1,00	(15)				
Pump technology	0,02	-0,02	-0,11	-0,15	-0,10	0,00	0,00	0,04	0,03	0,01	0,00	0,04	0,04	-0,61	1,00	(16)			
Manual technology	-0,03	-0,03	-0,08	0,00	0,03	-0,03	-0,02	-0,01	-0,02	-0,01	-0,01	0,04	-0,02	0,29	-0,25	1,00			

Appendix table 6. Correlation matrix, Model 2 year 2008.

Variable	(1)																		
Log Households value	1,00																		
Total Income	0,39	1,00	(3)																
Total land area	0,03	0,04	1,00	(4)															
Total living area	0,56	0,31	0,04	1,00	(5)														
Total living area2	0,44	0,27	0,02	0,90	1,00	(6)													
Health care expenditure	0,11	0,14	0,02	0,09	0,08	1,00	(7)												
Health care expenditures2	0,03	0,06	0,01	0,04	0,04	0,78	1,00	(8)											
Education expenditures	0,27	0,21	-0,01	0,16	0,12	0,03	0,00	1,00	(9)										
Education expenditures2	0,09	0,10	0,00	0,06	0,04	0,01	0,00	0,66	1,00	(10)									
Underemployment	-0,01	-0,01	-0,02	0,00	0,01	-0,01	0,00	-0,02	-0,01	1,00	(11)								
Underemployment2	0,01	0,00	-0,01	0,02	0,02	0,00	0,00	-0,01	0,00	0,84	1,00	(12)							
Non agrarian household	0,00	-0,01	-0,06	-0,03	-0,03	0,02	0,02	-0,02	-0,02	0,01	0,01	1,00	(13)						
Classified as poor area	-0,34	-0,17	-0,03	-0,20	-0,13	-0,04	-0,01	-0,13	-0,03	0,02	0,01	0,00	1,00	(14)					
Gravity technology	0,01	0,01	0,00	0,01	0,01	-0,01	-0,01	-0,01	-0,01	0,02	0,03	0,02	-0,04	1,00	(15)				
Pump technology	0,00	-0,04	-0,14	-0,01	-0,01	-0,01	0,00	0,01	-0,01	-0,01	-0,02	0,01	0,06	-0,65	1,00	(16)			
Manual technology	0,02	-0,03	-0,08	-0,04	-0,03	-0,01	0,00	0,02	0,03	0,01	0,00	0,04	0,00	-0,26	-0,24	1,00			

