SAVINGS AND CAPITAL FORMATION IN DEVELOPING ECONOMIES: EVIDENCE FROM VIETNAM

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Abbreviations

2SLS	two-stage least-squares
CIEM	Central Institute for Economic Management
DSO	Department Statistics Office
FE	Fixed Effects
GMM	Generalized Method of Moments
GSO	General Statistics Office
ILSSA	Institute for Labor Science and Social Affairs
IPSARD	Institute of Policy and Strategy for Agriculture and Rural Development
IV	Instrumental Variable
LPE	Gibrat's Law of Proportion Effect
OLS	Ordinary Least Squared
PCFs	People's Credit Fund
PCI	Provincial Competitiveness Index
RE	Random Effects
ROSCAs	Rotating Savings and Credit Associations
SBV	State Bank of Vietnam
UNFPA	United Nations Population Fund
USAID	U.S. Agency for International Development
VARHS	Vietnam Access to Resources Household Survey
VBA	Vietnam Bank for Agriculture and Rural Development
VBP	Vietnam Bank for the Poor
VCCI	Vietnamese Chamber of Commerce and Industry
VND	Vietnamese Dong (Vietnamese currency)
WB	World Bank

1. INTRODUCTION

1.1. Research problem

Economic development is always of a major concern for researchers as well as for the policy makers of this world. Savings and productive capital formation are regarded important sources for growth in the theoretical literature, and empirical studies indicate the steady–state impacts of savings on capital formation, investment and growth.[1] Finding answers to questions relating to savings and capital formation such as (i) what are the determinants of savings (ii) how to increase the resources available for productive capital formation and (iii) how productive capital formation is affected by internal and external factors, has always been a challenge for researchers. This dissertation will focus on the above issues in three specific directions. At first, we will examine household savings and productive capital formation with the exposure to negative shocks. Differences in household behavior towards their savings and productive capital formation can be affected by internal and external factors and with a narrow scope we investigate these differences under the influence of the social network and the insurance system. Second, the focus will be on the channels and the usage of financial institutions that the households employ for their monetary savings. Deposits in saving mechanisms are considered a source for investment and we will seek to answer whether household choices regarding the usage of different saving mechanisms, such as cash hoarding, informal saving intermediaries, and formal saving intermediaries are affected by their precautionary saving motive and given insurance coverage. Third, we will examine how entrepreneurial capital is formed. In the literature, entrepreneurship

[1] Barro and Sala-i-Martin (1995), Robelo (1991), Blomstrom *et al*. (1996), Chow (1993), Coen and Hickman (1980), Denison (1980), Eisner (1980), Papanek (1973), Singh (2010)

plays an important role, and fostering entrepreneurship is the key to economic growth, innovations and market development in developed, transitional, and developing economies (Aidis, 2005). Furthermore, entrepreneurship is shown to be a crucial source of innovative potential and job formation (Johnson and Loveman, 1995). The formation of entrepreneurial capital will be investigated in two dimensions: physical capital and human capital, and the growth of these two dimensions, under the influence of the institutional environment and the entrepreneur's education, will be the main theme of this step.

This research on savings and capital formation will contribute to the literature. We empirically investigate the case of Vietnam and considered it an interesting example for developing economies in general.

As a South-East Asian country, Vietnam is located favorably to connect with the world economy. After the unification of North and South in 1975, Vietnam continued being a centrally planned economy, which is, in restrospective, considered the main reason for the economic stagnation. The turning point in the modern economic history of Vietnam was 1986 when the government launched the *doi moi,* or "the innovation program". With the implementation of the program, the private sector was allowed to take part in entrepreneurship. The establishment and development of private enterprises was permitted and the household business was clearly defined regarding its legal, organizational, and operational status. The results were remarkable. The 1990 real GDP was about 20 billion USD (constant 2005 USD), and this figure doubled until 2000. Until 2010, it had increased to nearly 80 billion USD. In 2010 the GDP per capita (PPP, constant 2005 international USD) reached USD 3,000, three times higher than that in 1990. Other economic indicators such as the GDP growth rate, the life expectancy, the poverty rate, etc. improved sharply. The innovation program has liberated the economy,

and private entrepreneurship, which contributes to the development process, became possible. In 1990, there were only about 100 private enterprises and some 850,000 household enterprises were in operation. These numbers increased to 100,000 private firms and more than 2.4 million household businesses in 2000. The private sector accounted for 90% of newly created jobs and contributed 42% of GDP, about 3% more than the share of the state sector. In 2011, the number of enterprises reached the mark of 320,000 establishments, of which 96% were private enterprises, 1% were state-owned enterprises, and the rest were foreign companies. Most employment was found in the private sector (61%); 22% and 15% of jobs were offered by foreign and state enterprises, respectively.[2] The significant changes of the economy and the components of households and entrepreneurship motivate our researches on household saving behavior as well as on firm performance in Vietnam. In this dissertation, we will try to find answers to the research question, which is generally stated as: *Which factors determine savings and capital formation in a developing economy like Vietnam?*

First, we focus on households, which are considered the smallest cells of the economy. Here we investigate household savings and productive capital formation.

The relation between savings and growth of a nation's income has been largely discussed in the literature. As a share of national savings, household savings contribute to investment, which in turn promotes economic growth (Chow, 1993; Blomstrom *et al*., 1996). Studying household saving behavior is of great interest for researchers in this area. On the macro level, savings are considered a nationwide and aggregated variable and it is investigated how it interacts with other macro factors such as human capital, fixed capital, technological issues, or institutional factors. On the micro level, household saving behavior has been investigated largely and often exclusively in developed and

[2] GSO (2012), World bank data (2013)

transitional economies due to data availability. Studies are based on three main approaches towards the traditional theories of savings. These approaches are expressed by the disposable income hypothesis, the permanent income hypothesis, and the life-cycle hypothesis. Theoretically, households save for many reasons such as, precaution, retirement, interests, future expenditure, sense of independence, business, bequest, etc. Among saving motives, the precautionary motive is considered highly important in developing economies as the national insurance system is underdeveloped and does not cover the whole population. Most empirical studies focus on the determinants of household savings. Two categories of determining factors are the household head's characteristics and the household's characteristics. Within the household's characteristics, the most frequent-used explanatory variable is wealth and/or income (Ramanathan, 1968; Horika and Wan, 2007; Newman *et al.*, 2007). A positive relationship between the saving rate and wealth and/or income was found. Other variables are family size (Newman *et al.*, 2007), income source (Kelly and Williamson, 1968; Pailwar *et al.*, 2010), dependency ratio (Kelly and Williamson, 1968; Kraay, 2000; Pailwar *et al.*, 2010), or location of the household (Kelly and Williamson, 1968). Within the household head's characteristics, education of the household head appeared frequently as an explanatory variable in studies and it yielded either contradicting results (Kelly and Williamson, 1968) or no effect could be proven (Newman *et al.*, 2007, Pailwar *et al.*, 2010). Other characteristics of the household head used are age, gender, the status of membership of a social network, etc.[3] Aside from these factors, the social environment and government assistance, which receive little attention by researchers, can be used as substitutes for insurances. This is the first motivation for our study on household savings. The second motivation is that most studies so far employ

[3] See Kelly and Williamson (1968), Orbeta (2006), Newman *et al.* (2008), Kraay (2000), Pailwar *et al.* (2010), etc

the saving rate as the dependent variable. No study looks explicitly at both, liquid assets and productive capital formation as dependent variables. Resulting from these two motivations, we will, in the first part, investigate the role the social network and insurance play and how they affect household saving behavior and productive capital formation in rural Vietnam. The general research question motivating this part of the research concentrates on the role of social network and insurance. It can be formulated as follows: *Do social networks and insurance impact on household savings and productive capital formation in rural Vietnam?*

Then, continuing with the issue of household savings, in the next part we focus on the saving mechanisms which households can employ to store their savings according to their different saving motives.

Household saving behavior is also distinguished by different household decisions regarding which saving mechanism to employ. While in developed economies savings are to a large extent stored in the financial system, household savings in developing countries are largely stored at home. The high rate of cash hoarding may result in adverse impacts on economic development. The selection of where to store savings can vary from hoarding over formal financial institutions to informal financial intermediaries. In developing economies, chances to access to the formal financial system are not equally distributed among the population. Low-income households face many barriers on the way to access formal financial intermediaries such as complicated and unclear procedures, travelling cost to institutions, impersonal and unfriendly service, or high opening balance requirements and minimum deposits (ILO, 2007). So, low-income households tend to save money and substitutes as e.g. jewelry, at home rather than depositing to financial intermediaries. They do this, even though cash hoarding is insecure and does not yield any returns (Banerjee and Duflo, 2007).

As mentioned above, in developing economies the precautionary motive is considered to be dominant in case the household income is low and fluctuating. This motive requires highly liquid savings. Cash hoarding fulfils this liquidity requirements perfectly. The implementation of an insurance system can decrease household vulnerability towards risks and uncertainty and insurance can serve as a substitute for precautionary savings (Hubbard *et al.*, 1994; 1995; Kotlikoff, 1979; Chou *et al.*, 2003; 2004). However, the selection between cash hoarding or financial intermediaries seems to attract only minor attention in the literature and little empirical research in this field has been conducted so far. Carpenter and Jensen (2002) examine the household selection of saving mechanisms (banks and *bisi*) in Pakistan. Household income was found to have a positive effect on the probability to deposit savings in banks and also numeracy and literacy resulted to be important determinants. Other variables such as the number of female adults, the occupation and the location of households (in urban or rural areas) can affect household decisions regarding how and where to save. Newman *et al.* (2012) formulate a model on the basis of the study by Fafchmps *et al.* (1998). By means of this model they examine the role the social network plays in determining household savings. Using panel data constructed from household surveys in 2006, 2008 and 2010 in Vietnam, they found out that the membership of a high quality network has a positive and significant impact on the saving level of households. In detail, the participation of a high quality network can foster savings in formal financial intermediaries and cash hoarding. However, the membership of a high quality network has a negative marginal effect on savings in informal saving intermediaries. The study also found that the participation in a low quality network has no effect on household saving levels in all cases.

In order to contribute to this string of literature, our second paper will seek to answer the research question: *Do the short-term precautionary motive and insurance influence the selection among different saving mechanisms available to rural Vietnamese households*?

This empirical study will examine the effects that the short-term precautionary motive and insurance have on household decisions in two dimensions: the probability to join financial institutions as a client and the total amount of money that households deposit to financial institutions.

Last but not least, the process of capital formation through entrepreneurship, which is running parallel with savings and capital formation in households, will be examined. The influence the institutional environment and the human capital of the entrepreneur have on this process will be focused on.

The capital that is formed through entrepreneurship is a) physical capital and b) human capital. The growth of these types of capital (firm growth) is at the core of the development process and is a main concern for policy makers. Gibrat's Law of Proportion Effect (LPE) is considered the seminal contribution within firm dynamic theories. It defines that the growth of firms is a randomly distributed model. Researchers found that this law does not hold in case many factors determine the growth of firms. When investigating micro and small firms in southern Africa, McPherson (1996) finds that firm size and firm age negatively affect firm growth. Other factors influencing firm growth can be sector, location, and socio-economic variables. Mead and Liedholm (1998) use data of micro and small firms in Dominica and five African countries (Botswana, Kenya, Malawi, Swaziland, and Zimbabwe) and find that firm age, firm size and female entrepreneurs have negative effects on firm growth. The study of Biesebroeck (2005) finds superior performance of large firms in the manufacturing

sector in sub-Saharan African countries and that the aggregate productivity growth is largely dependent on the performance of large firms.

Externalities can affect the capital formation of firms. Such factors can be infrastructure, nature and the enforcement of business regulations, property rights, and the openness of public resources. All are considered important determinants of firm growth (Aterido *et al.*, 2011). Sleuwaegen and Goedhuys (2002) also find that firm size and firm age negatively affect firm growth. They define obstacles of firm growth such as regulatory barriers, market constraints, infrastructure, and financial constraints. The study of Fisman and Svensson (2007) investigates the role of bribery payments and taxes on firm growth. These two environmental factors are found to have negative impacts on firm growth. The study finds that the negative influence of corruption is more severe to firm performance than that of taxation. Corruption is also considered an obstacle to firm growth in the work of Honorati and Mengistae (2007). They study the growth of small-scale manufacturing firms in India. In this study, they state four institutional factors including corruption, labor regulation, access to finance, and the quality of the power supply as obstacles to business operations and growth. Using a large sample of 1,500 firms, Hallward-Driemeier *et al.* (2006) emphasize the importance of the investment climate for firm performance in China. They find that the technological infrastructure, the governmental regulatory burden, and corruption have a major influence on firm growth. Other institutional obstacles to firm growth can be defined as power outages and customs delays (Dollar *et al*., 2005).

The scarcity of firm data may be the major reason for the limited amount of literature on firm growth in Vietnam. In one study, Hansen *et al.* (2009) use 300 incumbent firms, whose corresponding data comes from three overlapping surveys which have been conducted between 1990 and 2000. They investigate the impacts of government

assistance and other interactions with the state sector on the long-term performance of small and medium sized manufacturing enterprises (SME) in Vietnam. They find that firm characteristics such as size, ownership, and location determine the growth of firms. Receiving initial government assistance or being a firm which counts the state sector as a customer have positive impacts on firm growth.

Few studies have concentrated on impacts of human capital on firm growth and the results seem to be inconclusive. McPherson (1996) finds that human capital has a positive relationship with firm growth. However, two other studies (Hansen *et al.,*2009; and Tuan and Yoshi, 2009) yield different conclusions, namely that augmented human capital of entrepreneurs has no impact on firm growth.

In this part, we will answer the research question relating to the impact the business environment and human capital have on firm capital formation. It is stated as follows: *Do institutional factors and the human capital of the entrepreneur affect capital formation through entrepreneurship in Vietnam?*

1.2. Research focus, design, and major results

The remaining chapters of this dissertation are as follows:

In chapter 2 or the first paper, we investigate the role of the social network nexus and the insurance nexus in determining household savings and productive capital formation in stocks and flows in rural Vietnam. We, therefore, look at more than monetary savings. We consider the ways of forming productive capital and the asset structure in terms of both, flows and stocks. There are two pillars in this research. The first pillar is monetary savings, which fulfills the need to hold a highly liquid and flexible asset, and the second pillar is real productive capital formation in rural households. In each pillar, we investigate the impacts of the two nexuses on household savings and productive capital formation. The first nexus is the social network and the assistance, which

composes the strength of a household's social network and support system, membership in organizations, and assistance in the shape of visits from consultants (professional workers employed by the government). The second nexus is the insurance nexus (availability and affordability of insurance). These two aspects are examined under the influence of negative shocks, which are the major concern of rural households. Basing on the exposure to negative shocks, rural households are classified into "ex ante" (without negative shocks) and "ex post" (with negative shocks) groups.

This paper uses data from a household survey of rural areas in Vietnam, namely VARHS08 (Vietnam Access to Resources Household Survey: Characteristics of the Vietnamese Rural Economy, 2008 Survey). The dataset contains a sample of 3,227 households in rural Vietnam. With the plane of cross-sectional data, the linear instrumental-variables estimation is employed for the quantitative analysis. This paper takes into account the endogeneity of all concerned variables of the social network nexus and the insurance nexus. Post-estimation tests have been done to ensure that results are consistent.

With regard to stocks, we found that the role of the supporter variable is more important than the roles of organization and assistance variables. The number of supporters positively relates to liquid assets but it has negative impacts on the rate of productive assets in both "ex ante" and "ex post" households. While membership of an organization has no impact on capital formation, the number of non-demanded visits (assistance) has impacts in "ex ante" households and no impacts in "ex post" households. The analysis shows that the *social network nexus* works in "ex ante" households rather than in "ex post" households. The insurance works as a precautionary method when we consider the liquid assets of households, and the results are identical in both "ex ante" and "ex post" households: Households with insurance accumulate a

smaller portion of monetary assets compared to those without insurance. The results robustly indicate that there is a strong, positive, and significant relationship between insurance and household productive assets. After comparing the two nexuses, we can conclude that the *insurance nexus* seems to be dominant in comparison with the *social network nexus* in both household groups: "ex ante" and "ex post".

With regard to flows, the role of *the social network nexus* is significant in case of the government assistance as this variable has negative impacts on "ex ante" households. The number of supporters and membership of organizations seems to have little impacts on household savings and productive capital formation. The study confirms the precautionary view, stating that joining an insurance scheme will reduce the rates of both, liquid savings and productive capital of households. Insurance is found to have statistically significant impacts in all cases except for the flow of productive assets. When comparing the role of both nexus, the results indicate that the insurance nexus is also dominant in household savings and productive asset formation in both groups: "ex ante" and "ex post".

Chapter three will present the second paper, which focuses on the impact of the short-term precautionary motive and insurance on household selection of saving mechanisms in rural Vietnam. Using the same dataset as for the first paper, this study quantitatively examines the theme under two dimensions: the probability of households to join saving intermediaries, and the contribution of households to saving intermediaries. In order to answer the respective research question, we focus on four hypotheses. The first hypothesis in this part (*hypothesis 3.1*) states that households primarily motivated to save for short-term precautionary reasons have a higher probability to save at home. The second hypothesis (*hypothesis 3.2*) proposes that insurance serves as a substitute for the short-term precautionary motive. In other words, the number of insurance contracts that

a household signed and holds will increase the probability of that household to deposit money to saving intermediaries. The third hypothesis (*hypothesis 3.3*) assumes negative impacts of the short-term precautionary motive on household contributions to saving intermediaries. The last hypothesis in this chapter (*hypothesis 3.4*) proposes that a higher number of insurance contracts will lead to a bigger amount of savings that a household deposits to saving intermediaries.

Because the dependent variable contains a left-censored value of zero, the Tobit model is normally used for estimates (Cameron and Trivedi, 2010). However, we use the two-part model instead as the Tobit model often faces the weaknesses of normality and heteroskedasticity. The first part of the two-part model is a binary outcome model, which estimates the probability of household participation to formal and informal saving intermediaries. The second part is a linear model, which estimates the household contribution to formal and informal saving intermediaries in rural Vietnam. In the second part, we use both the normal OLS and the linear IV estimations.

The dataset contains 1432 households which have monetary savings either in the form of cash hoarding or in the form of deposits in saving intermediaries. 86.3% of households exert cash hoarding as the main mechanism of their monetary savings. The difference between formal and informal participants is not significant. Savings motives are classified into the short-term precautionary motive (around 44% of total households) and the long-term motive (around 56% of total households).

The impact of the short-term precautionary motive is proven in the first part of the econometric model. The results indicate that the short-term precautionary motive may generally reduce the probability of households to deposit to saving intermediaries in rural Vietnam. In the formal and informal groups, the coefficients of the short-term motive are negative and significant. The estimation results have confirmed *hypothesis*

3.1 on the role the short-term precautionary motive plays for household selections regarding saving mechanisms in rural Vietnam. The first part of our two-part model also responds to *hypothesis 3.2*. The more types of insurance households signed and hold, the higher the probability of being a client of saving intermediaries. This result is consistent with the precautionary view, stating that the precautionary selection will be reduced if an insurance system is implemented. The second part of the two-part model tests the last two hypotheses. This sub-model is a combination of OLS and linear IV estimations. The significance levels of the two concerned variables are lower as compared to the case where the participation probability is tested. *Hypothesis 3.3* is confirmed partially since the short-term precautionary motive is found to have negative impacts within formal participants, but not having any statistical effects within informal particpants and when considering all participants. Refering to *hypothesis 3.4*, no evidence for any impact of the insurance variable on the contribution of households to saving intermediaries can be found.

In chapter four, we consider capital formation in enterprises. Firm growth as a specific case of firm capital formation is of an interest here. In this chapter, we investigate the impacts of the institutional environment and the entrepreneur's education on firm growth in Vietnam. Deriving the idea from the theoretical work of Gries and Naude (2011), we form two hyphotheses, which help to answer the respective research question. The first one (*hypothesis 4.1*) states that higher levels of institutional factors will associate with positive growth of firms in the region. The second hypothesis (*hypothesis 4.2*) connects the role of the entrepreneur's education with firm growth, as it states that higher levels of the entrepreneur's education will result in higher growth rates of firms. We use two datasets to examine these issues. The data comes from four main sources. The first one is the annual enterprise census by the GSO, which provides data

at the firm level and which surveys 100% of registered enterprises in Vietnam. The second source is the province-level data from the GSO website. The third one is institutional indicator data coming from the VCCI. The World Bank website is the last source, which provides the GDP deflator to calculate the real growth rate of firm capital. The first dataset is a balanced panel with 37,788 enterprises spanning from 2006 to 2009. The second dataset, which consists of 38,293 enterprises, is also a balanced panel with two points of time (2008 and 2009).

The growth rate of firms is considered in two dimensions: employment growth and capital growth. The capital growth is calculated in real values. Within each growth dimension, enterprises classified by the three sectors, agriculture, industry and service, will be analyzed. The average growth rate of employment offered by firms is around 10%. Firms operating in the industrial sector experienced the highest growth rates. The real growth rate of firm capital is much higher with 20% per year on average. Service firms experienced the highest growth among all sectors. Compared to other developing economies, the rate of entrepreneurs with a university degree is relatively high in Vietnam, accounting for around 72% of total entrepreneurs.

The dynamic model is employed with the advantage that panel data can control for the unobserved heterogeneity within the analysis of firm growth. Since the OLS model could yield inconsistent results in the presence of endogeneity, we employ the system GMM for the panel dataset, and the lagged differences of endogenous variables are included as instruments in different additional moments. When testing *hypothesis 4.1*, we use nine indicators as proxies for the institutional environment. The results confirm empirically that land access, time costs, informal charges, and business support service relate positively to firm growth. That means that higher levels of these institutional indicators will foster the growth of firms. The findings indicate an interesting result,sss

namely that the impacts of institutional factors are dissimilar between employment growth and capital growth as more significant results are found regarding the capital growth of firms.

Our *hypothesis 4.2* is partly proven by the empirical evidence. Unlike other studies, which found no statistically significant evidence of educational effects on firm growth, we find significant impacts of the entrepreneur's education on firm growth in some cases. The positive coefficients of the entrepreneur's education imply that enterprises whose entrepreneurs hold a bachelor degree or a more respected title, will experience higher growth rates than those firms with entrepreneurs holding a title below the bachelor level. Education has larger impacts on the growth of employment than on the growth of capital. Entrepreneurial education is found to have impacts on employment growth of agricultural and service firms as well as on capital growth within service firms. Education does not affect growth rates of industrial firms, neither employment, nor capital growth. Also do capital growth rates of agricultural firms not respond to entrepreneurial education.

Finally, Chapter 5 provides some concluding remarks for the dissertation.

2. HOUSEHOLD SAVINGS AND PRODUCTIVE CAPITAL FORMATION IN RURAL VIETNAM: INSURANCE VS. SOCIAL NETWORK

This chapter is based on the paper "Household savings and productive capital formation in rural Vietnam: insurance and social network" by Gries, T. and Ha, V. D. The paper has been accepted and will be publicized in The Modern Economy (ME). One of its earlier version was presented at the 6th RGS Doctoral Conference in Economics (February 26-28, 2013 at the Ruhr University Bochum).

2.1. Introduction

At the macro level, a major problem in economic development is how to increase the resources available for productive capital formation since productive capital formation and investment have a strong relationship with growth.[4] Hence, the allocation of resources between present and future consumption (savings) is one of the most fundamental economic choices in any economy.

Resources earmarked for investment and economic growth can be increased through more domestic savings. Household savings is one important part of investment.[5] In developing economies, liquid and productive capital formation not only serves economic growth but can also be used for other purposes such as the precautionary

[4] Papanek (1973), Coen and Hickman (1980), Denison (1980), Eisner (1980), Chow (1993), Blomstrom *et al*. (1996)
[5] Hyun *et al*. (1979), Bellone (2008), Ang (2009), Brahmasrene and Jiranyakul (2009), Herwartz and Xu (2009), Esso and Keho (2010)

motive, the life cycle motive, the inter-temporal substitution motive, or the bequest motive.[6] Because the financial market in rural areas is imperfect, these motives may lead to a differentiated saving behavior. Households allocate their capital in a way that fits in best with their respective motives. Unlike in developed economies, where people can put their savings into stocks and many other financial assets and where this large variety of financial assets can serve many purposes, people in developing economies have no access to this variety of assets with different purposes. These households often keep their short-term savings in the form of liquid assets such as gold, jewelry, or cash (at home and/or short-term deposits at financial institutions). Household savings with a longer-term perspective are invested in real productive assets such as land, cattle, or durables. The precautionary motive is especially important for households with no access to a formal social welfare system; indeed, most of these households are in rural areas. The main source of rural income is agriculture, which is strongly affected by adverse conditions such as diseases, pests, fires, and bad weather. Furthermore, agricultural price variability can lead to income fluctuations for the farmers. These income shocks can be effectively compensated by household savings.[7] Another type of negative shock relating to household members such as illness, death, or divorce can affect household savings.[8]

We are motivated by two main considerations. First, most studies in the existing literature, that investigate household savings use the savings rate, defined as the ratio of monetary savings (or liquid assets) to disposable income, as the dependent variable. No study looks explicitly at asset formation or at a large variety of assets for productive capital formation. What is more, no study looks simultaneously at liquid assets and productive capital formation options in rural households in developing countries.

[6] Browning and Lusardi (1996)
[7] Modena and Gilbert (2012)
[8] Ersado *et al.* (2003), Filippo and Luigi (2012)

Neither is there a study that examines both flows and stocks of savings and productive capital formation. Looking at the issue from a time dimension perspective, flows are defined as short-run (within one year) changes of the total balances of liquid and productive capital while stocks are defined as capital that has been accumulated over the long-run. Studies that investigate long-run asset accumulation are more relevant since they can provide a general picture of household behavior during the whole lifetime of respective households. However, the investigation of household behavior in flows can be a subordinate of stocks as the results in flows can provide a picture of the considered household behavior during one period.

Second, when examining household savings, researchers focus on two main categories of saving determinants: household's characteristics and household head's characteristics.[9] However, the literature pays little attention to institutional conditions, the natural and social environment, and government assistance.

Therefore, in this study we look at more than monetary savings. We include other ways of forming productive capital as well as the asset structure in terms of both flows and stocks. We look at monetary savings as the first pillar of asset composition, which fulfills the need to hold a highly liquid and flexible asset, and at real productive capital formation, the second pillar of asset accumulation in rural households. We investigate the important roles of *the social network* and *the assistance nexus* (strength of a household's social network and support system, membership in organizations, and assistance in the shape of visits from consultants (professional workers employed by the government)), as well as the impact of *the insurance nexus* (availability and affordability of insurance) on household savings and productive capital formation. Finally, we study these two aspects in connection with the effects of being exposed to

[9] Kelly and Williamson (1968), Ramanathan (1968), Kraay (2000), Paxton (2001), Denizer *et al*. (2002), Seguino and Floro (2003), Ersado *et al*. (2003), Orbeta (2006), Horika and Wan (2007), Kulikov *et al.* (2007), Newman *et al*. (2007), Pailwar *et al.* (2010), Feng *et al*. (2011)

negative shocks.

Vietnam is an interesting case to study since it has experienced strong economic growth since the late 1980s. Before that, Vietnam was one of the poorest countries in the world with GDP per capita (PPP, constant 2005 international USD) of US$ 803 in 1985 and a GDP growth rate of around 4% per year. However, the economy changed after the implementation of a series of innovation policies from 1986 onwards (known as 'Doi Moi'). During the 1990s and 2000s, Vietnam's average GDP growth rate was 7.5% and 7.1%, respectively, peaking at 10% in 1995. GDP per capita (PPP, constant 2005 international USD) reached US$ 2,611 in 2008, approximately three times that of the 1985's figure.[10] Even though the process of industrialization and modernization has been strongly fostered, most of the population still lives in rural areas (in 2009 rural inhabitants accounted for around 70% of total population down from 76% in 2000).[11] Due to its long coastline, Vietnam is sensitive to natural disasters from the sea. The country stretches out from north to south with a coastline of over 3,300km and is hit by an average of 4 severe storms or typhoons every year. These natural negative shocks are amplified by shocks to household members such as disease or death. These shocks are always a major concern for the population in rural areas since negative shocks tend to absorb a part of the households' liquid and productive assets. Accordingly, savings in the form of liquid assets and productive capital formation for precautionary reasons are almost an obligation in Vietnamese households.

The literature has shown that both social networks and insurance can affect household savings[12] and that both can be used to compensate for the impacts of negative shocks. While social networks are considered a traditional channel in developing economies, its

[10] WB (2012)
[11] GSO (2010)
[12] Hemming and Harvey (1983), Engelnhardt (1996), Hubbard and Skinner (1996), Beverly and Sherraden (1999), Chou *et al.* (2003), Ballinger et al. (2004), Giles and Yoo (2007), Maynard and Qiu (2009), and others

comparatively modern cousin – the insurance system - seems less developed due to scarce economic resources, constraints on the public sector and low institutional capacity.[13] This raises concerns about impacts of these two factors on household savings with respect to negative shocks. The question may be whether the modern scheme – insurance – has a greater impact than the traditional one – social networks – on capital formation. The answer may have implications for policy makers, whose policies concern household savings and productive capital formation in rural Vietnam.

To test the role of the social network nexus and the insurance nexus, we employ the linear instrumental-variables method and account for the endogeneity of all concerned variables, an approach that has not been taken before in the field of household savings.

The paper is organized as follows. Section II summarizes the relevant literature of the social network and the insurance nexus. Section III describes the data. Section IV provides the statistical methods used in the analysis. Section V discusses the empirical results and Section VI gives some conclusions and policy implications.

2.2. Literature review on the social network nexus and the insurance nexus

Household connections to social networks can be separated into two main streams. The first stream connects households and household members with economic and/or social organizations. The research by Pailwar *et al.* (2010) investigates the impact of household members who participate. A membership is said to exist when one household member works for a financial institution. Their research finds that membership in financial institutions has a significantly positive effect on household savings. Where social organizations are concerned, membership in an occupational pension scheme in the UK is positively related to savings.[14]

[13] Carrin (2002)
[14] Hemming and Harvey (1983)

The second stream connects households and household members with the community. The links between households and the community can be a way for households to obtain better supports and/or to reach a higher level of experience. To study how social learning can affect the life cycle 'precautionary savings' task, Ballinger *et al.* (2004) use experimental methods with subjects, who come from social science classes at the University of Houston, participating in one out of three groups. Each group represents a different generation. The former generation's members were observed by the successive generation's members. The results indicate that latter generations can improve their ability to solve the life cycle precautionary saving models. The results of Giles and Yoo (2007) provide support for the argument. They use household panel data from rural China and find that migrant networks that developed from the 1990s onwards have an effect on precautionary savings. Households can improve their ability to cope with risk as the networks expand. As the size of the village migrant network increases, households engage less frequently in precautionary savings. While friends and relatives also form parts of social networks,[15] their specific influence on household savings or productive capital formation has not been investigated.

Insurance and household savings can be used to pool negative shocks. The risk of unstable income or the occurrence of negative shocks can be mitigated by private and public insurance, and insurance can be used to complement household savings within the framework of such shocks. In a study on Taiwanese micro-data, Chou *et al*. (2003) find a negative relationship between health insurance and household precautionary savings. The empirical results suggest that the introduction and expansion of social health insurance significantly reduce households' precautionary savings. Another study by Chou *et al.* (2004) confirms the role of health insurance in reducing households'

[15] Fafchamps and Lund (2003)

precautionary savings in the context of the introduction of Taiwan's National Health Insurance program in 1995. Their findings are consistent with those of other studies on the impacts of different types of insurance such as social insurance[16], disability insurance[17], and unemployment insurance[18]. In two separate studies, Gruber and Yelowitz (1999) and Maynard and Qiu (2009) investigate the effect of Medicaid, a major social insurance scheme that provides health insurance to low-income individuals in the U.S., on household savings. The results suggest that Medicaid has a conclusive impact on reducing household savings. However, the study by Starr-MccLuer (1996) challenges the precautionary view in that it finds a strong and positive relationship between insurance and household wealth.

The literature has identified the positive role of social networks in motivating household savings through organizational membership or a social learning effect. It empirically confirms the complementary impacts of insurance on household savings, but not on household wealth. However, no study mentions about the effect of direct support from the government on household savings. To close the gap in the literature, we add government assistance in the form of consultancy services, and friends and relatives as components of the social network, and examine their impact on household liquid and productive capital formation. Using stocks and flows as separate categories, we can also test for the precautionary view of savings in the form of liquid assets and productive capital.

2.3. Data description

For our analysis we use data from a household survey of rural areas in Vietnam, namely VARHS08 (Vietnam Access to Resources Household Survey: Characteristics of the

[16] Hubbard *et al.* (1995)
[17] Kantor and Fishback (1996)
[18] Engen and Gruber (2001)

Vietnamese Rural Economy, 2008 Survey). This survey was funded by Danida and executed by the Central Institute for Economic Management (CIEM), in cooperation with the University of Copenhagen, the Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD), and the Institute for Labor Science and Social Affairs (ILSSA) in twelve provinces of Vietnam in 2008.[19] The data set "was designed to provide better and more current information about key factors influencing the livelihoods and development opportunities, as well as constraints that characterize the economic environment of households in rural Vietnam".[20] Therefore, it was the best source of detailed information on the issue this paper seeks to examine. A sample of 3,227 households, for all of which complete data is available, is used. Most households (52.3%) are located in the Northern Midlands – a mountainous area, while less than 1% are in the Mekong River delta. The remainders are located in the north central area and central highlands.

In this paper, we distinguish between liquid assets and productive assets (capital) to describe household savings and productive capital formation, so we can cover the two main categories of asset accumulation and asset holdings. Liquid assets are deposits in financial institutions, ROSCAs, private moneylenders, or cash/gold/jewelry kept at home. Such assets can be used for the short-term precautionary motive, among others. The short-term precautionary motive also reflects the discontinuity of the income and expenditure stream. Revenues from agricultural production are random and agricultural expenditure is seasonal in nature. Therefore, liquid asset holdings can be expected to buffer this mismatch between revenue and expenditure and to smooth the income and consumption path. By contrast, productive assets are assets such as productive durable goods, cattle, and land that can yield additional income for households. As such, they

[19] http://www.ambhanoi.um.dk/en/menu/AboutUs/News/NewsArchives2009/HouseholdSurvey2008Launched.htm
[20] VARHS (2006: 1)

form part of a wealth growth strategy. They may also serve to ensure the continued income and wealth of a household in case it sustains a larger shock. Liquid and productive assets add up to total assets (total capital formation). Each household's asset variables, stocks, and flows are related to its disposable income. A stock is a household's asset holdings at the time of the interview. We determine asset ratios for the stocks of (i) liquid assets, (ii) productive assets and (iii) total assets. A flow is a change in asset holding (asset formation) during the previous twelve months. Hence, for the flow variables we obtain (i) a flow liquid asset ratio, which represents a liquid savings ratio, (ii) a flow productive asset ratio, and (iii) a total (or an overall) flow ratio. All ratios are calculated by dividing their values by the household's disposable income over the previous 12 months. For example, the flow liquid asset ratio represents the flow of liquid assets divided by the household's disposable income (measured in the previous 12 months).

Due to the large number of households (58%) that experienced at least one negative shock during the previous year, and due to the expected effects of such a negative shock on observable asset values, we distinguish between households that sustained such a major negative shock and those that did not. For the group of households that did, we observe an "ex post" (of shock) situation with respect to precautionary asset holdings. For the group that did not experience a negative shock, we observe the "ex ante" (of shock) situation that should allow us to identify precautionary asset motives more clearly, in particular when comparing households' behavior to that of the "ex post" group. By dividing the households into these different groups we can identify "ex ante" of shock and "ex post" of shock decisions before comparing the influence of the social network nexus and the insurance nexus in household savings and productive capital formation. The variable definitions are described in the Appendix A.1.

Table 2.1: Summary of selected variables

Variables	All households		"ex ante" households		"ex post" households	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Total flow ratio	0.21	0.77	0.26	0.73	0.18***	0.80
Flow liquid asset ratio	0.07	0.13	0.09	0.15	0.05***	0.12
Flow productive asset ratio	0.14	0.76	0.17	0.71	0.12*	0.79
Total stock ratio	14.91	37.93	12.24	17.90	16.82***	47.30
Stock liquid asset ratio	0.15	0.35	0.19	0.43	0.12***	0.27
Stock productive asset ratio	14.76	37.94	12.05	17.92	16.71***	47.30
Shock	0.58	0.49				
Household member shocks	0.09	0.28				
Economic/natural shocks	0.54	0.50				
Household's characteristics						
Gender	0.82	0.38	0.80	0.40	0.84	0.37
Edu2	0.07	0.25	0.09	.028	0.06	0.23
Edu3	0.01	0.12	0.02	0.14	0.01	0.09
Household's characteristics						
Person	4.85	2.00	4.53	1.90	5.08	2.03
Young rate	0.25	0.22	0.23	0.22	0.26	0.22
Old rate	0.18	0.24	0.14	0.28	0.10	0.21
Social network						
Supporters	1.61	0.98	1.60	0.99	1.62	0.97
Organization	0.79	0.41	0.76	0.43	0.81	0.39
Assistance	4.24	5.71	4.13	5.80	4.31	5.65
Insurance	0.82	0.38	0.78	0.41	0.86	0.35
Instruments						
Ethnicity	0.62	0.49	0.71	0.46	0.55	0.50
Area1	0.52	0.50	0.43	0.49	0.59	0.49
Area2	0.15	0.36	0.16	0.37	0.14	0.35
Area3	0.24	0.43	0.29	0.45	0.20	0.40
Observations	3227		1352		1875	

(*)(***) indicate that mean differences between "ex ante" and "ex post" households are statistically significant at the levels of 10% and 1%, respectively.

Table 2.1 provides an overview of the major characteristics of the data, broken down into three household groups: all households, "ex ante" households and "ex post" households. First, among 58% of rural households suffered at least one negative shock

during the previous 12 months, 54% faced one economic or natural disaster, and 9% were confronted with negative shocks that originated within the household's members. These surprisingly large numbers show that disasters are an important part of life in rural Vietnam. Second, the total flow ratio in rural Vietnam is 21% and hence relatively low compared to other countries like China.[21] Only one third of the total flow represents flow liquid assets, a proportion that is closer to that of some transition economies.[22] The means of the three flow ratios are statistically different between "ex ante" and "ex post" households. Households facing shocks have a lower rate of liquid assets and productive capital formation compared to non-shock households.

Second, for stocks, the average ratio of total assets to net income is around 15 (times), indicating relatively high asset accumulation in rural households. Most assets are the productive stock of real household assets. Rural households maintain only a small share of liquid assets (cash and/or jewelry), preferring instead to invest a large proportion in profitable or productive assets such as productive durables, land, and cattle, and do not require more flexible and liquid monetary assets. In stocks, the mean differences between the two household groups are statistically significant as well. However, the means of productive assets and total assets in the "ex post" group are higher than those in the "ex ante" group while the mean of liquid assets in the "ex post" group is higher. This may indicate a negative impact of shocks on household income in rural areas.

Third, most households (82.4%) are headed by a male. This figure is comparable to data from the Philippines but higher than the figures for Zimbabwe and urban China.[23] The total dependency rate in the households is 36%, with a young dependency rate of 25%

[21] Horioka and Wan (2007), Feng *et al.* (2011)
[22] Denizer *et al.* (2002)
[23] Ersado *et al.* (2003), Orbeta (2006), Feng *et al.* (2011)

(similar to that in urban China, but twelve per cent lower than in rural China) and an old dependency rate of 18% (similar to rural and urban China).[24]

Fourth, we consider three components of the social network. The average number of supporters who can help these households in times of difficulty is over one. This variable reflects the existence of close relationships among relatives or friends or community members and in turn suggests a functioning social network in rural areas. It also indicates an agricultural culture in which households can quite easily call on relatives, friends, and members of their community for assistance. Another social network variable is membership of organizations in rural areas. More than 70% of households have at least one household member who is affiliated with the political or a social organization such as the Political party, the Youth union, the Women's union, or with an economic organization such as a business association, a credit/microfinance association, a cooperative and so forth. Concerning assistance from local authorities and the government, rural households in these areas receive on average four non-demanded visits from agricultural consultants (professional workers) each year. These visits, a type of government assistance, serve to provide rural households with information and/or assistance on farming and livestock raising techniques, and are paid for by the government. There is no major difference between the means of "ex ante" and "ex post" households in the assistance and supporter variable.

Fifth, 82% of households have at least one type of insurance. The share of households engaging into the insurance system within the "ex post" group is higher than that of the "ex ante" group (86% compared to 78%).

[24] Horioka and Wan (2007)

2.4. Econometric framework

Because of the plain cross-section data structure, the econometric model used to identify the impacts of the social network nexus and the insurance nexus is the linear instrumental-variables (IV) model. In OLS estimations, endogeneity may arise when the error term is systematically related to the regressors, and thus the OLS estimators are inconsistent or cannot be used for a causal interpretation. The IV model, which controls for endogeneity is employed with the two-stage least-squares (2SLS) method, which can yield the most efficient estimators.[25] The IV model takes the following form:

$$Y_i = \beta_0 + \sum_{j=1}^{J} \beta_j X_{ji} + \sum_{k=1}^{K} \beta_{k+J} W_{ki} + u_i \qquad (2.1)$$

Y_i represents the dependent variables including the flow liquid asset ratio, the flow productive asset ratio, the total flow ratio, the stock liquid asset ratio, the stock productive asset ratio, and the total asset ratio. *J, K* is the number of endogenous and exogenous variables, respectively. W_{ki} denotes the included exogenous variables, which are uncorrelated with u_i. The six exogenously determined regressors are number of non-demanded visits measuring for the government assistance, education of household head, gender of household head, number of household members, a proxy for household size, the young rate, and the old rate of households. The number of non-demanded visits is one of our concerned variables, but it is outside the households' control so we regard it as an exogenous factor. While gender of household head is obviously exogenous, we regard the rest as exogenous variables.[26] X_{ji} denotes the endogenous regressors, which potentially correlate with u_i. They include household wealth, measured in its natural logarithm, number of supporters, membership in social/economic organizations, and insurance. While the three latter variables are of interest to us, household wealth is one

[25] Cameron and Trivedi (2010)
[26] Kulikov *et al.* (2007), Maynard and Qiu (2009), Feng *et al*. (2011), Kedir and Ibrahim (2011)

likely endogenous variable and is considered an endogenous control variable. We believe that some unobserved factors may contribute to the above endogenous variables, thus causing endogeneity in the model. A number of instruments are considered to account for the endogeneity of the potentially endogenous variables. The instruments (the excluded exogenous variables) comprise the distance between households and all-weather roads, ethnicity of households, age of household head, and location of households (Area1, Area2, and Area3). These instruments can fully or partly affect the endogenous regressors. As wealth is considered, the justification could be based on most instruments. While age of household head has a strong relationship with household wealth,[27] distance to all-weather roads and household location can be used to measure the invisible value of houses and lots. Real estate close to an all-weather or major road, which implies a convenient-transport connection, often has a higher value than properties in remote areas or those that are close to a minor road. The higher value of real estate near all-weather roads can be due to the fact that these properties can be suitable as offices for small businesses or business rentals. The price of land varies according to the geographical location. For example, one hectare of agricultural land in the Central Highlands, a region that is fertile and suitable for growing high-value crops such as rubber, cashews, or peppers, is much more expensive than comparable lots in the Northern mountainous area (unfertile one-season rice fields). The breakdown into geographical location and ethnicity can reflect a difference in culture and thus influence the number of supporters and organizational membership. For example, people in the south are said to be more open than those in central areas, so it may be relatively easier for people in the south to make friends. Another example is ethnicity. Members of the Kinh community may have easier access to organizations as this group accounts for

[27] Shorrocks (1975), Mirer (1979), Masson (1986), Jappelli (1999)

85.7% of the total population in 2009. The second largest ethnic group – the Tay community– accounted for only 1.89%.[28] The ethnic origin of households is still relatively important in Vietnam, meaning that members of larger Kinh community may have better connections and can fall back on stronger networks. Concerning the insurance variable, membership of an insurance scheme can be determined by a number of factors, including ethnicity and age of the household head[29].

2.5. Empirical results

2.5.1. The roles of the social network nexus and the insurance nexus in stocks

Table 2.2 reports the results of stocks of liquid assets and productive assets including the diagnostic tests. The first row presents the three household groups, namely all households, "ex ante" households, and "ex post" households. For each household group, three estimations with three different dependent variables are presented: total flow ratio, flow liquid asset ratio, and flow productive asset ratio. The estimation results are from the IV regressions since the Wooldridge's robust score test and the robust regression F test indicate the presence of endogeneity. The Sargan chi2 is a diagnostic test value for overindentifying restrictions.

Five estimations, i.e., (1), (3), (4), (5), and (6) with the superscript "a" use the full set of instruments while the others drop the ethnic variable from the set due to overidentifying restrictions. The ethnic variable is dropped from the estimations (2), (7), (8), and (9) because the diagnostic test of overidentifying restrictions for exogenous instruments is not satisfied when the ethnic variable is included as an instrument.

[28] UNFPA (2011)
[29] Arun *et al.*, (2012)

Table 2.2: Regression results for stocks

	all households			"ex ante" households			"ex post" households		
	(1)[a]	(2)	(3)[a]	(4)[a]	(5)[a]	(6)[a]	(7)	(8)	(9)
VARIABLES	Total stock ratio	Stock liquid asset ratio	Stock prod. asset ratio	Total stock ratio	Stock liquid asset ratio	Stock prod. asset ratio	Total stock ratio	Stock liquid asset ratio	Stock prod. asset ratio
Constant	-221.2***	1.46*	-222.5***	-218.4***	0.54	-218.9***	-273.3	3.16	-276.4
	(67.59)	(0.84)	(67.90)	(80.11)	(1.161)	(80.62)	(183.2)	(1.97)	(184.4)
Household head's characteristics									
Gender	-3.21	0.05*	-3.25	-5.91*	0.007	-5.92*	-2.42	0.08*	-2.51
	(2.21)	(0.03)	(2.23)	(3.23)	(0.04)	(3.25)	(3.90)	(0.05)	(3.93)
Edu2	-9.99***	0.07*	-10.06***	-10.28***	0.03	-10.31***	-7.65**	0.06	-7.71**
	(2.22)	(0.04)	(2.24)	(3.65)	(0.06)	(3.68)	(3.79)	(0.05)	(3.84)
Edu3	-22.21***	0.35***	-22.53***	-21.42***	0.40**	-21.82***	-27.49**	0.26*	-27.75**
	(4.36)	(0.11)	(4.40)	(7.31)	(0.16)	(7.38)	(11.28)	(0.15)	(11.37)
Household's characteristics									
LnWealth	17.41***	-0.09	17.49***	18.01***	-0.02	18.03***	20.71	-0.22	20.92
	(5.18)	(0.06)	(5.21)	(6.13)	(0.09)	(6.17)	(13.76)	(0.15)	(13.84)
Person	-4.19***	0.02	-4.19***	-4.28***	0.001	-4.28***	-5.16***	0.03	-5.19***
	(0.83)	(0.01)	(0.83)	(1.35)	(0.02)	(1.36)	(1.84)	(0.02)	(1.85)
Young rate	17.25***	-0.01	17.30***	11.52**	0.05	11.47*	13.05	-0.10	13.15
	(5.23)	(0.07)	(5.31)	(5.85)	(0.12)	(5.91)	(11.67)	(0.12)	(11.74)
Old rate	16.29***	-0.08*	16.36***	18.08***	-0.08	18.16***	13.72*	-0.10	13.82*
	(3.23)	(0.05)	(3.25)	(4.05)	(0.06)	(4.07)	(7.11)	(0.09)	(7.17)
Supporter	-7.77***	0.15***	-7.88***	-11.98***	0.18***	-12.15***	-6.12	0.09**	-6.21*
	(1.55)	(0.03)	(1.56)	(3.99)	(0.06)	(4.01)	(3.73)	(0.04)	(3.75)
Organization	9.37	-0.14	9.50	23.03	-0.12	23.15	-10.26	-0.07	-10.19
	(8.51)	(0.12)	(8.55)	(14.25)	(0.21)	(14.34)	(15.72)	(0.15)	(15.80)
Assistance	0.28***	-0.003	0.28***	0.45**	-0.002	0.46**	0.31	-0.0009	0.32
	(0.10)	(0.002)	(0.10)	(0.20)	(0.003)	(0.20)	(0.21)	(0.002)	(0.21)
Insurance	52.90***	-0.61***	53.31***	38.47***	-0.38**	38.85***	88.35***	-0.79***	89.14***
	(8.53)	(0.15)	(8.57)	(11.89)	(0.17)	(11.96)	(26.86)	(0.30)	(27.05)
Diagnostic Tests									
Wooldridge's robust score test (p-value)	71.6 (0.00)	43.4 (0.00)	72.9 (0.00)	33.2 (0.00)	16.1 (0.00)	34.1 (0.00)	31.3 (0.00)	46.0 (0.00)	31.8 (0.00)
Robust regression F test (p-value)	17.9 (0.00)	11.1 (0.00)	18.2 (0.00)	7.8 (0.00)	4.1 (0.00)	8.1 (0.00)	7.8 (0.00)	11.8 (0.00)	7.9 (0.00)
Sargan Test chi2 (p-value)	5.50 (0.14)	1.53 (0.47)	5.55 (0.14)	2.98 (0.39)	0.14 (0.99)	2.97 (0.40)	0.91 (0.64)	1.04 (0.60)	0.91 (0.64)
Observations	3,227	3,227	3,227	1,352	1,352	1,352	1,875	1,875	1,875

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

[a] employ full set of instruments: Distance, Ethnicity, Lnage, Lnage2, Area1, Area2, and Area3. Others use the set of instruments without Ethnicity.

First, we examine controlled independent variables. Gender of household head seems to have less impact in both "ex ante" and "ex post" households.[30] There is a slight and weakly significant difference in stock productive assets in "ex ante" households and stock liquid assets in "ex post" households. This may indicate that gender difference of household heads is no longer an important factor for decisions regarding the household saving behavior in rural Vietnam. The education variable has significant impacts on a household's accumulation of savings and productive capital in rural Vietnam. Higher educational attainment on the part of a household's head indicates larger differences in both liquid and productive asset accumulation. However, the effect of the education variable indicates a difference in direction between liquid and productive assets. In both household groups, households with a head with a vocational training level of education or above tend towards a higher liquid asset rate[31] while these households have lower productive asset ratios, which also determine signs and significance levels of the total stock ratios. A higher ratio of liquid assets can be explained by the fact that highly educated household heads may have higher incomes[32] and thus more resources for liquid accumulation. The results for productive assets are robust across groups and education levels. Net income may be the main reason behind the negative signs of the productive asset ratio. In line with the higher rate of liquid assets, the transformation of income to productive assets in households whose heads have higher education may be relatively lower than in base households. A greater proportion of net income may be used for other purposes such as consumption or liquid assets rather than for reinvestment in productive capital.

[30] In line with Paxton (2001), Ersado *et al.* (2003), and Denizer *et al.* (2002), but in contrast to Seguino and Floro (2003), Kulikov *et al.* (2007), and Feng *et al.* (2011).
[31] In line with Dynan *et al.* (2004), Newman *et al*. (2007), Pailwar *et al*. (2010), and Feng *et al.* (2011), but in contrast to Denizer *et al*. (2002) and Kulikov *et al*. (2007).
[32] Both groups with higher education have a net income that is almost double the net income of the reference group (no formal qualifications).

Number of household members has consistently negative effects on both household groups in terms of their productive asset ratios, yet there is no significant impact on liquid assets. More members may need more resources for consumption, so among them there may be greater demand for available cash. The dependency rate (young and old) seems to have a greater effect on the "ex ante" household group than on the "ex post" household group. The results indicate that a higher dependency rate may imply a lower level of net income. It is assumed that with a constant level of net income transformed into productive assets, households with a lower net income will have a higher rate of productive assets (and in turn, a higher total asset ratio).

Turning to the central question of the study, we investigate the impacts of the social network nexus and the insurance nexus on household savings and productive capital formation, in relation with the exposure to shocks. Within the social network nexus, the role of the supporter variable seems to be more important than those of organization and assistance variables. A higher number of supporters can promote liquid assets but reduce the rate of productive assets in both "ex ante" and "ex post" households. More supporters may mean more help, so a higher number of supporters may reduce the significance of the precautionary motive and hence the value of liquid assets. However, this is not what we observe. In fact, these households have a higher ratio of liquid assets. One explanation could be that these assets reflect a smoothing of consumption and income variations, rather than being evidence of precautionary activity because of a major threat. In other words, a strong social network represented by number of supporters allows households to retain greater liquid assets in order to smooth short-term smaller fluctuations, including a kind of down-payment motive, such that households are put in a position to wait for a better price or sufficient resources before acquiring a productive asset.

While membership in an organization has no impact on capital formation, the number of non-demanded visits (assistance) can increase the productive asset and total asset ratios only in "ex ante" households. The result may indicate the effectiveness of the assistance scheme in that it enhances the household's ability to transfer its income into productive assets. However, assistance has no effect on capital accumulation in "ex post" households.

The analysis may imply that the *social network nexus* works in "ex ante" households rather than in "ex post" households. This means that social networks seem to have an insignificant role when it comes to making households more resilient to shocks.

The results of the *insurance nexus* are split into two directions. The precautionary view, which is supported in the literature, is held when we consider the liquid assets of households. The results are identical in both "ex ante" and "ex post" household groups when households with insurance accumulate a smaller portion of monetary assets compared to those without insurance. The second direction relates to the statistically significant impacts of insurance on productive assets. Our finding confirms the argument of Starr-McCluer (1996) that there is a strongly and positively significant relationship between insurance and household productive assets. The results are robust across households and the accumulation process can be used to explain the strong and positive effects of insurance. Households with insurance can increase their ability to accumulate productive assets and form stocks. This may also be in accordance with the lower rate of liquid assets.

Compared to the *social network nexus*, the role of the *insurance nexus* seems to be dominant in both "ex ante" and "ex post" household groups. Insurance may not only help households increase their productive capital formation, but also insure households against risk.

2.5.2. The roles of the social network nexus and the insurance nexus in flows

A similar method is applied to analyze the flows of household liquid assets and productive assets. Five estimations, i.e., (3), (5), (6), (7), and (9) with the superscript "a" use the full set of instruments (Distance, Ethnicity, Lnage, Lnage2, Area1, Area2, and Area3), while the other estimations exclude the ethnic variable from the set.

Concerning *the social network nexus*, number of supporters seems to have an effect only on the liquid assets of "ex ante" households. The number of supporters has no impact on the "ex post" group. It seems that these households have to deal with the fallout from negative shocks themselves. Help from friends and/or relatives does not change their liquid and productive asset ratios.

Organization membership has little effect on liquid assets and no impact on productive capital. It can affect households in that it reduces the liquid asset ratio within the "ex ante" group, but this effect is not present within the "ex post" households. This means that membership does not influence household behavior in case of negative shocks.

Assistance seems to have a greater impact in the *social network nexus*. It affects not only liquid assets but also productive assets of "ex ante" households. A higher number of non-demanded visits may induce these households to spend more on consumption rather than liquid or productive assets. Another intuitive explanation could be that the visits from agricultural consultants help households to increase their net income and when their consumption rises, their liquid and productive capital ratios may fall. Within the social network nexus, assistance may be the most important factor affecting, both liquid and productive assets. The magnitude of the insurance coefficient is, however relatively small.

Table 2.3: Regression results for flows

	all households			"ex ante" households			"ex post" households		
	(1)	(2)	(3)[a]	(4)	(5)[a]	(6)[a]	(7)[a]	(8)	(9)[a]
VARIABLES	Total stock ratio	Stock liquid asset ratio	Stock prod. asset ratio	Total stock ratio	Stock liquid asset ratio	Stock prod. asset ratio	Total stock ratio	Stock liquid asset ratio	Stock prod. asset ratio
Constant	4.45**	1.68***	2.64	5.02	1.69**	3.18	6.84	2.70**	4.59
	(1.99)	(0.55)	(1.66)	(3.30)	(0.77)	(2.50)	(4.42)	(1.35)	(3.87)
Household head's characteristics									
Gender	0.17***	0.05***	0.12**	0.20	0.05	0.15	0.15*	0.06*	0.11
	(0.06)	(0.02)	(0.05)	(0.12)	(0.03)	(0.09)	(0.08)	(0.03)	(0.07)
Edu2	0.12	0.05**	0.06	0.22	0.07*	0.16	0.02	0.03	-0.006
	(0.09)	(0.02)	(0.08)	(0.20)	(0.04)	(0.17)	(0.08)	(0.04)	(0.06)
Edu3	0.48***	0.19***	0.26**	0.75***	0.23***	0.45**	0.45	0.20**	0.30
	(0.15)	(0.05)	(0.12)	(0.29)	(0.09)	(0.22)	(0.28)	(0.09)	(0.24)
Household's characteristics									
LnWealth	-0.28*	-0.11***	-0.16	-0.33	-0.12**	-0.20	-0.49	-0.19*	-0.32
	(0.15)	(0.04)	(0.13)	(0.25)	(0.06)	(0.19)	(0.33)	(0.10)	(0.29)
Person	0.06**	0.02***	0.03	0.12**	0.03**	0.08*	0.05	0.03**	0.03
	(0.03)	(0.008)	(0.02)	(0.06)	(0.01)	(0.04)	(0.04)	(0.01)	(0.04)
Young rate	-0.04	-0.04	-0.04	-0.20	-0.06	-0.23	-0.16	-0.09	-0.04
	(0.17)	(0.04)	(0.14)	(0.28)	(0.07)	(0.21)	(0.29)	(0.08)	(0.25)
Old rate	-0.35***	-0.10***	-0.24***	-0.37**	-0.09**	-0.25**	-0.37***	-0.13**	-0.26**
	(0.09)	(0.03)	(0.07)	(0.17)	(0.04)	(0.12)	(0.14)	(0.05)	(0.12)
Supporter	0.08	0.07***	-0.04	0.35**	0.12***	0.10	-0.08	0.01	-0.07
	(0.06)	(0.02)	(0.03)	(0.18)	(0.04)	(0.11)	(0.06)	(0.03)	(0.04)
Organization	-0.26	-0.07	-0.17	-0.72	-0.24*	-0.51	-0.20	0.003	-0.21
	(0.23)	(0.07)	(0.18)	(0.55)	(0.14)	(0.41)	(0.32)	(0.09)	(0.28)
Assistance	-0.01***	-0.004***	-0.004*	-0.03**	-0.005**	-0.01*	-0.0002	-0.0008	-0.0007
	(0.004)	(0.001)	(0.002)	(0.01)	(0.002)	(0.007)	(0.003)	(0.001)	(0.003)
Insurance	-1.23***	-0.49***	-0.54**	-1.72***	-0.39***	-0.94**	-0.76*	-0.52***	-0.46
	(0.36)	(0.10)	(0.22)	(0.61)	(0.12)	(0.41)	(0.42)	(0.20)	(0.35)
Diagnostic Tests									
Wooldridge's robust score test (p-value)	27.3 (0.00)	112.7 (0.00)	13.9 (0.00)	19.1 (0.00)	55.1 (0.00)	9.8 (0.04)	24.6 (0.00)	66.4 (0.00)	10.4 (0.03)
Robust regression F test (p-value)	7.0 (0.00)	29.6 (0.00)	3.5 (0.00)	4.7 (0.00)	14.1 (0.00)	2.5 (0.04)	6.3 (0.00)	17.4 (0.00)	2.6 (0.03)
Sargan Test chi2 (p-value)	2.94 (0.23)	2.34 (0.31)	3.83 (0.28)	1.27 (0.53)	2.20 (0.53)	3.15 (0.39)	2.11 (0.55)	1.10 (0.58)	1.29 (0.73)
Observations	3,227	3,227	3,227	1,352	1,352	1,352	1,875	1,875	1,875

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

[a] employ full set of instruments: Distance, Ethnicity, Lnage, Lnage2, Area1, Area2, and Area3. Others use the set of instruments without Ethnicity.

On the other side - the *insurance nexus* - the results show that, except for the estimation of the flow productive assets, insurance is statistically significant in other estimations. It can be said that insurance participation confirms the precautionary view as stated in the literature.[33] "Ex ante" households that are signed up to insurance schemes have lower rates in both flow liquid assets and flow productive assets. Accordingly, they may spend more on consumption than on savings in the shape of liquid and productive assets, leading to lower ratios in these categories. The findings also reflect the fact that some productive assets may function as precautionary assets, so it appears that insurance substitutes for the need to save and allows for more consumption. There are hardly any observable effects of insurance on households that sustain a shock. However, it seems they have more liquid assets if they are insured. The findings concerning insurance in rural Vietnam are similar to those in China after the Chinese government increased health spendings for rural households.[34] In "ex post" households, the insurance variable secures the precautionary role in liquid assets only. This may indicate that shocks equally affect household productive assets regardless of insurance. One significant difference compared to stocks is the signs of the coefficients of productive assets. We expect positive effects in both cases, stocks and flows, but the signs turn out to be negative in flows. One factor that can affect the different signs is the time dimension. In flows, the time period is quite short for households with insurance to accumulate enough resources to acquire a high-value productive asset and what is more, they have no strong demand for liquid assets. It may be asked "where these households put their liquid assets in order to produce a positive effect of productive assets in stocks" The answer may be that they do not employ savings mechanisms for their liquid assets, but they do take part in the informal credit market. They play the role of private creditors

[33] Hubbard *et al.* (1995), Gruber and Yelowitz (1999), Chou *et al*. (2003, 2004, 2006), Maynard and Qiu (2009)
[34] Barnett and Brooks (2010)

who lend their monetary savings, which in this case are not accounted in liquid assets, thus leading to a smaller rate of liquid assets. In stocks, the accumulation process happens over a long time and these households can regain their credits back and transform their liquid assets plus credits into productive assets, yielding the positive signs of productive assets in flows.

The above analysis indicates that in flows the insurance nexus is also dominant in household savings and productive asset formation in both "ex ante" and "ex post" groups. Within the "ex ante" group, social networks have an impact on liquid assets and minor effects on productive assets, while insurance has a relatively larger effect on household behavior in both categories. Within the "ex post" group, insurance has an impact on liquid assets, whereas social networks make no difference.

2.6. Conclusions and policy implications

To sum up, the social network nexus and the insurance nexus are shown to play a significant role in household savings and productive capital formation. Using the IV estimation, we identify that in stocks or in the long-term, the role of social networks is inconclusive in "ex ante" households while we find no relationship between social networks and household savings and asset formation in "ex post" households. The insurance variable seems to have a greater impact as it affects both liquid and productive assets in both household groups. While liquid assets still follow the precautionary argument, productive assets are found to have a positive relationship with insurance. In flows or in the short-term, social networks support the precautionary view of "ex ante" households while insurance is shown to play a role in both "ex ante" and "ex post" household groups. In conclusion, the insurance nexus is dominant compared to the social network nexus when it comes to determining household savings and productive capital formation in rural Vietnam.

The analysis also produces some policy implications. First, governmental assistance has a positive effect on household savings in the short-term in that it reduces the liquid savings while increasing productive asset accumulation in the long-term. Technical assistance may be important for farming processes and thus can raise the agricultural output of rural households. Technical assistance cannot alone create higher income for rural households. In addition to an increase in output, a price policy should be implemented to guarantee a stable income from agriculture. The price policy is important since for many years, agricultural producers have often faced a cycle involving: low prices plus high output or low output plus high prices.

Second, the role of insurance is identified and shown to be more important than the traditional method (social networks) in influencing the precautionary motive of savings. Participating in an insurance scheme can help rural households to cope with the occurrence of negative shocks. Promoting insurance participation may be one way to encourage productive asset accumulation, which can yield additional value, and produce additional assets that can then be reinvested in the economy.

3. SHORT-TERM PRECAUTION, INSURANCE AND SAVING MECHANISMS IN RURAL VIETNAM

This chapter is based on the paper "Short-term precaution, insurance and saving mechanisms in rural Vietnam" by Ha, V. D. It has been published within the Working Paper Series by the Center for International Economics of the University of Paderborn.

3.1. Introduction

The decision to save in the form of either cash hoarding or in form of deposits in financial intermediaries may be important for researchers since households in developing economies tend to save in cash at home rather than to deposit savings to financial intermediaries (Stix, 2012). This trend in saving decisions can potentially lead to adverse impacts on economic development (Lervine and Zervos, 1998). However, the literature seems to pay little attention to this field and therefore we conduct this study to find out whether the household short-term precautionary motive and insurance affect household participation and contribution to savings intermediaries.

Vietnam is an interesting case to study. During the last three decades, Vietnam was one of the fastest growing economies. As a result, the demand for capital increased, leading to a more active role of the financial system which has also undergone dramatic changes in both, quantity - and quality – aspects. This is especially true when we speak of rural areas. During 2007 and 2008, the economy faced high interest rates, reflecting a high demand for liquidity. At the peak in mid-2008, the nominal deposit interest rate in some financial institutions reached 19% per year (SBV, 2008). This indicates a shortage of liquidity in the economy. However, the main objective of Vietnam was to control the

inflation in this period as it reached 22.1% that year (WB, 2013). In accordance with the current fiscal policy, the State Bank of Vietnam (SBV) applied a contractionary policy and the supply of liquidity from the SBV was reduced by increasing the prime lending rate from 6.5% in January to 15% in June, 2008. Additionally, the access of commercial banks and other financial institutions to credits from the SBV was restricted because most commercial banks and financial institutions cannot provide enough collateral for their borrowings (SBV, 2011). As the concerned financial service providers were without access to the tertiary market (SBV) they were left with two options to access cash in order to counter balance any scarcity of liquidity. These options were the primary market (individuals and organizations) and the secondary market (other commercial banks and financial institutions). The access of financial institutions to the secondary market (interbank market) was also difficult as the overnight interest rate reached 25-27% that year, much higher than the interest rates in the primary market (SBV, 2011). Moreover, some financial institutions also required collaterals for their lending. As financial institutions faced many obstacles to access the secondary and the tertiary market, they had to return to the traditional market of liquidity – the primary market i.e. enterprises and households. So, the question of how to motivate households to place their monetary savings in the financial system, so that it can circulate in the economy instead of letting cash be kept under the pillows, may be an important issue for policy makers. Like in other developing countries, rural households in Vietnam can employ the whole variety of saving mechanisms. Households can save their money in formal saving intermediaries such as banks, credit funds, and credit associations, or save in informal saving intermediaries such as ROSCAs, and private money lenders, or simply hoard cash. In Vietnamese households, cash hoarding is extremely dominant (Newman *et al.,* 2012). Motivated by the current strain of the financial market, this

study investigates whether the selection of the short-term precautionary motive by households in rural Vietnam can affect their decision to place monetary savings in formal and/or informal saving intermediaries instead of keeping their savings under the pillows.

In developing economies, the possibility to access to the formal financial system is not shared equally among people. Especially individuals in rural areas are in disadvantage, due to differences in education, differences in geographical distance as well as differences of formal institution networks between regions. Filling the gap between demand and supply of the formal financial system, the informal financial mechanism is recognized as an important channel to accumulate savings for investment through a local capital mobilization, which helps to improve the welfare of all participants as well as to fulfill needs and safety requirements of household savings (Kimuyu, 1999; Gugerty, 2007; Kedir and Ibrahim, 2011; Pellegrina, 2011). The advantage of informal institutions such as ROSCAs or private moneylenders over the formal mechanism is more obvious in developing economies, especially in rural areas, where the formal system is still weak and no full coverage is given. The internal capital does not allow formal financial institutions to exist in every commune as well as to develop an adequate technical infrastructure like those in urban areas. Additionally, the informal financial system neither needs much initial capital nor does it need any sophisticated operation system such as offices, laborers, computers, or an accounting computer system, etc. Another advantage of the informal system is the information aspect, which may lead to lower costs of transaction and less time consuming processes. People engaging in a specific informal saving institution are often from the same community and share the same information within the group. So, participants can reduce the risk of asymmetric information and therefore maneuver around issues like adverse selection,

moral hazard, wrong evaluations, high monitoring costs, high controlling costs, and repayment insecurities, whereas at the same time trust and social capital are increased (Capenter and Jensen, 2002; Etang *et al.,*2011; Kedir and Ibrahim, 2011). However, the informal financial mechanism cannot completely substitute for the formal mechanism because of its nature. Due to its local character, the informal financial mechanism cannot exploit the potential advantages of the economies of scale. Also does it only focus on small and distinct geographical areas. It is also prone to the domino effect, which is likely to occur if an informal representative goes bankrupt. This may lead to other representatives also going to bankrupt and to a spread of evil tidings in the local area eventually causing further contagion. In the informal mechanism, negative effects impact participants more severely because most informal institutions work on the basis of the participant's credibility. Regardless of any advantages and disadvantages, the informal financial mechanism still exists as a complementary channel to the formal financial system and plays an important role for the development process. The household selection of saving mechanisms i.e. formal intermediaries, informal intermediaries, or cash hoarding are related to the liquidity each saving mechanism offers. For example, long-term motives like the enterprise motive or bequest motive do not require liquid savings as the probability of a sudden necessity for this money is rather small. However, the precautionary motive requires highly liquid savings in developing economies, in which insurance for precautionary purposes seems to be less developed (Carrin, 2002).

Until now, the literature seems to neglect the household selection between cash hoarding and deposits to saving intermediaries. In rare cases, like in the studies of Carpenter and Jensen (2002), and Newman *et al.* (2012), the authors directly investigate the participation of households into formal and informal saving intermediaries.

Carpenter and Jensen (2002) investigate the factors affecting household decisions regarding the use of formal and informal saving instruments in Pakistan. The saving mechanisms considered are both: banks, representing a formal instrument and *bisi*, representing an informal mechanism similar to a ROSCA. In order to identify the determinants of household participation into saving mechanisms, the authors use bivariate probit estimations for banks and *bisi* in both: urban and rural areas. The study finds that higher income households have a higher probability to save in banks rather than in *bisi*. Numeracy and literacy are important factors increasing the probability to save in a bank while *bisi* participation is only slightly affected by literacy. The level of education is also a determinant influencing the usage of a bank. The participation in a *bisi* is not influenced by education. Other variables can affect household decisions as well, e.g. the number of female adults in the household, the occupation of the head of the household, and the location of the household (i.e. urban or rural).

Like the work of Carpenter and Jensen (2002), Newman *et al.* (2012) use panel data of household surveys from 2006, 2008 and 2010. In the study, they investigate the role the social network plays in determining the level of household savings in rural Vietnam. Basing on the study of Fafchmps *et al.* (1998), they form a model in which information (represented by the membership of the social network) is proven to play an important role in determining the level of deposit savings. The social network is divided into two sub-categories: high and low quality networks. The results reveal that generally the membership of a high quality network positively and significantly connects to the overall saving level of households. When disaggregating the overall level into the different saving types, it becomes visible that the membership of a high quality network can promote savings in both, formal mechanisms and savings in the form of cash at home. However, a high quality network membership has a negative marginal effect on

the participation in informal savings mechanisms. In regard to the interaction between group density and network variables, the results are only robust when looking at the overall saving level and when looking at the fragment "home savings". Results are not robust when looking at the participation in formal and informal savings mechanisms. The study also finds that a membership in the low quality group has no effect on the household saving level. The empirical analysis seems to support the theoretical model built before, as the authors found that targeting information through a network would increase the level of formal savings.

In order to contribute to the still few studies in this distinct area, our paper will investigate the impact of the short-term precautionary savings' selection on a household decision on joining a saving intermediary in rural Vietnam. We propose the first hypotheses:

Hypothesis 3.1: *Households who regard the short-term precautionary motive the main reason for their saving efforts will have a higher probability of cash hoarding or a lower probability of saving through saving intermediaries.*

Households, which tend to be more vulnerable to risks and uncertainty, seem to be primarily motivated by the precautionary motive. These households are assumed to keep their savings under the pillow as they require a high liquidity because the short-term precautionary motive demands prompt expenses in case incidents occur. Saving intermediaries often cannot offer such a high liquidity of funds. This line of argumentation is especially reasonable for households in remote areas as the transaction costs of depositing and withdrawing savings to/from saving intermediaries are higher than the costs of cash hoarding.

The vulnerability of households towards risks and uncertainty could be reduced by the enforcement of insurance, which should in turn theoretically and empirically reduce the

precautionary savings (Hubbard *et al*., 1994; 1995; Kotlikoff, 1979; Chou *et al*., 2003; 2004). We, therefore form *hypothesis 3.2*:

Hypothesis 3.2: An insurance system can substitute for the short-term precautionary motive when it comes to the household decision to join saving intermediaries or not.

The argument is as follows: if the short-term precautionary motive reduces the probability of a household to participate in a saving intermediary, the existence of an enforced insurance system can inverse this relationship. The number of insurance contracts that a household signed and holds will be used as a proxy for the insurance system variable. We expect that a higher number of insurance contracts will positively relate to the probability of a household to participate in a saving intermediary. Households participating in various types of insurance are expected to be less vulnerable as risks are covered. Thus the demand for liquid savings is reduced and as a result these households will tend to participate in saving intermediaries rather than to hoard cash.

This paper concerns the impacts of the short-term precautionary motive and the insurance not only on the probability of household participation, but also on household contribution to savings intermediaries, which is mentioned in the last two hypotheses of this part.

Hypothesis 3.3: The participant's contribution to saving intermediaries is negatively affected by the precautionary savings motive.

Hypothesis 3.3 implies that participants driven by the short-term precautionary motive will have lower balances in saving intermediaries compared to households driven by long-term saving motives.

Hypothesis 3.4: The number of insurance contracts that participants signed and hold will positively relate to their contribution to saving intermediaries.

In *hypothesis 3.4*, insurance participation is assumed to increase household deposits in formal and informal savings intermediaries. The more types of insurance households participate in, the more their deposits in saving intermediaries will increase.

In accordance with the two types of saving mechanisms investigated here, we divide households into two different groups: a) participants, including both, formal and informal participants, and b) non-participants. Formal participants and informal participants represent households having deposits in formal saving intermediaries and households with deposits in informal saving intermediaries, respectively. Non-participants are those who exert cash hoarding.

Compared to previous studies, our study goes further regarding the sample selection and regarding the methodology taken. To avoid the sample selection bias, which may arise as households included in the sample have no savings and therefore cannot engage into any saving mechanism, we include only savers in our dataset. Regarding the methodology, this study will be expanded by considering both, participation probability and contribution of households to saving intermediaries. It will also take into account the endogeneity issue of the concerned explanatory variables in order to give consistent results.

The remainder of this part is as follows. Section 3.2 presents the empirical analysis. Section 3.3 introduces the results. Section 3.4 will give some conclusions and policy implications of the paper.

3.2. Empirical analysis

The study investigates the impacts the short-term precautionary motive and insurance have on a household's decision regarding the participation and selection of saving mechanisms in rural Vietnam.

Because of the plain cross section structure, we use the following reduced form of an equation:

$$D_i = \beta_0 + \sum_{j=1}^{J} \beta_j X_{ji} + \sum_{k=1}^{K} \beta_{k+J} W_{ki} + u_i \quad (3.1)$$

D_i is the household participation and contribution to formal and informal saving intermediaries. K is the number of excluded exogenous regressors. J equals to 2 and X_i is the vector of two variables: the short-term precautionary motive and the number of insurance contracts. These two variables are separated from the others since the main concern of the study is to investigate the role of the short-term precautionary motive and insurance on household decisions towards saving mechanisms. W_{ki} is a vector of exogenous variables including household head's characteristics and household's characteristics. Household head's characteristics are gender, education, employer and age. The education of the household head's variable takes three different values: (1) tertiary and above, (2) vocational training or other diplomas, and (3) below primary-school level of education (i.e. has not finished elementary education or no school enrollment at all). The employer of the household head is classified into governmental sector, firms and enterprises, private employers (small business owners or other households). The base category is the self-employed household head. Household's characteristics include household wealth (measuring total wealth of a given household), the number of household members, dependency rate (rate of household members not in the labor force), ethnicity, household location, and the number of insurance contracts that households signed and hold.

Because the dependent variable contains censored values (left-censored zero), the Tobit model is normally used to conduct estimations (Cameron and Trivedi, 2010). However, as the Tobit model often faces weaknesses during the diagnostic analysis such as

normality and heteroskedasticity[35], we use the two-part model instead. The two-part model consists of two separated parts: a binary outcome model (first part) and a linear model (second part). Being a binary model, the Probit model is employed in the first part to estimate the probability of household participation to formal and informal saving intermediaries in rural Vietnam. The dependent variable (D_i) in equation (3.1) is a dummy variable, receiving a value of one for participants and of zero for non-participants, i.e. in the binary estimation, D_i receives 1 if the household *i* has deposits in either formal or informal saving intermediaries and D_i receives 0 if the household *i* hoards cash.

The linear model in the second part estimates the household contribution to formal or informal saving intermediaries in rural Vietnam. The dependent variable (D_i) in equation (3.1) is the natural logarithm of household deposits in saving intermediaries. In other words, D_i measures the level of a participant's deposits in formal and/or informal saving intermediaries. If the error term in the model is related to the regressor, the OLS estimators will be inconsistent and cannot yield a causal interpretation. Two main variables, the short-term precautionary motive and the number of insurance contracts are in this case considered to be endogenously determined. The instrumental-variables (IV) method is employed to eliminate the endogeneity issue of these two variables.

A set of instruments is used to control for the endogeneity of the endogenous variables. This set composes three exogenous variables comprising ethnicity, gender of the household head, and the distance between the household and the center of the town. Some intuitive explanations could be used to prove the possible impacts of these instruments on the precautionary motive and insurance. First, people belonging to the Kinh ethnicity may have easier access to organizations as this group makes up for

[35] Appendix B.2

85.7% of total population in 2009. The second largest ethnicity – the Tay group – accounts for only 1.89% (UNFPA, 2011). The ethnic origin of households is still relatively important in Vietnam. This means that people belonging to the larger Kinh group might have better connections and stronger networks they can rely on, which may reduce the precautionary motive but increase other motives as investment or buying high-value durable goods. The gender of the household head may affect saving motives, especially in developing economies. As shown in table 3.2 of the descriptive statistics, the role of males in households seems to be dominant as the rate of male household heads is 82% in the complete sample (82% in the non-participant group, and 80% in the participant group). In Eastern countries, women are often taking care of work within the house such as homework and child care while men are mainly considered to be the main income source and responsible for work outside the house. Also the male is normally the decision taker in the household and he is the main connection to people outside the family. A female household head may concentrate more on the short-term precautionary motive while a male household head may focus more on the long-term investment motive, which can yield additional income. Insurance was found to be influenced by gender. Gender differences have significant impacts on insurance in many studies (Rand and Tarp, 2011; Dong *et al*., 2003; Buor, 2004; Thoursie, 2007). The female claimants were found to receive lower payments from insurances than men, holding other factors constant (Doerspinghaus *et al*., 2008). Additionally, insurance was affected by the distance variable, which was considered as a proxy of transaction costs. Distance can be seen as an important factor which can impede the insurance sector in developing economies. Buor (2004) proved that the distance to health facilities has high impacts on female insurance utilization. In another study, Dong *et al*. (2003) found that the distance to health facilities had negative influence on the willingness-to-pay of the insurance.

The data used for this study is from a household survey of rural areas in Vietnam, namely VARHS08 (Vietnam Access to Resources Household Survey: Characteristics of the Vietnamese Rural Economy, 2008 Survey). This survey was funded by Danida and conducted by the Central Institute for Economic Management (CIEM), in cooperation with the University of Copenhagen, the Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD), and the Institute for Labor Science and Social Affairs (ILSSA)[36]. The full dataset comes from the surveys in 2006, 2008 and 2010, but an existing access limitation does hinder us to attain the richness of the whole dataset. The accessible part of the data is the 2008 section, which we use here.

A total of 3269 households participated in this survey. The survey questionnaires comprise a wide range of household and household member characteristics such as household demographics, land use, agricultural production, household assets, occupation and income, training, savings, credits, shocks and social networks. Households surveyed spread from the north to the south of Vietnam. The households are classified into four regions: Northern Midlands – mountain, North Central, Central Highlands, and Mekong River Delta. A sample of 1342 households is used for the study and these share the same characteristic: namely that they have monetary savings, which are either kept at home (in form of cash, gold, and jewelry) or deposited in financial intermediaries (formal or informal). Households that do both, cash hoarding and depositing in financial institutions are excluded from the sample.

[36] http://www.ambhanoi.um.dk/en/menu/AboutUs/News/NewsArchives2009/HouseholdSurvey2008Launched.htm

Table 3.1: Saving motives

Motives	Number (and %) of households				
	All	Non-participants	Participants		
			Both	Formal	Informal
Short-term precautionary motive	594 (44.26)	544 (46.98)	50 (27.17)	24 (29.27)	27 (25.47)
Protecting against bad harvest and natural disasters	104 (7.75)	90 (7.77)	14 (7.61)	7 (8.54)	7 (6.60)
Health care expenses	304 (22.65)	280 (24.18)	24 (13.04)	15 (18.29)	9 (8.49)
Buying agricultural inputs	186 (13.86)	174 (15.03)	12 (6.52)	2 (2.44)	11 (10.38)
Long-term motive	748 (55.74)	614 (53.02)	134 (72.83)	58 (70.73)	79 (74.53)
Accumulating for big expenditures	375 (27.94)	312 (26.94)	63 (34.24)	23 (28.05)	42 (39.62)
Providing for old age	132 (9.84)	104 (8.98)	28 (15.22)	15 (18.29)	13 (12.26)
Profit-making investment	27 (2.01)	12 (1.04)	15 (8.15)	5 (6.10)	10 (9.43)
Cost of education	139 (10.36)	121 (10.45)	18 (9.78)	13 (15.85)	6 (5.66)
Others	75 (5.59)	65 (5.61)	10 (5.43)	2 (2.44)	8 (7.55)
Total	1342	1158	184	82	106

Note: numbers in parentheses are percentage

Table 3.1 provides the general picture of household monetary savings in rural Vietnam. There is a big gap between keeping monetary savings at home and depositing savings in financial institutions. While most households (86.3% or 1158 over 1342 households) keep their monetary savings at home (non-participants), only 13.7% of savers deposit monetary savings to saving intermediaries. However, among participants, formal and informal participants share quite equivalent portions with 44.6% and 57.6%, respectively. The numbers are consistent with those in urban Pakistan (Carpenter and Jensen, 2002).

The data description also provides answers to the question: Why do households save? For reasons of data availability, these motives are separated into two categories: short-term precautionary and long-term motives. The short-term precautionary motive (including protecting against bad harvest and natural disasters, health care expenses, and buying agricultural inputs) is defined as those in which savings can be used for short-term, regular, and unforeseen circumstances. We add savings for agricultural inputs as one of the short-term precautionary motives since in rural Vietnam most households engage in agricultural production, what demands from households to put aside a certain amount of money for inputs such as seeds, fertilizers, or labor. Farmers often face problems with these inputs such as the low quality of seeds and fertilizers, increasing working salaries for seasonal labors, or extra expenses for water and electricity. The long-term motives represent those purposes in which savings are not used for regular, immediate or sudden needs. In the full sample, households pay more attention to long-term motives (55.74%) rather than short-term precautionary motives (44.26%). However, participants and non-participants behave differently. While in the total sample, the rates of non-participants with short-term precautionary and long-term motives do not largely differ from each other, most of participants (72.83%) save for

their long-term motives. Health care expenses is the most concerned issue within the short-term precautionary motives, while the accumulation for big expenditures is the most important issue within long-term motives. This is in accordance with Besley *et al.* (1993) and Kedir and Ibrahim (2011). There is a distinction when we compare with the profit-making investment motive. Within non-participants, the investment motive accounts for only one per cent, while the figures of the participanting groups are much higher with 8.15%, 6.1%, and 9.43% for all participants, formal participants, and informal participants, respectively.

Table 3.2 presents descriptive statistics for some other variables used in the study. Relating to household head's characteristics, the data shows that most household heads are male (82%). Only a low rate of household heads work outside their own households as a majority (70%) of household heads work as self-employed workers within their own households. 20% of household heads are employed by individuals, 6.2% by the public or government sector, and 2.5% by firms or enterprises. There is no highly significant difference among non-participants and others in detailed comparisons. The educational indicator separates education of household heads into three levels. The first level (Primary) represents those who are illiterate or did not finish primary school. With 90% most household heads are in this category. 8.1% of household heads completed vocational training, professional high school or junior diploma (Vocational) while the tertiary education (Tertiary) represents 2.2% of total household heads. The mean difference of the second educational level is statistically significant when we compare participants and non-participants or when we compare non-participants and formal participants.

Table 3.2: Summary statistics of selected variables

	All	Non-participants	Participants		
			Both	Formal participants	Informal participants
Employer of household head					
Public sector	.062	.055	.103**	.110	.094
Firms	.025	.024	.033	.037	.038
Private	.209	.212	.190	.134*	.236
Self-employed	.704	.709	.674	.719	.632
Male	.820	.820	.800	.790	.800
Primary	.897	.906	.842	.756	.906
Vocational	.081	.073	.125**	.195***	.075
Tertiary	.022	.021	.033	.049	.019
Ethnicity	.707	.685	.848***	.939***	.783**
Dependency rate	.34	.35	.28 ***	.31	.24 ***
Number of person in household	4.7	4.8	4.4 ***	4.2 ***	4.6
Location of household					
North	.383	.361	.522***	.476**	.566***
Center	.227	.244	.120***	.220	.038***
Highlands	.282	.302	.152***	.256	.075***
South	.108	.093	.206	.048	.321
Number of insurance	1.33	1.28	1.64 ***	1.72 ***	1.6***
Observations	1342	1158	184	82	106

**** p<0.01, ** p<0.05, * p<0.1 (significance level of mean differences when compared to non-participants)*

Most households are located in the North (38.3%) and in Central Vietnam (22.7%). 28.2% are from the Central Highlands and 10.8% are from the Mekong River Delta. The ethnicity also seems to differ among non-participants and others. The Kinh group – the largest ethnic group in Vietnam – makes up for 70.7% of total observations, and other ethnics make up for the rest (29.3%). The dependency rate (the rate of under-16 years old and over-60 years old people of total household members) within the non-participant group is relatively higher than that within the participant group. One channel for the precautionary selection, namely insurance, is employed by most households in the sample. The data shows that 84% of households hold at least one insurance contract for their households or for their members. On average, each household engages in 1.33 insurance schemes. There exists a mean difference regarding the number of insurance contracts between formal participants and non-participants, and between informal participants and non-participants. The average number of insurance contracts that participants signed and hold is statistically higher than that of non-participants at the 5% significance level.

3.3. The results

3.3.1. Household participation in saving intermediaries

In the binary model, we consider the impact of the precautionary motive's selection and insurance factor on three different groups of households. The first group, including all households (non-participants and participants), is called the total group. The second group includes non-participants and formal participants and it is called the formal group. The third group, namely the informal group, includes non-participants and informal participants. We compare the participation probability between the two parties within each group.

For robustness, three estimations have been run for each household group. The first estimation includes only the two concerned variables (the precautionary motive and the number of insurance contracts). For the second estimation, we add the household head's variables as control factors, and the third estimation employs both household head's variables and household's characteristics, as control variables.

Table 3.3 presents the estimation results regarding the household participation probability to formal and informal saving intermediaries. The influence of the short-term precautionary variable and the insurance variable is robust across estimations and household groups.

The results confirm *hypothesis 3.1*. They indicate that the short-term precautionary motive may lead to a decreasing probability of households to deposit to saving intermediaries in rural Vietnam. This means that households whose saving efforts are mainly driven by the short-term precautionary motive will have less tendency to deposit their monetary savings to saving intermediaries or they exert cash hoarding for precautionary reasons. The informal participants seem to play a dominant role compared to the formal participants, as the full sample is mainly affected by the sign and significance level of the informal participants. Within the formal group, the effect is not highly significant while the impact in the informal group is statistically highly significant, what in turn results in a high significance in the full sample. The impact of the precautionary motive is also larger within the informal group, what is reflected by a larger coefficient. That means that households driven by the short-run precautionary motive may have a higher probability to deposit to informal saving intermediaries when comparing with the probability of these households to deposit to formal saving institutions.

Table 3.3: Probit estimation results of household's participation in saving intermediaries

	Saving intermediaries								
	Total			Formal			Informal		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Precautionary motive	-0.44***	-0.42***	-0.38***	-0.32***	-0.30**	-0.24*	-0.45***	-0.46***	-0.45***
	(0.09)	(0.09)	(0.10)	(0.12)	(0.12)	(0.13)	(0.11)	(0.11)	(0.12)
Insurance	0.19***	0.17***	0.17***	0.21***	0.16***	0.20***	0.16***	0.16***	0.14**
	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)	(0.07)	(0.06)	(0.06)	(0.07)
Household head's characteristics									
Lnage		0.30*	0.32		0.64***	0.81***		0.02	-0.08
		(0.16)	(0.20)		(0.21)	(0.26)		(0.19)	(0.24)
Vocational		0.13	0.05		0.44***	0.36*		-0.23	-0.28
		(0.15)	(0.16)		(0.17)	(0.18)		(0.19)	(0.22)
Tertiary		-0.06	-0.11		0.23	0.13		-0.35	-0.28
		(0.29)	(0.32)		(0.32)	(0.34)		(0.43)	(0.50)
Gov		0.24	0.24		0.14	0.17		0.30	0.20
		(0.18)	(0.19)		(0.23)	(0.23)		(0.22)	(0.25)
Firms		0.12	0.08		0.08	0.10		0.25	0.09
		(0.26)	(0.28)		(0.32)	(0.33)		(0.30)	(0.32)
Private		0.02	0.13		-0.10	0.10		0.11	0.16
		(0.12)	(0.12)		(0.17)	(0.18)		(0.13)	(0.14)
Household's charcteristics									
Dependency rate			-0.37**			-0.16			-0.57**
			(0.19)			(0.23)			(0.24)
Person			-0.09***			-0.15***			-0.03
			(0.03)			(0.05)			(0.03)
LnWealth			0.34***			0.46***			0.22***
			(0.06)			(0.07)			(0.06)
North			0.05			1.09***			-0.24
			(0.15)			(0.28)			(0.16)
Center			-0.56***			0.81***			-1.24***
			(0.17)			(0.30)			(0.24)
Highlands			-0.55***			0.82***			-1.15***
			(0.17)			(0.30)			(0.21)
Constant	-1.20***	-2.40***	-6.01***	-1.69***	-4.20***	-10.87***	-1.44***	-1.53**	-3.10**
	(0.09)	(0.66)	(1.14)	(0.12)	(0.88)	(1.55)	(0.11)	(0.75)	(1.30)
Observations	1,342	1,342	1,342	1,240	1,240	1,240	1,264	1,264	1,264

*Robust standard errors in parentheses, *** p<0.01, ** p<0. 05, * p<0.1*

The negative impact of the short-term precautionary selection may indicate that in case of the short-term precautionary motive, the cost of cash hoarding cannot be fully covered by its benefits. These costs can be the opportunity cost as no interest is paid, the risk of theft, or even the destruction of money (e.g. by fire). The benefits in this case are the return to savings in the form of deposits and the opportunity cost of not paying the transaction cost when households engage in saving intermediaries. A short cost-benefit analysis may lead households to the decision to keep monetary savings under the pillow instead of depositing savings in formal and informal saving intermediaries.

Hypothesis 3.2 is empirically supported as the insurance system is found to be a supplement for the precautionary savings motive. In the estimations, the number of insurance contracts is statistically significant and positively related to household participation. In both cases, formal and informal participation, the more types of insurance the household has, the higher the probability of household participation to saving intermediaries is. The results confirm the precautionary view as households protecting themselves by paying for insurance will reduce their need to exert cash hoarding for precautionary reasons. The insurance system can thus push households to take part in formal and informal financial institutions. The results regarding insurance and the short-term precautionary motive prove that insurance can be used as a substitute for monetary savings at home and a large number of insurance contracts per household reduce the probability cash hoarding being exerted in rural households in Vietnam.

The results regarding the control variables show that the education level of household heads has no effect on household decisions where to put their monetary savings (in formal or informal saving intermediaries). Similar to Kedir and Ibrahim (2011), whose results show that there is no evidence of any public sector impact on participation decisions regarding ROSCAs, we find that the sector that employs the household head

does not statistically affect the household participation to saving intermediaries. The dependency rate seems to decrease the household motivation to join saving intermediaries in the general case. A higher dependency rate may associate with a high demand for precautionary savings or a high liquidity of savings. For example, households with a high rate of young individuals need more resources for monthly expenditures like for health, education, and others, so these households have to put aside more of their monetary savings for the sake of the precautionary motive. However, the effect is statistically insignificant for the formal participants while the coefficients still share the negative signs. The insignificance of the impact in the aggregated group may come from the dominant role of the dependency rate in the informal group.

The empirical results in this part confirm our *hypothesis 3.1* namely that the household's selection of the short-term precautionary saving motive will reduce the probability of the household engaging in formal and informal saving intermediaries. In addition, insurance is found to have significant impacts on the participation probability, which means that the findings support for our *hypothesis 3.2*, stating that insurance can substitute for the short-term precautionary motive.

3.3.1. The participant's contribution to saving intermediaries

The second part presents the participant's contribution to formal or informal saving intermediaries. In this part, non-participants are excluded from the sample. In other words, all households in the sample used for these estimations are either formal participants or informal participants. Regarding participants in general and informal participants (except for the first estimation), the Hausman tests indicate that the endogeneity issue persists. In order to eliminate the problem of weak instruments, the IV LIML model is used in those estimations. With regard to estimations for formal

participants, the exogenous hypothesis test cannot be rejected, so the robust OLS estimation is used to yield consistent results.

The results in table 3.4 show the determinants of the participant's contribution to saving intermediaries in rural Vietnam. The first three specifications are for all participants. The next three specifications are for the formal participants, and last three for the informal participants, respectively. Most variables are less significant compared to those in the probit estimations. This may result from the smaller sample size with 82 and 106 observations in the formal participant group and the informal participant group, respectively.

Hypothesis 3.3 is empirically confirmed in the case of formal participants. The short-term precautionary motive has negative effects on the participant's contribution to formal saving intermediaries. However, these impacts are less significant than those estimated in the participation aspect with the probit specifications. The magnitude of the coefficient is again larger in the informal participant case. This may be explained by the probability that formal participants behave consistent with the precautionary motive in either participation or contribution. With a less-developed insurance system, the precautionary motive is primarily dominant. When households focus on the precautionary reason, they deposit less in saving intermediaries, especially in the case we speak about formal saving intermediaries, which may generate higher transaction costs as well as less liquidity compared to cash hoarding.

Table 3.4: Linear estimation results of participant's contributions to saving intermediaries

	Savings intermediaries								
	Total			Formal			Informal		
	(1)[a]	(2)[a]	(3)[a]	(4)[b]	(5)[b]	(6)[b]	(7)[b]	(8)[a]	(9)[a]
Precautionary motive	-4.09	-4.76	-4.94	-0.66**	-0.69**	-0.68*	-0.23	-4.30	-6.47
	(3.36)	(3.99)	(4.33)	(0.26)	(0.29)	(0.36)	(0.25)	(9.69)	(5.85)
Insurance	1.17	1.43	1.56	0.07	0.05	-0.00	0.30*	0.71	-1.25
	(1.78)	(1.91)	(2.68)	(0.12)	(0.13)	(0.11)	(0.15)	(4.30)	(2.99)
Household head's characteristics									
Lnage		-0.87	-0.70		-0.66	-0.33		-3.24	-5.07
		(1.04)	(1.00)		(0.59)	(0.58)		(4.73)	(3.83)
Vocational		-0.54	-0.90		0.32	0.11		-0.29	1.66
		(2.42)	(3.01)		(0.36)	(0.36)		(4.58)	(3.36)
Tertiary		-0.84	-1.33		-0.15	-0.10		0.44	-1.68
		(1.12)	(1.22)		(0.60)	(0.69)		(3.40)	(2.35)
Gov		-1.77	-1.65		-0.43	-0.03		-0.25	1.52
		(1.44)	(1.80)		(0.59)	(0.63)		(3.75)	(2.88)
Firms		-1.67	-1.28		-0.29	0.19		-2.39	-2.95
		(1.04)	(1.06)		(0.27)	(0.39)		(4.06)	(2.25)
Private		-1.80**	-1.39**		-0.13	0.33		-2.00	-2.83
		(0.72)	(0.70)		(0.40)	(0.42)		(1.89)	(1.88)
Household's charcteristics									
Dependency rate			-0.08			0.03			2.21
			(0.91)			(0.56)			(2.18)
Person			-0.05			-0.05			0.14
			(0.25)			(0.08)			(0.38)
LnWealth			0.20			0.49***			0.93
			(0.34)			(0.15)			(0.69)
North			0.56			-0.14			-2.38
			(1.97)			(0.50)			(2.93)
Center			1.10			-0.05			0.92
			(0.90)			(0.54)			(1.94)
Highlands			2.12**			0.46			-0.50
			(1.01)			(0.49)			(1.50)
Constant	8.72**	12.54*	8.65	10.54***	13.23***	5.64**	8.38***	21.88	20.88
	(3.41)	(6.79)	(7.17)	(0.25)	(2.39)	(2.47)	(0.29)	(27.24)	(14.59)
Observations	184	184	184	82	82	82	106	106	106

*Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

[a] estimations use the IV LIML method, and [b] the estimations use the normal OLS

Hypothesis 3.4 is not quantitatively supported as there is no significant impact of the number of insurance contracts on the household contribution to saving intermediaries. It implies that regardless of the number of insurance that the household holds, formal and informal participants deposit indifferently to saving intermediaries. These participants may have other resources, which can insure households against risks and uncertainty such as support from relatives and friends. Therefore they are self-confident to cover all their expenses in case they have to and do not count only on insurances. So, little attention is paid to the insurance issue and the empirical results reject *hypothesis 3.4*.

The contribution of participants to saving intermediaries differs between formal participants with the short-term precautionary saving motive and those with the long-term saving motive. However, the role of the insurance is not significant in determining the level of the participant's contribution to saving intermediaries.

The results of the household participation and contribution to formal and informal saving intermediaries may give some implications for policy makers. First, with an under-development of the financial system and a cash-based economy, transaction costs may be important in determining household decisions in choosing saving intermediaries. Policies aiming at reducing the cost of savings in saving intermediaries should be emphasized and the decentralization of formal mechanisms can be a solution. The opening of branches locally or the appearance of financial representatives or agents can increase the liquidity of the household deposits. This can reduce the transaction cost, which can be considered as the main obstacle for the household participation into saving institutions. Formal rural financial institutions such as the Vietnam Bank for Agriculture and Rural Development (VBA), the Vietnam Bank for the Poor (VBP), the People's Credit Fund (PCFs) can combine financial tools to reduce the transaction costs and thus to attract more deposits. These tools can be deposit incentives such as the

variation of deposit types, the flexibility of deposit time and interest rates, etc. Another way to reduce the transaction cost is prolonging the working time of financial agents during working days and at the weekend. This could be more economical than opening new branches. Second, policy makers can encourage households to deposit to saving intermediaries by increasing the credibility of informal financial institutions. Private money lenders and ROSCAs should be observed by the local authorities through a registration procedure, which ensures informal financial activities to properly perform. Being recognized by law, informal financial intermediaries in Vietnam might attract many more participants. However, the informal financial intermediaries are unregistered and operate privately, and they receive no control, observation, or audits from governmental offices. This may be the main reason for many recent bankruptcies of many informal intermediaries, and as a result, it reduces the credibility of the informal intermediaries, which leads to a possible decrease of the household participation and contribution to this type of financial mechanism. In addition, promoting the insurance system is one direction to foster the household participation to saving intermediaries. Rural households can use insurance schemes as a channel to insure against risks rather than by hoarding cash. Households being insured tend to leave the short-term precautionary selection and move towards other long-term motives, which leads households to use more services of financial intermediaries.

3.4. Conclusions

The paper presents empirical evidence for what role the short-term precautionary motive and insurance play in affecting the household participation and contribution to saving institutions in rural Vietnam. Using the two-part model, we identify the impact of the precautionary motive and the number of insurance contracts on both, household participation and participant's contribution separately. The probit model is used to test

hypothesis 3.1 and *hypothesis 3.2*. *Hypothesis 3.1* states that households which regard the precautionary motive as the primary reason for their savings will have a higher probability of cash hoarding or less probability to join any saving intermediaries compared to those households who prefer long-term motives. *Hypothesis 3.2* states that insurance can be regarded a substitute for the short-term precautionary motive. The linear model is employed to answer the third and the forth hypotheses in this part, which investigate the role of the short-term precautionary savings motive and the number of insurance contracts in participant's contribution to saving intermediaries.

The study finds that the first two hypotheses (*hypothesis 3.1* and *3.2*) are empirically supported, while *hypothesis 3.3* is partially proven. The results lead to a rejection of *hypothesis 3.4*. First, the household selection between the short-term precautionary saving motive and the long-term motive statistically differ in the engagement to saving intermediaries. If the primary motive is short-term precaution, households tend to exert cash hoarding rather than to deposit their savings to saving intermediaries. Second, we find that in order to substitute for short-term precautionary savings, insurance can be used as a channel, as the number of insurance contracts is found to be positively related to the participation probability. Third, with regard to participant's contributions, which measure the household deposits in saving intermediaries, the short-term precautionary variable has significant impacts on household deposits in formal saving intermediaries. Differences in selection between the short-term precautionary and long-term saving motives will lead to differences in formal participant's contributions. Furthermore, the study finds no significant evidence for insurances' influence on participant's contributions to saving intermediaries in rural Vietnam.

4. INSTITUTIONAL ENVIRONMENT, HUMAN CAPITAL, AND FIRM GROWTH: EVIDENCE FROM VIETNAM

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4.1. Introduction

Countries try to develop through expansion of a market economy. Entrepreneurship is a core element of developing a market economy. As a result, many studies have focused on entrepreneurship in developed and transitional countries.[37] However, in developing countries which start to turn into a modern market economy, we do not know much about entrepreneurship and we are not clear about what fosters firms and firm growth under the conditions these infant market economies provide. Existing theories on firm growth do not sufficiently consider the institutional environment of less developed markets in developing economies (Sleuwaegen and Goedhuys, 2002). Furthermore, the literature has not fully investigated the contribution of entrepreneurial activities, which is one of the important factors to consider in underdeveloped and low income economies (Gries and Naude, 2011). If we know more about the institutional environment and if we can identify which entrepreneurial characteristics are needed in order to be successful, the answers can be useful for policy designers regarding how to foster firm growth. The purpose of this paper is to examine the role factors describing

[37] Dunne *et al.* (1989), Dunne and Hughes (1994), Liu *et al.* (1999), Burke *et al.* (2000), Reichstein and Dahl (2004), Yusada (2005), Honjo and Harada (2006), Praag (2006), Park *et al.* (2010), Tomczyk *et al.* (2013)

the institutional environment (or institutional factors) and the entrepreneur's education play for firm growth in a low income, infant market economy like Vietnam. The empirical study has found that the institutional environment significantly affects firm performance. A more surprising finding is that the institutional factors are more significantly affecting the growth of a firm's capital than that of a firm's employment. Furthermore, firm growth is affected by skills and abilities of entrepreneurs.

The firm dynamics originate from Gibrat's law of proportion effect (LPE), which is the base for stochastic models. It states that the firm growth function is a randomly distributed model. According to this law, firm growth is independent of its size. Size distribution of firms will increase with time and firms share the same growth opportunities across size (Bigsten and Gebreeyesus, 2006). However, in accordance to recent studies in developed and transitional economies, many empirical researches in developing economies showed that the Gibrat's Law does not hold. In an empirical study, McPherson (1996) finds that there exists a negative relationship between firm growth and both firm size and firm age when he investigates micro and small firms in southern Africa. Using the linear estimation method, he considers determinants of firm growth as size and age, sector, location, human capital, and socio-economic variables. Sector differentiates firm growth as firms in the construction and the service sector have probably higher growth rates. Firms in urban and commercial areas grow more rapidly than those in rural and suburban areas. Gender discrimination is found to persist as firms with male entrepreneurs experience higher growth rates. Mead and Liedholm (1998) descriptively support the inclusion that there is a negative impact of firm age, firm size and female entrepreneurs on firm growth. They conduct a survey to examine the determinants of growth of micro and small firms in Dominica and five African countries (Botswana, Kenya, Malawi, Swaziland, and Zimbabwe). They find that

enterprises in these countries grow faster if they are smaller, younger, and male-headed firms. The sectorial variable differently affects firm growth across countries. However, the study of Biesebroeck (2005) finds superior performance of large firms. To investigate the impacts of firm size on firm growth and productivity of manufacturing enterprises in nine sub-Saharan African countries, the study uses a panel data set from 1992 to 1996 including approximately 200 firms per country. The results reveal that the largest manufacturing firms display the highest growth rates in sub-Saharan African countries. Firms with 100 employees and above are more productive and more likely to survive. Large firms are found to grow faster and to increase productivity faster. The aggregate productivity growth is largely dependent on the performance of large firms. The contribution of micro and small firms to aggregate productivity growth is not remarkable.

Apart from enterprise characteristics, institutional factors such as the quality and quantity of infrastructure, the nature and the enforcement of business regulations, property rights, and the openness of public resources are considered as important determinants of firm growth (Aterido *et al.*, 2011). Sleuwaegen and Goedhuys (2002) use data of manufacturing firms in Côte d'Ivoire to investigate the influence of institutional elements on firm growth. A sample of 185 manufacturing firms from 1995 was selected. Quantitative results indicate that the legitimation of firms has positive impacts on firm growth and that there exists a negative relationship between firm growth and both, firm size and firm age. Results show that firm growth obstacles, including regulatory barriers, market constraints, infrastructure, and financial constraints differ systematically with firm size. Large and micro firms report less frequent constraints compared to small and medium firms. Fisman and Svensson (2007) employ firm data in Uganda to study the impacts of bribery payments and taxes on firm

growth. These two business environment factors are found to have negative impacts on firm growth, whereby the negative influence of corruption is more severe to firm performance than that of taxation. Corruption is also considered an obstacle to firm growth in the work of Honorati and Mengistae (2007). The growth of small-scale manufacturing firms in India is examined and a relatively small sample size has been employed. Four institutional factors including corruption, labor regulation, access to finance, and the quality of power supplies are obstacles to business operation and growth. Hallward-Driemeier *et al.* (2006) emphasize the importance of the investment climate for firm performance in China with a large sample size of 1,500 firms. Technological infrastructure, government regulatory burdens, and corruption matter largely, while labor market flexibility and access to finance are found to have less impact on firm growth. In another study using a large number of firms, Dollar *et al.* (2005) investigate the investment climate and its impacts on firm growth in 4 developing countries, including China, Bangladesh, India, and Pakistan. There is a significant variation of investment climates within each country and the role local government plays is important. Power outages and customs delays are the most severe obstacles for firm productivity and profitability. The availability of financial services strongly relates to firm growth. However, they do not find any impacts of general issues of governance and corruption across countries and locations. The influence of corruption is considered in detail in the research of Wang and You (2012), which indicates that corruption likely fosters firm growth in China. This study also shows that the disparity of financial development across regions affects firm growth. Because of the imperfect Chinese financial market, higher probability to access external finance is supposed to enhance firm growth.

The literature on firm growth in Vietnam is relatively rare. This may result from the unavailability of firm-level data, which requires many resources. Hansen *et al.* (2009) use data from three overlapping surveys during the period of 1990 and 2000 to investigate the impacts of government assistance and other interactions with the state sector on long-term performance of small and medium size manufacturing enterprises in Vietnam. Starting with a total of 447 firms in 1990, the data set is reduced to 300 incumbent firms in 2000 due to the combination of three different datasets. The determinants of SME growth have been indicated. Firm size relates negatively to firm growth while urban firms grow faster than their rural counterparts. Sole proprietorship, cooperatives, and limited liability firms also grow faster than household firms. The initial government assistance seems to have positive impacts on firm growth. Firms that have the state sector as a customer grow faster than those without customers from the state sector. Another study with 337 manufacturing SMEs in 2005 has been done by Tuan and Yoshi (2009) employing the normal OLS for multiple estimators. The results reveal that SMEs introducing new products grow faster than those without new products. Firm size, firm age, and competition intensity negatively relate to firm growth, while higher private shares will promote the growth of firms. Nguyen and Dijk (2012) use data of 874 enterprises from a survey in 2005 to analyze the relationship between corruption and growth of private and state-owned enterprises in Vietnam. They use three different perceived measures for corruption and find that corruption is harmful to growth of private firms but not for state-owned firms. They also induce that the quality of provincial public governance such as land access, private sector development policy, and the costs of new business entries can generate significant differences in the level of corruption across provinces in Vietnam.

The literature on the role the institutional environment plays for firm growth and performance in developing economies is rather limited. Most previous studies use either firm-level subjective or objective measures for the institutional environment and no study is able to look at a comprehensive number of institutional conditions. Firm-level subjective measures represent a firm's attitude towards the business environment and the data relies on questions such as: "Do business associations play an important role in advising and countering policy?" And the answer may be a Likert scale ranked from 1 to 5 or higher. The objective measures relate to countable values of the business environment such as "How many times did your firm receive tax inspections last year?". We would like to fill this literature gap by employing absolutely new indicators as proxies for the institutional environment. These indicators compromise both objective and subjective measures and are considered comprehensive indicators for the institutional environment. These indicators are professionally established to measure different dimensions of the business environment and are regarded as critical tools for measuring and assessing the standards of economic governance in Vietnam (VCCI, 2013). This is one objective of this paper and we therefore concentrate on the role the institutional environment plays for firm growth in Vietnam as a representative for developing economies. Deriving the idea from the theoretical work of Gries and Naude (2011), it is suggested that successful entrepreneurial activities are more likely if the market environment allows a match between entrepreneurial ideas and opportunities in the market to establish a successful business, we form *hypothesis 4.1* with additional modifications:

Hypothesis 4.1: Higher levels of institutional factors will be positively related to firm growth.

This hypothesis implies that firms located in provinces which have experienced higher points on the institutional quality scale will associate with higher growth rates. In other words, the business environment created by the local authority is considered a determinant of firm performance and the quality of local economic governance will affect firm growth in the same direction.

The literature on firm dynamics in developing economies seems to neglect the role of entrepreneurial human capital. Relatively few studies have focused on this issue and the results are mixed. The study of McPherson (1996) includes entrepreneurial human capital to the model and finds that human capital positively relates to firm growth. Enterprises with trained entrepreneurs grow faster than those with untrained entrepreneurs. However, entrepreneurial human capital seems to have no impacts on growth according to other studies. Hansen *et al.* (2009) measure the impacts of entrepreneurial human capital by adding the level of education of the entrepreneur into the model specifications, but they don't find any significant evidence for the effect of this variable on firm performance. The study of Tuan and Yoshi (2009) leads to the same conclusion when they use two indicators for human capital of entrepreneurs including education and working experience in the specifications. Both indicators for human capital are found to have no impact on firm growth. In order to fill the gap in the literature, we would like to examine the role of entrepreneurial human capital on firm growth in Vietnam and following the theoretical work of Gries and Naude (2011) on the impacts of human development on entrepreneurial functioning,[38] we form *hypothesis 4.2*:

[38] *Which implies that the human capital development will associate with a higher degree of entrepreneurial functioning.*

Hypothesis 4.2: Human capital development of entrepreneurs will associate with a higher degree of firm performance or a higher level of education of entrepreneurs will result in higher growth rates of firms.

Hypothesis 4.2 states that firms with entrepreneurs with higher levels of education are likely to experience higher growth rates.

In order to justify these two hypotheses, we use firm-level data in combination with provincial data. One important contribution of this study is that it employs a rich data set from a yearly census, which has not been explored before reaching a total of over 233,000 enterprises in 2009. A high number of observations can give a general and comprehensive picture about the growth process of firms in the context of different local business environments in Vietnam. In addition, the combination of time-series data and cross-section data allows us to apply a more in-depth methodology by implementing more reliable estimation methods for panel data. We employ the dynamic model and control for the endogeneity of firm variables. To investigate the role of the entrepreneur's education and how it influences firm growth, we use the fixed effect estimation method.

The empirical results in Vietnam show that higher level of the institutional factors such as business support service, land access, time costs, and informal charges will associate with higher growth rates of firms. The impacts of these institutional indicators can be observed in both dimensions of firm growth: employment and capital. An interesting finding is that the institutional factors have more significant impacts on the growth rate of a firm's capital than on the growth rate of a firm's employment.

That there is an impact of education on firm growth is confirmed. Firms that have entrepreneurs with a bachelor degree experience higher labor growth rates if these firms operate in the agriculture or service sector. We found no significant evidence for this

same relationship when it comes to industrial firms. The influence of the entrepreneur's education on capital growth is not so clear. The results indicate that higher levels of education of entrepreneurs foster the capital growth of firms if these firms operate in the service sector while there is no significant evidence for an education effect in the agriculture and industry sectors.

The paper is structured as follows. Section II will present the empirical analysis which describes both descriptive and econometric methods used in this paper. Section III analyzes the empirical results in which the roles the institutional environment and the entrepreneur's education play for firm growth are highlighted. Section IV gives conclusions for the paper.

4.2. Data and Methodology

4.2.1. Data sources

The data used in this study has been retrieved from four main sources. *Firstly*, the firm data is extracted from the annual enterprise censuses conducted by the General Statistics Office of Vietnam (GSO). The annual census which started in 2000 has surveyed 100% of incumbent state-owned, private and foreign enterprises (except those controlled by the Ministry of Defense and the Ministry of Police) in Vietnam. All enterprises in the survey are formally registered. The number of enterprises increased from 42,307 in 2000 to 233,236 in 2009. The survey is led by the GSO, and the Provincial Department Statistics Offices (DSO) are responsible for the data collection process. Entrepreneurs are asked to submit a completed answer sheet of the questionnaire to the respective DSO. The database contains two main sources of information: a) the enterprise's characteristics such as the enterprise's name, address, type, sector and b) the enterprise's structure such as the number of employees, wages, sales, R&D activities, environmental protection activities. More questions have been gradually added to the

questionnaire in recent censuses. Some information just appears in the two surveys of 2008 and 2009 i.e. the entrepreneur's level of education or the information about the firm's technical issues. This dataset is the most comprehensive and largest source about entrepreneurship in Vietnam. The *second* source is the GSO website which provides data about the different provinces. The province-level dataset is collected on a yearly basis and published afterwards in the Statistical Yearbook of Vietnam. The *third* source is the Vietnamese Chamber of Commerce and Industry (VCCI). The VCCI provides data on the different indicators describing the institutional environment surrounding entrepreneurship in Vietnam. These indicators are considered highly important and are the only measure of the institutional environment that has been compiled by official institutions in Vietnam. The *last* data source made use of is the World Bank website which supplies the GDP deflator of Vietnam for the study period. By means of the GDP deflator, we calculate the real growth rate of firm capital.

4.2.2. The dependent variable: firm growth

As in the studies of Dollar *et al.* (2005), Hallward-Driemeier *et al.* (2006), Aterido *et al.* (2011), Aterido and Hallward-Driemeier (2007), we consider firm growth in the dimensions of employment growth and capital growth. Following Allen *et al.* (2007) and Nguyen and Dijk (2012) we define that the employment growth is the rate of difference in the number of employees between $year_t$ and $year_{t-1}$ relative to the number of employees in $year_{t-1}$. The firm-level capital growth is similarly calculated using the position of total firm assets. We consider the real growth rate of firm capital since the value of total assets in the latter year (Y_t) is adjusted by the GDP deflator to the previous year (Y_{t-1}) before we get to the subtraction in the above fraction.

4.2.3. The institutional environment and firm growth

4.2.3.1. Institutional variables

We examine the impacts of the institutional environment on the growth rates of firms. Our investigation is based on a set of institutional indicators including nine different indicators measuring the business and institutional environment in Vietnam. These nine indicators comprise both, firm-level subjective and objective measures for the business environment to assess the economic governance on the provincial level. The aggregate measurement PCI (Provincial Competitiveness Index) is a weighted combination of these nine indicators and the PCI is regarded as the overall measurement of provincial governance. These institutional indicators have been developed since 2005 by the Vietnamese Chamber of Commerce and Industry (VCCI) and the U.S. Agency for International Development (USAID) (PCI, 2013). They are standardized to a ten-point scale and are: (i) ENTRYCOST: time cost to register, to get licenses, and perceived degree of difficulty to get all licenses; (ii) LANDACCESS: how easy to access land and the security of tenure; (iii) TRANSPARENCY: transparency and access to information and legal documents; (iv) TIMECOST: time waste on bureaucratic compliance and inspections; (v) INFORCHARGE: informal charges; (vi) PROACTIVITY: creativity and cleverness of provincial officials in implementing central policies; (vii) SUPPORTSERVICE: availability of business support; (viii) LABORTRAIN: efforts of provincial authorities for training and skill development; and (ix) LEGAL: private sector's confidence in provincial legal institutions.[39] A high score means: (*a*) less costs and charges with regard to the indicators (i), (iv), and (v), and (*b*): good governance with regard to the other indicators.

[39] *The definitions of indicators are given in Appendix C.1.*

4.2.3.2. Control variables

The control variables consist of two groups: firm specifics and provincial characteristics. Firm-specific covariates include ownership, location, age, size, and capital structure. First, firm ownership is divided into public, private, and foreign firms. Ownership is classified, according to who is the majority shareholder: i.e. public enterprises are those in which more than 50% of total shares are in hands of the public sector. Two dummy variables (PUBLIC and PRIVATE) are used for the firm ownership covariate. Second, the location of a firm's headquarter is considered the respective firm's location. We separate location into three main regions: the north, the center, and the south of Vietnam. Two location dummies (SOUTH and NORTH) are used.

Firm age (AGE) is included to the model to test whether the Gibrat's LPE holds or not. Firm age is a numeric variable and is measured in years. We expect that AGE has negative impacts on firm growth. We also include firm size (SIZE) into the model and SIZE is measured by the firm's total assets and it is expected to have negative effects on firm growth since large firms tend to grow slower than smaller ones. The capital structure of firms (STRUCTURE), which is measured by the rate between total liabilities and total assets of a firm at the beginning of the financial year, is included. It is used as a proxy for internal finance and is used to test whether firm growth is financially constrained.

Provincial characteristics are also supposed to have impacts on firm growth. To capture the provincial impacts, we concentrate on four main categories: urbanization, population growth, public investment and average human capital. First, the rate of people living in urban areas within one province (URBAN) is used to measure the urbanization-rate. Enterprises in regions with a relatively high urban density may experience higher growth rates than those enterprises operating in rural areas due to a better access to

input and output markets. Highly urbanized areas in Vietnam are often big cities, which can provide large quantities and highly differentiated production factors such as capital and labor. Largely urbanized areas represent a large market for a firm's products at least if their outputs are consumed domestically. Most main ports are located in large cities and being located closely minimizes the transportation costs for firms, whose products are exported. As a pure population indicator may correlate with the urbanization variable we use the growth rate of population (POPULATION) instead. Third, firms may grow due to the attractiveness of the regional economic environment and the presence of public infrastructure. In order to capture these potentially favorable conditions that might be provided, we use annual public investment per capita (INVESTMENT) as an indicator on the provincial level to account for investment in the economic environment. We do not use the total annual public investment since provinces large in population and economic size can receive more capital from the central government, and the average capital can eliminate the difference in the provincial size. The quality of the labor force is one last important factor of the provincial characteristics considered here. The average number of students as a share of the total provincial population (STUDENT) is used as a proxy for the labor force quality.

4.2.3.3. Samples

In order to verify *hypothesis 4.1*, we compile the first dataset, which combines enterprise information from 2006 to 2009 with provincial data of the same period. The first dataset is a balanced panel containing a total of 37,788 firms in three main categories: agriculture, industry and services.

Figure 4.1 shows the shares of firms in each sector. Agricultural firms account for 4% of the total number of firms but their shares of total employees and capital are much

higher with 44% and 41%, respectively. 41% of the firms operate in the industrial sector, employing 44% of total employees, and binding 32% of total assets. The total share of service firms is largest (50%) but the employment and capital shares are lower than those of agricultural and industrial firms. The above figures indicate that agricultural enterprises are on average larger than those firms operating in service and industrial sectors in both aspects: employment and capital.

Figure 4.1: Share of firms

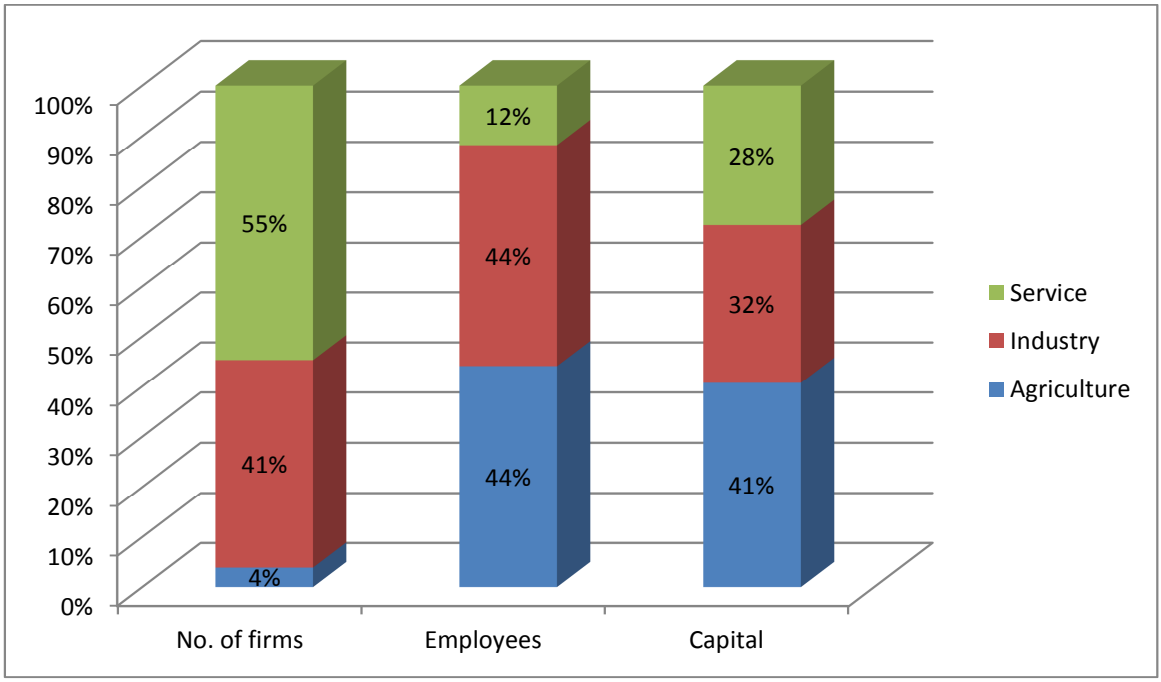

Table 4.1: Employment growth and capital growth

	Mean	25th percentile	Median	75th percentile
Employment growth	.100	0	0	.071
Agriculture	.061	0	0	.056
Industry	.125	-.038	0	.101
Service	.085	.000	0	.043
Capital growth	.200	-.113	.004	.256
Agriculture	.112	-.119	-.034	.117
Industry	.184	-.115	.008	.254
Service	.356	-.111	.004	.268

Table 4.1 reports the mean and the standard deviation of employment growth and capital growth across sectors. According to our sample, the average growth rate of total employees during the research period is 10%, which is lower than the 12% Aterido *et al.* (2011) report of. Across sectors, agricultural firms experience the lowest growth rates. Industrial firms grow twice as fast as agricultural firms. Firm capital grows at an average rate of 32.5% yearly. Service firms experience the highest growth rates (35.6% on average) during the period under consideration, while the capital of agriculture firms grows slowest, namely at a rate of 23% yearly. Both agricultural and industrial growth rates stay below average.

Graphically, the employment growth rate of firms, which is presented in Figure 4.2, fluctuates across time and sector. At most points of time, except in 2008, employment growth of agricultural firms is lower than those of industrial and service firms. The growth trend of agricultural firms is different from those firms operating in the industry and service sector. While in 2008, agricultural firms experienced higher growth rates in employment compared to 2007, reaching the highest level (9.6%) in 4 years, the employment growth rate in industrial and service firms decreased by about 1% and 3.3%, respectively. Growth trends of firm capital are identical in all sectors. Figure 4.3 shows that there was a large slowdown in capital growth during 2008 and 2009. In 2009 capital grew faster again. In 2008, the capital growth rate of industrial and service firms was at about 4% while these figures were roughly 24% in respect of industrial and 30% in respect of service firms in the years 2007 and 2009. One common feature is that firms of all sectors experienced significant lower grow rates in 2008. This may reflect the worldwide economic recession that started the year before.

Figure 4.2: Average employment growth of firms

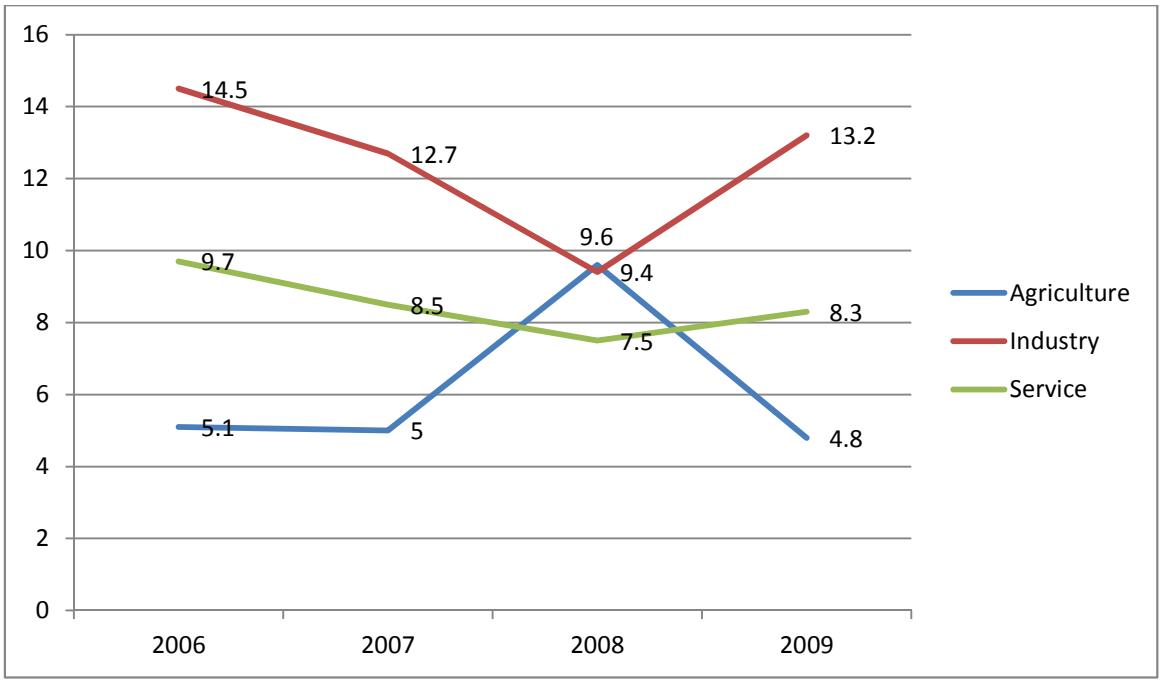

Figure 4.3: Average capital growth of firms

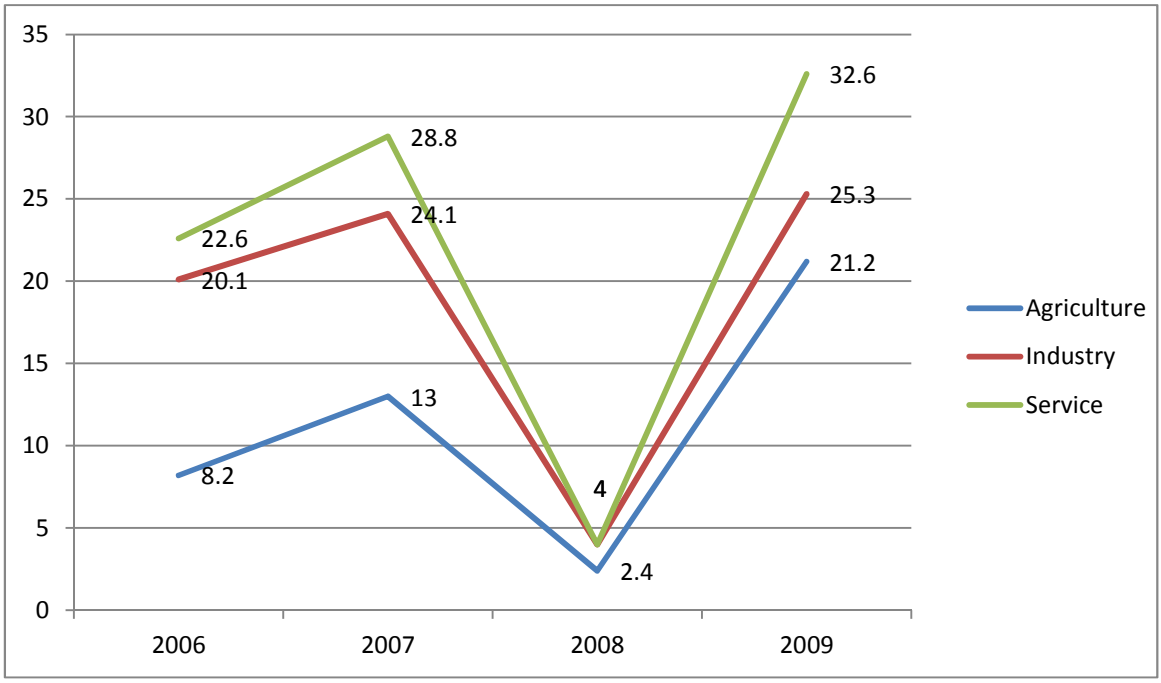

Table 4.2 reports descriptive statistics of variables used in the study. Most firms are privately owned while public and foreign firms represent only a small number of total firms with 6% and 7%, respectively. The ratio of debt to total assets is 0.48. However, the high standard deviation shows that this rate differs more extremely among firms in Vietnam than those in Japan (Honjo and Harada, 2006). There is a high number of firms

located in the south (41%). 26% of firms are located in the Center and 34% of firms are located in the North.

Table 4.2: Variable descriptions and statistics

Variable	Description	Mean	S.D.
Dependent variable			
Emp_growth	Employment growth	.100	.672
Cap_growth	Capital growth	.200	1.110
Entreprenuer's characteristics*			
EDU	University degree gained (yes = 1)	.720	.449
AGE_ENT	Age of the entreprenuer	47.234	9.097
MALE	Gender of the entrepreneur (male =1)	.791	.406
Firm's characteristics			
STRUCTURE	Rate of total liability to total assets at the beginning of year	.478	1.421
PUBLIC	Public sector holds more than 50% shares (yes = 1)	.063	.244
PRIVATE	Private sector holds more than 50% shares (yes = 1)	.866	.341
FOREIGN	Foreign sector holds more than 50% shares (yes = 1)	.071	.257
AGE	Age of firm	8.330	6.868
SIZE	Total firm's assets	.052	.717
NORTH	Firm's headquarter locate in the North (yes = 1)	.337	.473
CENTER	Firm's headquarter locate in the Center (yes = 1)	.257	.440
SOUTH	Firm's headquarter locate in the South (yes = 1)	.406	.491
Provincial characteristics			
URBAN	Urban rate	.377	.263
POPULATION	Population growth	1.444	4.178
STUDENT	Number of students per capita	39.277	45.520
INVESTMENT	Public investment per capita	82.708	93.016

** Statistics for two years (2008 and 2009) only*

4.2.3.4. Methodology

The lack of empirical evidence on the determinants of successful entrepreneurship in low income and infant market economies motivates this study and we investigate the impacts of institutional factors on firm growth in such economies. We use a firm-level dataset within the country's boundaries to explore the impacts of the institutional environment on firm growth in Vietnam.

Most previous studies investigate the growth of firms on the basis of cross-sectional estimations with specifications of augmented covariates in firm characteristics. The cross-sectional data implies that the observed variables fully reflect the heterogeneity of firms, and represent factors affecting firm growth. However, firm growth can be affected by potentially observable variables, which are not included in the model. The unobserved heterogeneity can cause the coefficients to be biased. Panel data can help to control for the unobserved heterogeneity within the analysis of firm growth (Bigsten and Gebreeyesus, 2006). Making use of our panel dataset, we employ the dynamic setting to estimate the impact the institutional environment has on firm growth by means of the following general specification:

$$\Delta Y_{it} = \beta \Delta Y_{it-1} + \alpha I_{it} + \gamma X_{it} + \mu_i + u_{it} \quad (4.1)$$

Where ΔY_{it} represents firm growth, (I_{it}) the institutional variables, X_i the control variables, μ_i unobserved and time-invariant effects, and u_{it} the pure error term. As the control variables X_{it} compose the firm-specific covariates (Z_{it}) and the province-specific covariates (S_{it}), the equation (4.1) can be modified as follows:

$$\Delta Y_{it} = \beta \Delta Y_{it-1} + \alpha I_{it} + \theta Z_{it} + \rho S_{it} + \delta_i + \nu_i + u_{it} \quad (4.2)$$

δ_i are unobserved and firm-specific time-invariant effects, and ν_i are unobserved and province-specific time-invariant effects.

A simple OLS estimation of the equation (4.2) will yield inconsistent results since the endogeneity issue arises when the growth of firms (left-hand side) is a function of firm-specific factors (δ_i) or of the lag of firm growth (ΔY_{it-1}). In order to get around the endogeneity issue, the instrumental variable method is applied. One way to do this is the first difference generalized method of moments (GMM) estimator, which was formed in 1991 by Arellano and Bond. This method can eliminate the unobserved firm effects by first differencing and employing the lagged values of all endogenous variables as instruments. The first difference GMM estimators are consistent only in case of no serial correlation of the error term. However, our dataset does not ensure the absence of serial correlation. We therefore use the system GMM, which was proposed by Blundell and Bond in 1998. In the system GMM model, lagged differences of endogenous variables are additionally counted as instruments in different additional moments. The province-level variables are more likely to be exogenous to the firm since any specific firm has only minor impacts on provincial averages. In addition, the existence of province-level variables and sector differentiation in estimations might help to control for macro factors which might affect institutional variables and firm growth.

4.2.4. The entrepreneur's human capital and firm growth

4.2.4.1. The entrepreneur's human capital and additional variables

To investigate the impacts of the entrepreneur's human capital on the growth of firms, we use the entrepreneur's level of education as the proxy for the entrepreneur's human capital. The entrepreneur's education (EDU) is measured as a dichotomous variable, which receives 1 if the entrepreneur has a university degree or higher (Colombo and Grilli, 2005; Capelleras and Rabetino, 2008; Capelleras and Hoxha, 2010). Some of the entrepreneur's characteristics are added as control variables in this part. The gender of the entrepreneur (MALE) is added to the model and is coded 1 if the entrepreneur is

male. The entrepreneur's age (AGE_ENT) is a numeric variable and measured in years at the survey time. Other control variables presented in the previous part are also included.

4.2.4.2. Samples

To respond to *hypothesis 4.2* regarding the role of human capital, we match the first with the second data source. Since the data regarding the entrepreneur's education are available only for the years 2008 and 2009, the balanced sheet of data contains these two periods only. After the matching process, the new dataset is a balanced panel with 38,293 enterprises including 1,573 agricultural firms, 15,720 industrial firms, and 21,018 service firms. Table 4.2 reports some entrepreneurial characteristics. The share of entrepreneurs that have a university degree is 72% which is higher than that in Argentina, Brazil, Mexico, and Peru (Capelleras and Rabetino, 2008) or in Kosova (Capelleras and Hoxha, 2010). Most firms (78%) are headed by a male. This figure is comparable to those in other developing economies (Coad and Tamvada, 2012; Capelleras and Rabetino, 2008) but much higher than that in transitional and developed economies (Capelleras and Hoxha, 2010; Tomczyk *et al*., 2013). The average age of entrepreneurs is 47, which is equal to that in the research of Tomczyk *et al*. (2013) and is higher than those in Capelleras and Rabetino (2008) or Capelleras and Hoxha (2010).

4.2.4.3. Methodology

In line with the theoretical ideas of Gries and Naude (2011)[40], the firm-level dataset allows us to examine the effects of the entrepreneur's education on firm performance in Vietnam. To respond to *hypothesis 4.2*, we re-modify equation (4.2):

$$\Delta Y_{it} = \beta EDU_{it} + \alpha I_{it} + \theta Z_{it} + \rho S_{it} + \delta_i + \nu_i + u_{it} \qquad (4.3)$$

[40] *Which states that human development will associate with a higher degree of entrepreneurial functioning.*

Because of the plain of short panel data, we estimate equation (4.3) with either fixed effects (FE) or random effects (RE) estimators. In order to choose consistent estimators, the paper uses a double-check procedure for the estimation selection. The first check employs the Hausman test for fixed effects. Under the null hypothesis that the effects are random, the Hausman test will compare the coefficients of time-varying regressors. In the second step, we compare FE and RE estimators with the existence of cluster-robust standard errors. The Sargan-Hansen test is used for this selection process. The results of these two tests lead us to select consistent estimators. In order to yield robust results without being confronted with the threads of heteroskedasticity, the estimations with cluster-robust standard errors will be applied.

4.3. The results

4.3.1. The institutional environment and firm growth

In this section, the results will be presented and first we will concentrate on the response to *hypothesis 4.1*. We expect that higher scores on the institutional indicator-scale, which represents a more favorable institutional environment for a firm's operations, will associate with higher growth rates of firms.

Table 4.3 reports the estimations using the system GMM to identify the effects of the institutional environment on firm growth regarding employment and capital. The first three columns are for employment growth of firms in the agriculture, industry, and service sectors. The firm-level capital growth for each of the three sectors respectively, is presented in the last three columns.

Table 4.3: Estimation of impacts of the institutional environment on firm growth using the system GMM

VARIABLES	Employment growth			Capital growth		
	Agriculture	Industry	Service	Agriculture	Industry	Service
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	1.449	0.371	-0.011	-0.943	0.920**	4.456***
	(2.143)	(0.327)	(0.179)	(0.651)	(0.395)	(1.514)
Emp_growth_{-1}	-1.337***	-0.907	-0.016			
	(0.510)	(0.720)	(0.273)			
Cap_growth_{-1}				-1.233***	-1.198***	-1.105***
				(0.256)	(0.134)	(0.123)
ENTRYCOST	0.010	0.008	0.006	0.023	-0.023*	0.001
	(0.027)	(0.017)	(0.007)	(0.025)	(0.013)	(0.013)
LANDACCESS	0.017	0.032**	0.011	0.016	0.080***	0.036***
	(0.036)	(0.014)	(0.007)	(0.025)	(0.016)	(0.012)
TRANSPARENCY	-0.047	-0.030*	-0.012	-0.047*	-0.026**	-0.019
	(0.040)	(0.017)	(0.011)	(0.026)	(0.012)	(0.012)
TIMECOST	-0.010	-0.014	0.002	0.016	0.008	0.031***
	(0.015)	(0.010)	(0.004)	(0.020)	(0.009)	(0.007)
INFORMALCHARGE	0.100***	0.020	-0.017*	0.092**	0.038**	0.026*
	(0.036)	(0.024)	(0.009)	(0.040)	(0.016)	(0.015)
PROACTIVITY	-0.009	-0.008	0.014*	-0.001	-0.034***	-0.009
	(0.013)	(0.010)	(0.008)	(0.017)	(0.011)	(0.008)
SUPPORTSERVICE	0.039*	0.038**	0.010**	0.050**	0.045***	0.017**
	(0.023)	(0.017)	(0.004)	(0.022)	(0.009)	(0.008)
LABORTRAIN	-0.022	-0.023*	-0.014**	-0.030	-0.030***	-0.000
	(0.025)	(0.013)	(0.006)	(0.027)	(0.011)	(0.013)
LEGAL	-0.022	-0.011	-0.002	-0.012	-0.027**	-0.029***
	(0.020)	(0.015)	(0.005)	(0.020)	(0.012)	(0.010)
STRUCTURE	-0.067	0.252*	0.049	0.916*	-0.205	0.322
	(0.342)	(0.143)	(0.043)	(0.476)	(0.171)	(0.244)
PUBLIC	-3.123	0.120	0.266	-0.047	-0.441	-3.615**
	(2.801)	(0.485)	(0.257)	(0.666)	(0.664)	(1.674)
PRIVATE	-1.526	-0.288	0.076	0.324	-0.577	-4.373***
	(1.983)	(0.370)	(0.173)	(0.672)	(0.459)	(1.522)
SIZE	-0.015	-0.080**	0.002	0.000	-0.121***	-0.024*
	(0.034)	(0.039)	(0.002)	(0.013)	(0.045)	(0.014)

AGE	0.024	-0.017***	-0.006**	-0.004	-0.017***	-0.035***
	(0.017)	(0.005)	(0.003)	(0.005)	(0.004)	(0.006)
NORTH	-0.083	-0.006	0.075***	0.054	0.084***	0.085***
	(0.078)	(0.022)	(0.019)	(0.087)	(0.028)	(0.027)
SOUTH	-0.267	-0.052	0.019**	0.146	-0.107	0.015
	(0.206)	(0.062)	(0.008)	(0.098)	(0.069)	(0.031)
URBAN	-0.039	0.077	0.120***	-0.565**	0.069	-0.212*
	(0.421)	(0.086)	(0.035)	(0.221)	(0.070)	(0.117)
POPULATION	-0.004**	0.000	0.000	-0.004*	-0.000	-0.002
	(0.002)	(0.001)	(0.001)	(0.003)	(0.001)	(0.002)
STUDENT	-0.001	0.000	-0.000**	0.002*	0.002***	0.002***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)
INVESTMENT	0.000	-0.000	-0.000***	0.000	-0.001**	-0.001**
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Diagnostic tests						
Sargan overidentification	8.09 [.15]	8.23 [.08]	2.73 [.74]	14.96 [.13]	2.27 [.52]	8.54 [.38]
Hansen overidentification	8.09 [.15]	7.69 [.10]	7.95 [.16]	15.88 [.10]	2.18 [.54]	12.04 [.15]
Instruments	27	26	27	32	25	30
Observations	3,988	45,314	58,349	3,988	45,314	58,241
Number of enterprises	1,472	15,639	20,677	1,472	15,639	20,674

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Within the process of conducting the system GMM estimations, we firstly run and compare various specifications based on different sets of instruments. These sets of instruments include all exogenous variables plus different lags of endogenous variables such as first lags, second lags, and third lags with and without earlier lags. Within these sets, the number of exogenous variables is fixed whereas the number of lagged endogenous instruments varies according to different estimations. On the basis of the Sargan and Hansen test of overidentification, the set of instruments including exogenous variables and earlier lags of endogenous variables passes the overidentification restrictions. Thus, table 4.3 presents the system GMM estimations with exogenous variables as well as earlier lags of endogenous variables as instruments, which can provide consistent and reasonable estimates of interest. Since there is evidence of an unequal variance of the error term, which causes heteroscedasticity, we compute all estimations with robust standard errors.

Entry costs and firm growth: the entry costs seem to have no effect on the growth rate of firms, except for the negative impacts on the growth of firm capital in the industry sector. This is because the major concerns in respect to entry costs is related to the start-up process of entrepreneurship such as the time to register, to acquire licenses as well as the number of licenses needed. The establishment of new branches which is part of the growth process of firms has also to fulfill these administrative requirements. Firms may have become familiar with all the procedures leading to the fact that this factor cause no impact. Another reason may be that there exists little difference in entry costs across provinces, i.e. the time to receive all necessary licenses and the number of licenses required depend on nationally regulated policies and are therefore uniquely adopted in the whole country.

Land access and security of tenure: The openness of land access and the security of tenures seem to be important to firm growth. Easier access to land and more security of land tenures once land is already acquired, will result in higher growth rates of firms. Land and its tenures is always connected with agricultural enterprises, however we do not find any significant evidence for the fact that land access and land tenures influence the performance of these firms. One reason may be that the quality of land is more important than the quantity of land for agricultural firms and the growth depends on the investment such as increasing land fertility or applying new techniques to increase the land output. Industrial firms are largely affected by this factor in both areas: employment and capital growth. These outcomes may result from the construction investment such as buildings and machinery, which absorb much of firm resources. The ease to access land and high security of land tenure will assure industrial firms to have rights and possibilities for a long-term production. Land access and tenure are also found to have effects on capital growth of service firms.

Transparency and access to information: the results indicate that a higher level of transparency will associate with lower growth rates of firms. This relationship is significant in respect to the employment growth of industrial firms and the capital growth of industrial and also agricultural firms. This indicator seems to have no significant impacts on the growth rate of firms operating in the service sector. The negative impacts may result from the fact that in active markets, new laws and policies have not been well communicated to specific firms. Such markets will attract and contain a large number of firms, which then can be overwhelmed by the local authority's ability to fully cover communication with all individual firms within the province. The insufficient connectivity between the local authority and firms may result in the fact that these provinces receive lower scores at this indicator.

Time costs of regulatory compliance: A relatively high value of this index indicates a reduced waste of time for bureaucratic compliance and local inspections. The variable has a significant influence on capital growth of service enterprises while it does not impact firms in other sectors. The insignificance of this indicator when it comes to agricultural and industrial firms may imply that bureaucratic compliance processes are very similar across provinces. In addition, the frequency of inspections by local regulatory agencies has been regulated at the national level, thus the number of inspections may be comparable across all firms and all sectors.

Informal charges: less informal charges will generally support higher growth rates of firms. This indicator fully supports *hypothesis 4.1* regarding the capital growth of firms as we find positive and significant impacts across all types of firms. The results imply that less extra fees will promote firm growth. Our findings are similar to those of some previous literature (Aidis, 2005; Krasniki, 2007; Capelleras and Hoxha, 2010; Nguyen and Dijk, 2012). However, when it comes to the effect informal charges have on employment growth, we find a positive relationship.

Proactivity of provincial leadership: The influence of proactivity on firm growth is rather moderate. We find that the employment growth of service firms is positively related to proactivity whereas proactivity impacts capital growth of industrial firms negatively.

Business support services: the support services seem to be the most important institutional factor that promotes growth of enterprises in Vietnam. It is found that higher levels of business support such as trade promotion, information provision, business partner matchmaking, technological services as well as the quality of these services, will foster firm growth. So, this kind of support services can be considered growth incentives. Our result is supported by the study of Hansen *et al.* (2009), as they

also found that initial government assistance has positive impacts on firm growth. This finding is relatively close to the matching theory of Gries and Naude (2011) as a match between support services, given by local government, and the business plan, ability, or vision of enterprises appears and this match is absorbed by the firms leading to growth or expansion.

Labor and training: the results indicate that provincial efforts to promote vocational training and skill development for local industries relate negatively to growth rates of industrial firms. This variable also affects employment growth of service firms while there is no evidence for any influence on agricultural firms. The negative impacts on industrial firms may have two reasons. Firstly, more efforts of local authorities are made in those provinces, where the labor skills and techniques are relatively low and firms in these sites grow slower than those in other provinces. The second reason may be that although the provincial government in some cases is putting more attention to vocational training programs, this attention alone is not sufficient to improve the quality of regional workers. The lack of qualified workers can thus result in lower growth rates of firms compared to those in other provinces.

Legal institutions: this subjectively perceived factor affects capital growth of industrial and service firms negatively. It is revealed that firms experiencing higher growth rates have less faith in the stability of provincial legal institutions and in the possibility that local institutions can be an effective way for dispute solving. The firm's negative attitude towards local institutions is understandable because of the instability of legal regulations and laws in most developing economies. In these economies, the application and effectuation of laws and regulations by legal institutions may vary across provinces as the local authorities can use their power to (i) issue new sub-regulations that directly influence the business performance, (ii) intervene in the dispute resolutions, or (iii)

cover themselves against the appeal of an investigation of corrupt behavior. Entrepreneurs who made experiences of this kind or are in general skeptical of the local administration and its ambitions may forecast eventual adverse impacts in the future. Therefore, they may already prepare solutions for any negative effects resulting from the behavior and sanctions enforced by legal institutions, and thus their resulting losses may be less severe in the case of adverse selections.

Turning to control variables, in most specifications, firm age coefficients receive negative values and they are statistically significant in the industry and service sector. It means that the Gibrat's LPE does not hold in the case of industrial and service firms regarding both: employment growth and capital growth aspects. Our results find that older enterprises grow slower than younger ones when looking at firms active in the industry or service sector. This finding is supported by previous literature e.g. Sleuwaegen and Goedhuys (2002), Honjo and Harada (2006), Tuan and Yoshi (2009), Coad and Tamada (2012), and Wang and You (2012). One common feature is that, except for the study by Honjo and Harada (2006), which concerns Japanese data, the other studies refered to also focused on developing economies such as Cote I'voire, India, or China. Most studies which rejected Gibrat's Law, and therefore found positive relationships between firm age and firm growth, used data from developed and transitional economies. This may indicate how different the economic environment is in developing economies when comparing with more advanced economies. An economic boom in developing economies may create more growth opportunities for those firms, which are relatively new, as compared to the older firms. We find no statistical evidence for a firm age effect on firm growth in agricultural enterprises. Firm size is found to have negative impacts on growth of industrial firms. This is in accordance with most of the theoretical and empirical literature on firm dynamics (Sleuwaegen and Goedhuys,

2002; Honjo and Harada, 2006; Capelleras and Hoxha, 2010; Mateev and Anastasov, 2010; Park *et al.*, 2010; Coad and Tamada, 2012, etc) since mature firms tend to grow at lower rates than smaller ones. This indicates the diminishing returns of size to firm growth. However, the impacts of size on growth of agricultural and service firms are not clear and statistically insignificant.

Looking at firm characteristics, the coefficients of capital structure are positive and statistically significant in employment growth of industrial firms and capital growth of agricultural firms. These findings are consistent with the study of Honjo and Harada (2006), in which the capital structure was found to have impacts on firm growth and these impacts vary across dependent variables. Other specifications propose that the debt to total assets rate negatively enters the growth equations or equals zero. These findings were launched by the empirical study of Honorati and Mengistae (2007) as they used the same system GMM estimation for firm growth and generally found very little evidence for any impacts the capital structure may have on firm growth. Our results lead to the same conclusion, namely that firm growth is not financially constrained.

The influence of firm ownership on firm growth is not clear, except for the capital growth rate of service firms. In this case, we find that public and private ownership influence firm growth negatively. That means firms whose majority shareholder is the public or private sector, grow at lower rates compared to firms with foreign majority shareholders. The legal ownership structure has no significant influence on firm growth in other specifications. Our results are partially contradicting the study of Hansen *et al.* (2009), in which household firms are found to experience lower revenue growth rates compared to larger sole proprietorship firms, cooperatives, and limited liability firms. The reason for the results may come from differences in the sample classification and in

the sample size. While we classify all firms on the basis of ownership, Hansen *et al.* (2009) base their classification on the formal registration of a given firm, and they also exclude foreign firms from the sample. The second reason for the difference in results may be that Hansen *et al*. (2009) use a much smaller sample compared to ours. The effects of a firm's location on growth are statistically significant for service firms. The findings meet the expectation that firms in the north and the south, where the two largest economic centers, Hanoi and Hochiminh City are located, will experience higher growth rates than those in the center of Vietnam.

Regarding the provincial characteristics, the urbanization rate coefficient is significant in service firms, which accordingly experience higher employment growth, but lower capital growth rates. Agriculture firms are found to be negatively affected by a high rate of urbanization, while there is no influence of urbanization found in other specifications. The negative impact of the urbanization rate on the growth of agriculture firms may be the result of the industrialization and urbanization process, which began with the implementation of economic reforms in 1986. Since that time, the government has concentrated on the industry and service sector. The reform switched the economic regime from a centrally-planned economy to a market-oriented economy. The reform has pushed the economy forward, which has been going hand in hand with an increasing urban population and some of these newly arising townsmen lost their cultivated shields to industrial enterprises.

Population growth seems to have no impact on firm growth. Its coefficients are mostly statistically insignificant in all specifications. The variable used to measure public investment has significant and negative signs in industrial or service firms. It implies that firms will grow faster in provinces that have lower average public investment. In Vietnam, the government often calls for investment from the private and foreign sector

in all areas, including infrastructure (e.g. building new roads and bridges in the form of build-operate-transfer). Public investment is often conducted in areas where there is a lack of private and foreign investment such as schools, hospitals, and infrastructure in remote areas. Therefore, areas where private and foreign investment finds less economic opportunity, and thus leading to slower firm growth, may experience a higher public investment per capita in order to compensate for the missing private and foreign investment flow. The proxy for the quality of human capital, the number of students per capita, has strong impacts on capital growth and less influences on the employment growth of firms. This indicates that a higher quality of labor in the area will associate with higher growth rates of firm capital. The influence of labor quality on employment growth is not strong, as this variable is only found to impact service firms.

In sum, the empirical results divide institutional factors into two groups. The first group statistically supports *hypothesis 4.1* which states that higher levels on the institutional environment scale will associate with higher growth rates of firms. This group includes the factors: business support service, land access, time costs, and informal charges. The second group, including the factors: entry costs, transparency, proactivity, labor and training, and legal institutions, does not give significant evidence to support our *hypothesis 4.1*. The results also indicate that the most significant effects these factors provoke, are related to the capital growth, rather than the employment growth of firms.

4.3.2. The entrepreneur's human capital and firm growth

Table 4.4 presents the estimations of employment and capital growth using the fixed-effects (FE) model. The Hausman test indicates a highly and statistically significant difference. This leads to the rejection of the null hypothesis and thus the FE model will yield the more consistent estimators. The Sargan-Hansen test also strongly rejects the

null hypothesis of RE and we can therefore conclude that the FE models are more appropriate. Therefore FE estimators with cluster-robust standard errors are selected.

The results partly confirm *hypothesis 4.2,* stating that the human capital development of the entrepreneur will associate with a higher degree of firm performance or that a higher level of the entrepreneur's education will result in higher growth rates of firms. Unlike other studies such as those of Hansen *et al.* (2009), and Tuan and Yoshi (2009) which found no statistically significant evidence of educational effects on firm growth, our study finds that the entrepreneur's education has significant impacts on firm growth in some cases. The positive coefficients of the entrepreneur's education imply that enterprises headed by entrepreneurs with a solid educational background are more likely to experience growth rates above the average. Using a dummy variable, we find that the entrepreneur's education has a significant influence on the employment growth of agricultural and service firms as well as capital growth within service firms. However, the entrepreneur's education does not affect growth rates of industrial firms; neither employment growth, nor capital growth. The growth of agricultural firms is also independent from their entrepreneurs' education.

Table 4.4: Estimation of impacts of the entrepreneur's education on firm growth using fixed-effects estimations

VARIABLES	Employment growth			Capital growth		
	Agriculture	Industry	Service	Agriculture	Industry	Service
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-3.938*	1.032	0.835**	-1.924	-2.299***	-2.221***
	(2.102)	(0.766)	(0.408)	(1.195)	(0.348)	(0.471)
ENTRYCOST	0.027	-0.100**	-0.029	-0.039	-0.018	0.004
	(0.116)	(0.041)	(0.031)	(0.040)	(0.018)	(0.024)
LANDACCESS	-0.161**	0.013	0.036*	-0.073**	-0.013	0.007
	(0.063)	(0.026)	(0.019)	(0.031)	(0.012)	(0.013)
TRANSPARENCY	0.273	0.079**	-0.020	-0.030	0.015	0.012
	(0.223)	(0.037)	(0.020)	(0.029)	(0.017)	(0.011)
TIMECOST	0.071	-0.012	0.015	-0.026	-0.018	0.007
	(0.072)	(0.029)	(0.015)	(0.039)	(0.013)	(0.010)
INFORMALCHARGE	-0.023	0.003	0.039	0.073*	-0.010	-0.029**
	(0.090)	(0.041)	(0.028)	(0.041)	(0.017)	(0.015)
PROACTIVITY	-0.039	-0.045*	-0.016	0.009	-0.004	-0.015
	(0.127)	(0.024)	(0.018)	(0.035)	(0.012)	(0.010)
SUPPORTSERVICE	-0.211	-0.054**	-0.002	0.007	-0.031***	-0.017*
	(0.154)	(0.027)	(0.012)	(0.033)	(0.011)	(0.010)
LABORTRAIN	0.355***	0.031	-0.013	0.013	0.032*	0.017
	(0.130)	(0.038)	(0.020)	(0.048)	(0.017)	(0.014)
LEGAL	-0.189**	0.055*	0.006	0.033	0.005	-0.004
	(0.082)	(0.032)	(0.022)	(0.026)	(0.012)	(0.012)
EDUCATION	0.710**	-0.049	0.093**	-0.014	-0.022	0.047*
	(0.327)	(0.051)	(0.037)	(0.067)	(0.022)	(0.026)
AGE_ENT	0.030	-0.004	-0.002	0.000	-0.000	0.019
	(0.018)	(0.005)	(0.003)	(0.002)	(0.002)	(0.017)
MALE	0.526	-0.081	-0.048	0.019	0.083**	-0.542
	(0.465)	(0.144)	(0.066)	(0.074)	(0.040)	(0.533)
STRUCTURE	0.063	0.013	0.002**	0.841***	0.233***	0.002
	(0.333)	(0.028)	(0.001)	(0.243)	(0.077)	(0.004)
PUBLIC	-0.234	0.155	-0.114	-0.654***	-0.094	-0.271
	(0.364)	(0.156)	(0.081)	(0.193)	(0.098)	(0.199)

PRIVATE	0.030	0.075	-0.138*	-0.600***	-0.086	-0.279
	(0.285)	(0.097)	(0.075)	(0.149)	(0.094)	(0.185)
AGE	0.061	-0.021	-0.022	0.216***	0.263***	0.257***
	(0.131)	(0.051)	(0.028)	(0.082)	(0.026)	(0.021)
SIZE	0.271	-0.211	0.013	-0.987***	-0.680***	-0.018
	(0.241)	(0.143)	(0.013)	(0.238)	(0.132)	(0.034)
URBAN	2.966	-0.316	-0.483	0.654	0.620*	-0.359
	(2.809)	(0.689)	(0.565)	(1.999)	(0.366)	(0.344)
POPULATION	-0.003	-0.002	-0.003	0.000	-0.001	0.003
	(0.006)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
STUDENT	0.002	0.005	-0.002	-0.003	-0.001	0.004
	(0.035)	(0.008)	(0.005)	(0.015)	(0.004)	(0.005)
INVESTMENT	-0.008*	-0.000	-0.001	-0.003**	-0.001**	-0.001
	(0.004)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Hausman FE vs. RE	128.51	179.62	234.12	64.94	525.33	174.39
p-value	[.00]	[.00]	[.00]	[.00]	[.00]	[.00]
Sargan-Hansen statistic	86.34	73.24	163.72	504.8	229.75	n.a.
p-value	[.00]	[.00]	[.00]	[.00]	[.00]	n.a.
Observations	3,130	30,561	40,070	3,130	30,561	40,070
Number of enterprises	1,573	15,702	21,018	1,573	15,702	21,018

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

4.4. Conclusions

Using a large-scale survey of all enterprises in Vietnam we investigate two hypotheses, drawing from the theoretical literature of Gries and Naude (2011), relating to firm success. *Hypothesis 4.1* states that a higher level of institutional factors will lead to firm growth in both, employment and capital dimensions. We use a balanced panel dataset consisting of a sample of 37,788 enterprises, applying system GMM estimators. Our data comes from the yearly censuses conducted by the GSO. In order to create a balanced panel dataset including all required variables, our period of investigation spans from 2006 to 2009. To make a detailed picture of the economy, we divide enterprises according to their sector of operation into the three groups: agriculture, industry and service. Firm growth is considered in two dimensions: employment growth and capital growth. The results show that institutional factors such as business support service, land access, time costs, and informal charges empirically confirm *hypothesis 4.1*, saying that a higher level of institutional environment scores will associate with higher growth rates of firms. However, we find that some institutional factors such as entry costs, transparency, proactivity, labor and training, and legal institutions do not support this hypothesis. The findings indicate an interesting result, namely that the impacts of institutional factors are not similar between employment growth and capital growth. More robust results are found when it comes to the capital growth of firms.

Within *hypothesis 4.2*, we examine whether the entrepreneur's education matters for firm growth. For data availability reasons, we form a balanced panel dataset with a two-year period from 2008 to 2009, including 38,293 enterprises in three sectors. Since the dataset is a short panel, we employ the fixed-effects model, which is proven to give more consistent estimates than the random effect model. Our results indicate that *hypothesis 4.2*, saying that a higher level of the entrepreneur's education will result in

higher growth rates of firms, is partially supported. The hypothesis is confirmed regarding employment and capital growth of service firms as well as regarding employment growth of agricultural firms. However, we find no significant impacts of the entrepreneur's education on employment growth and capital growth of industrial firms, and capital growth of agricultural firms.

5. Concluding remarks

This dissertation investigates household savings and capital formation in Vietnam. It comprises three separate empirical studies, focusing on (i) household savings and productive capital formation; (ii) household savings and saving mechanisms; and (iii) entrepreneurial capital formation, institutional environment, and human capital.

In chapter 2, we investigate the role of the social network nexus and the insurance nexus in determining household savings and productive capital formation in rural Vietnam. We analyze the issue in two dimensions, stocks and flows, and consider the exposure to negative shocks. The answer to the respective research question in this part is that the social network nexus has more impacts in "ex ante" rather than in "ex post" households. In both household groups, the effects of the insurance nexus dominate over those of the social network nexus. In case of stocks, we also find that the precautionary view is held in liquid assets but not in productive assets.

Continuing with the issue of household savings, chaper 3 investigates the impacts of the short-term precautionary selection and insurance on household decisions when it comes to the participation in saving mechanisms in rural Vietnam. The finding suggests that the short-term precautionary motive and insurance have impacts on household selections regarding different saving mechanisms. The persistence of the short-term precautionary motive reduces the household's probability to deposit to formal and informal saving intermediaries. In addition, insurance is found to be a substitute for short-term precautionary savings. Refering to the contribution aspect, the short-term precautionary motive is found to reduce the participant's deposits in formal saving intermediaries, while there is no evidence for insurance influencing on household's contributions to saving intermediaries.

In the forth chapter, the capital formation through entrepreneurship is examined, focusing on physical and human capital growth. In this chapter, the institutional environment and the entrepreneur's education are found to have impacts on firm growth in Vietnam. We find that in accordance to the theoretical literature, a higher level of institutional factors such as land access, time costs, informal charges, and business support service will promote firm growth regarding both dimensions considered: employment and capital. Another finding is that the impacts of institutional factors are more significant when it comes to the capital growth of firms. The impacts of the entrepreneur's education on firm growth are analyzed and the results support the hypothesis that higher levels of the entrepreneur's education will associate with higher growth rates of firms.

In summary, the study has indicated determinants of savings and capital formation in Vietnam. Social network and insurance are found to have impacts on savings and productive capital formation of households. Household selections of saving mechanisms are affected by the short-term precautionary motive as well as by insurance. When considering the capital formation of entrepreneurship, we find that institutional factors and the human capital of entrepreneurs do affect firm performance.

APPENDIX

A. Appendix for chapter 2

Appendix A.1: Variable definitions

Variables	Description
Total flow ratio	Ratio of the total flow of liquid and productive assets to the household's net income
Flow liquid asset ratio	Ratio of the flow of liquid assets to the household's net income
Flow productive asset ratio	Ratio of the flow of productive assets to the household's net income
Total stock ratio	Ratio of the total stock of liquid and productive assets to household's net income
Stock liquid asset ratio	Ratio of the stock of liquid assets to the household's net income
Stock productive asset ratio	Ratio of the stock of productive assets to the household's net income
Household head's characteristics	
Gender	Households whose head is male (yes = 1)
Edu2	Households whose head has vocational training, or professional high school or junior diploma (yes = 1)
Edu3	Household swhose head has tertiary education (yes = 1)
Household's characteristics	
LnWealth	Total value of all household assets, natural logarithm
Person	Number of family members
Young rate	Ratio of number of young people (under 15) to total number of household members (%)
Old rate	Ratio of number of old people (over 60) to total number of household members (%)
Social network	
Supporter	Number of supporters (friends/relatives) outside the family
Organization	Households with at least one member in political/social or economic organizations (yes =1)
Assistance	Number of non-demanded visits from agricultural consultants (extension workers) during the previous 12 months
Insurance	Households with at least one member engaging in one type of insurance (yes = 1)
Instruments	
Distance	Distance from household to an all-weather road
Ethnicity	Households in Kinh ethnic group (yes = 1)
Lnage	Age of household head, natural logarithm
Lnage2	Squared natural logarithm of household head's age
Area1	Households loacted in Northern midlands - mountain areas and

	former Ha Tay province* (yes = 1)
Area2	Households located in North Central area (yes = 1)
Area3	Households located in Central Highlands (yes = 1)
Shock	Households facing at least one shock (yes = 1)
Household member shocks	Households facing shocks relating to household members (divorce, abandonment, family disputes, illness)
Economic/natural shocks	Households facing economic and natural shocks (crop prices, unemployment, unsuccessful investment, loss of land, robbery, theft, floods, landslides, typhoons, storms)

*Note: Household net income is measured within previous 12 months, * Today Ha Tay province is part of Hanoi city*

Appendix A.2: First-stage IV estimation for all households

VARIABLES	LnWealth	LnWealth	Supporter	Supporter	Organization	Organization	Insurance	Insurance
Constant	3.02	3.24	-7.07***	-2.88	-1.52	-0.81	3.92***	3.01***
	(2.74)	(2.77)	(2.27)	(2.24)	(1.19)	(1.19)	(0.85)	(0.84)
Household head's characteristics								
Gender	0.27***	0.27***	-0.09*	-0.04	0.05**	0.05***	0.004	-0.01
	(0.05)	(0.05)	(0.05)	(0.04)	(0.02)	(0.02)	(0.02)	(0.02)
Edu2	0.12	0.11	0.14**	0.03	0.06**	0.04	0.06**	0.08***
	(0.07)	(0.07)	(0.06)	(0.06)	(0.02)	(0.02)	(0.02)	(0.02)
Edu3	0.25	0.24	0.16	0.05	0.16***	0.14***	0.19***	0.21***
	(0.16)	(0.16)	(0.15)	(0.15)	(0.03)	(0.03)	(0.02)	(0.02)
Household's characteristics								
Person	0.09***	0.10***	-0.04***	-0.001	-0.0004	0.01	0.03***	0.02***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.004)	(0.004)	(0.003)	(0.003)
Young rate	-0.47***	-0.46***	-0.14	-0.05	-0.19***	-0.17***	0.09**	0.07**
	(0.10)	(0.10)	(0.09)	(0.09)	(0.04)	(0.04)	(0.04)	(0.04)
Old rate	-0.41***	-0.41***	-0.10	-0.05	-0.01	-0.004	-0.08*	-0.09**
	(0.11)	(0.11)	(0.10)	(0.10)	(0.04)	(0.04)	(0.05)	(0.04)
Assistance	0.0006	0.0004	0.03***	0.02***	0.01***	0.005***	-0.01***	-0.004***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)
Instruments								
Distance	8e-05***	9e-05***	-0.0001***	-3e-05	e-05*	2e-05***	4e-05***	3e-05***
	(e-05)	(e-05)	(3e-05)	(2e-05)	(6e-06)	(5e-06)	(4e-06)	(3e-06)
Lnage	4.46***	4.33***	4.60***	2.19*	0.95	0.54	-1.63***	-1.10**
	(1.45)	(1.47)	(1.21)	(1.19)	(0.62)	(0.62)	(0.46)	(0.45)
Lnage2	-0.54***	-0.53***	-0.58***	-0.29*	-0.11	-0.06	0.20***	0.14**
	(0.19)	(0.19)	(0.16)	(0.16)	(0.08)	(0.08)	(0.06)	(0.06)

Area1	-0.28***	-0.26***	-0.38***	-0.12*	0.28***	0.32***	0.02	-0.04
	(0.08)	(0.08)	(0.06)	(0.06)	(0.03)	(0.03)	(0.03)	(0.03)
Area2	-0.61***	-0.61***	0.40***	0.44***	0.45***	0.45***	0.11***	0.10***
	(0.08)	(0.08)	(0.07)	(0.07)	(0.03)	(0.03)	(0.03)	(0.03)
Area3	-0.41***	-0.41***	-0.42***	-0.25***	0.34***	0.37***	-0.09***	-0.13***
	(0.09)	(0.09)	(0.06)	(0.06)	(0.03)	(0.03)	(0.03)	(0.03)
Ethnicity		0.03		0.64***		0.11***		-0.14***
		(0.04)		(0.04)		(0.02)		(0.02)
Observations	3,227	3,227	3,227	3,227	3,227	3,227	3,227	3,227
R-squared	0.12	0.12	0.15	0.22	0.10	0.11	0.08	0.11

*Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

Appendix A.3: First-stage IV estimation for "ex ante" households

VARIABLES	LnWealth	LnWealth	Supporter	Supporter	Organization	Organization	Insurance	Insurance
Constant	-4.79	-4.57	-10.38***	-5.32	0.46	2.14	4.76***	3.92**
	(4.34)	(4.43)	(3.69)	(3.70)	(1.81)	(1.80)	(1.56)	(1.58)
Household head's characteristics								
Gender	0.33***	0.33***	0.05	0.07	0.05*	0.06*	-0.01	-0.01
	(0.09)	(0.09)	(0.07)	(0.07)	(0.03)	(0.03)	(0.03)	(0.03)
Edu2	0.28**	0.27**	0.19**	0.08	0.05	0.02	0.07**	0.09**
	(0.11)	(0.11)	(0.09)	(0.09)	(0.04)	(0.04)	(0.04)	(0.04)
Edu3	0.11	0.10	0.06	-0.04	0.20***	0.16***	0.23***	0.25***
	(0.23)	(0.23)	(0.19)	(0.19)	(0.04)	(0.04)	(0.03)	(0.04)
Household's characteristics								
Person	0.09***	0.09***	-0.04**	0.00	0.01	0.02***	0.04***	0.04***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Young rate	-0.25	-0.25	-0.08	-0.04	-0.17**	-0.15**	0.06	0.05
	(0.18)	(0.18)	(0.15)	(0.15)	(0.07)	(0.07)	(0.06)	(0.06)
Old rate	-0.42**	-0.42**	-0.08	-0.04	0.01	0.03	-0.08	-0.09
	(0.17)	(0.17)	(0.15)	(0.15)	(0.07)	(0.06)	(0.07)	(0.07)
Assistance	0.01	0.01	0.02***	0.01***	0.002	0.001	-0.01***	-0.01***
	(0.01)	(0.01)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)
Instruments								
Distance	0.0001***	0.0001***	-8e-05***	-9e-06	e-05	4e-05***	4e-05***	3e-05***
	(2e-05)	(2e-05)	(2e-05)	(e-05)	(e-05)	(7e-06)	(8e-07)	(7e-06)
Lnage	8.30***	8.18***	6.14***	3.31*	-0.05	-0.99	-2.03**	-1.56*
	(2.30)	(2.35)	(1.96)	(1.96)	(0.94)	(0.94)	(0.82)	(0.83)
Lnage2	-1.02***	-1.00***	-0.76***	-0.42	0.01	0.13	0.25**	0.20*
	(0.30)	(0.31)	(0.26)	(0.26)	(0.12)	(0.12)	(0.11)	(0.11)

Area1	-0.26***	-0.25**	-0.34***	-0.16*	0.22***	0.28***	-0.09***	-0.12***
	(0.10)	(0.10)	(0.09)	(0.09)	(0.04)	(0.04)	(0.03)	(0.04)
Area2	-0.65***	-0.65***	0.32***	0.36***	0.41***	0.42***	0.06	0.05
	(0.11)	(0.11)	(0.09)	(0.09)	(0.04)	(0.04)	(0.04)	(0.04)
Area3	-0.47***	-0.46***	-0.41***	-0.26***	0.26***	0.31***	-0.19***	-0.22***
	(0.12)	(0.12)	(0.08)	(0.09)	(0.04)	(0.04)	(0.04)	(0.04)
Ethnicity		0.03		0.59***		0.20***		-0.10***
		(0.07)		(0.06)		(0.03)		(0.03)
Observations	1,352	1,352	1,352	1,352	1,352	1,352	1,352	1,352
R-squared	0.13	0.13	0.12	0.17	0.08	0.11	0.11	0.12

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

Appendix A.4: First-stage IV estimation for "ex post" households

VARIABLES	LnWealth	LnWealth	Supporter	Supporter	Organization	Organization	Insurance	Insurance
Constant	8.02**	8.19**	-4.75*	-1.32	-2.61*	-2.32	3.42***	2.60***
	(3.40)	(3.42)	(2.87)	(2.79)	(1.56)	(1.56)	(0.95)	(0.92)
Household head's characteristics								
Gender	0.21***	0.22***	-0.19***	-0.12**	0.04	0.04*	0.01	-0.004
	(0.07)	(0.07)	(0.06)	(0.06)	(0.02)	(0.02)	(0.03)	(0.03)
Edu2	-0.05	-0.06	0.09	-0.004	0.07**	0.06**	0.06*	0.08**
	(0.09)	(0.09)	(0.10)	(0.10)	(0.03)	(0.03)	(0.03)	(0.03)
Edu3	0.48***	0.47***	0.33	0.25	0.14***	0.14**	0.17***	0.20***
	(0.14)	(0.14)	(0.25)	(0.24)	(0.06)	(0.05)	(0.02)	(0.03)
Household's characteristics								
Person	0.10***	0.10***	-0.05***	-0.01	-0.01	-0.005	0.02***	0.01***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.004)	(0.004)
Young rate	-0.60***	-0.59***	-0.15	-0.03	-0.20***	-0.19***	0.12**	0.09**
	(0.12)	(0.12)	(0.12)	(0.11)	(0.05)	(0.05)	(0.05)	(0.04)
Old rate	-0.38***	-0.37***	-0.08	-0.04	0.005	0.01	-0.06	-0.07
	(0.14)	(0.14)	(0.14)	(0.14)	(0.05)	(0.05)	(0.06)	(0.06)
Assistance	-0.003	-0.004	0.03***	0.02***	0.01***	0.01***	-0.002	-0.003
	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.002)
Instruments								
Distance	8e-05***	8e-05***	-0.0001***	-6e-05***	5e-06	e-05	3e-05***	9e-06*
	(2e-05)	(2e-05)	(4e-05)	(2e-05)	(9e-06)	(8e-06)	(5e-06)	(5e-06)
Lnage	1.98	1.87	3.54**	1.50	1.50*	1.33	-1.39***	-0.90*
	(1.80)	(1.81)	(1.54)	(1.50)	(0.82)	(0.82)	(0.52)	(0.50)
Lnage2	-0.23	-0.22	-0.45**	-0.21	-0.18*	-0.16	0.17**	0.11*
	(0.24)	(0.24)	(0.21)	(0.20)	(0.11)	(0.11)	(0.07)	(0.07)

Area1	-0.27**	-0.25**	-0.44***	-0.12	0.32***	0.35***	0.11**	0.03
	(0.12)	(0.12)	(0.09)	(0.10)	(0.05)	(0.05)	(0.04)	(0.05)
Area2	-0.59***	-0.59***	0.43***	0.46***	0.48***	0.48***	0.17***	0.16***
	(0.12)	(0.12)	(0.10)	(0.10)	(0.05)	(0.05)	(0.05)	(0.05)
Area3	-0.34***	-0.33***	-0.44***	-0.25**	0.41***	0.42***	0.02	-0.03
	(0.13)	(0.13)	(0.10)	(0.10)	(0.05)	(0.05)	(0.05)	(0.05)
Ethnicity		0.03		0.68***		0.06***		-0.16***
		(0.05)		(0.05)		(0.02)		(0.02)
Observations	1,875	1,875	1,875	1,875	1,875	1,875	1,875	1,875
R-squared	0.11	0.11	0.19	0.27	0.13	0.14	0.07	0.11

*Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

B. Appendix for chapter 3

Appendix B.1: Variable definitions

Variables	Description
Household head's characteristics	
Male	Households whose head is male (yes = 1)
Primary	Households whose head is illiterate or did not finish primary school
Vocational	Households whose head has vocational training, or professional high school or junior diploma (yes = 1)
Tertiary	Households whose head has tertiary education (yes = 1)
Gov	Households whose head works for the Government (yes = 1)
Firms	Households whose head works for firms and enterprises (yes = 1)
Private	Households whose head works for private households/individuals (yes = 1)
Self-employed	Households whose head works as self-employed workers within their households
Lnage	Age of household's head, natural logarithm
Household's characteristics	
Insurance	The number of insurance contracts that households signed and hold
LnWealth	Total value of all household assets, natural logarithm
Person	Number of family members
Dependency rate	Ratio of number of young people (under 16) plus number of old people (over 60) to total number of household members (per cent)
Ethnicity	Households in Kinh ethnic group (yes = 1)
North	Households located in Northern midlands - mountain areas and formerly Ha Tay province* (yes = 1)
Center	Households located in North Central area (yes = 1)
Highlands	Households located in Central Highlands (yes = 1)
South	Households located in the Southern area

*Note: household net income is measured within previous 12 months, * Ha Tay province is today part of Hanoi city*

Appendix B.2: Tobit regression

	Saving intermediaries	Formal saving intermediaries	Informal saving intermediaries
	(1)	(2)	(3)
Household head's characteristics			
Lnage	4.09	13.24***	-1.49
	(2.51)	(4.52)	(3.17)
Vocational	0.72	5.68*	-3.43
	(2.15)	(3.18)	(3.21)
Tertiary	-1.04	2.38	-3.24
	(3.78)	(5.70)	(5.32)
Gov	2.95	2.75	2.53
	(2.44)	(4.20)	(3.03)
Firm	0.70	1.67	0.50
	(3.75)	(6.25)	(4.51)
Private	1.23	1.47	1.60
	(1.68)	(3.07)	(2.04)
Household's characteristics			
Dependency_rate	-4.83**	-3.03	-7.50**
	(2.40)	(3.92)	(3.22)
Person	-1.21***	-2.57***	-0.41
	(0.38)	(0.69)	(0.48)
LnWealth	4.64***	7.76***	3.10***
	(0.76)	(1.42)	(0.91)
North	0.83	18.00***	-3.04
	(1.80)	(4.94)	(2.00)
Center	-7.04***	13.49***	-16.78***
	(2.22)	(5.08)	(3.37)
Highlands	-6.80***	13.54***	-15.41***
	(2.11)	(4.93)	(2.91)
Insurance	2.24***	3.28***	1.94**
	(0.67)	(1.16)	(0.83)
Precautionary motive	-5.00***	-4.15*	-6.03***
	(1.31)	(2.20)	(1.71)
Constant	-80.79***	-181.66***	-41.52**
	(14.34)	(29.75)	(17.27)
sigma	13.74***	17.44***	13.83***
	(0.89)	(1.73)	(1.19)
Diagnostic Tests			
Normality test, p-value	3.31E-71	8.09E-53	7.46E-57
Homoskedasticity test, p-value	6.83E-151	8.07E-141	1.70E-117
Observations	1,342	1,240	1,264

Standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

C. Appendix for chapter 4

Appendix C.1: Definitions of institutional factors

Variable	Full name	Definition
ENTRYCOST	Entry Costs	Provincial index that measures of 1) the time it takes a firm to register and acquire land; 2) the time to receive all the necessary licenses needed to start a business; 3) the number of licenses required to operate a business; and 4) the perceived degree of difficulty to obtain all licenses/permits.
LANDACCESS	Land Access and Security of Tenure	Provincial index that combines two dimensions of the land problems confronting entrepreneurs-how easy it is to access land and the security of tenure once land is acquired.
TANSPARENCY	Transparency and Access to Information	Provincial index that measures whether or not firms have access to the proper planning and legal documents necessary to run their businesses, whether or not those documents are equitably available, whether or not new policies and laws are communicated to firms and predictably implemented, and the business utility of the provincial webpage.
TIMECOST	Time Costs of Regulatory Compliance	Provincial index that measures how much time firms waste on bureaucratic compliance, as well as how often and for how long firms must shut their operations down for inspections by local regulatory agencies. This year, the index also includes a battery of indicators measuring progress on public administration reform (PAR).
INFORMALCHARGE	Informal charges	Provincial index that measures how much firms pay in informal charges, how much of an obstacle those extra fees pose for business operations, whether or not payment of those extra fees results in expected results or "services," and whether or not provincial officials use compliance with local regulations to extract rents.
PROACTIVITY	Proactivity of Provincial Leadership	Provincial index that measures the overall attitude of provincial officials as well as their creativity and cleverness in implementing central policy, designing their own initiatives for private sector development, and working within sometimes unclear national regulatory frameworks to assist and interpret in favor of local private firms.

SUPPORTSERVICE	Business Support Services	Provincial index that measures the availability of business services, such as private sector trade promotion, provision of regulatory information to firms, business partner matchmaking, and technological services for firms; the number of private providers of these services; and the quality of these services.
LABORTRAIN	Labor and Training	Provincial index that measures the efforts by provincial authorities to promote vocational training and skills development for local industries and to assist in the placement of local labor.
LEGAL	Legal Institutions	Provincial index that measures the private sector's confidence in provincial legal institutions; whether or not firms regard provincial legal institutions as an effective vehicle for dispute resolution or as an avenue for lodging appeals against corrupt official behavior.

Appendix C.2: Impacts of the entrepreneur's education on firm growth using random-effects estimations

VARIABLES	Employment growth			Capital growth		
	Agriculture	Industry	Service	Agriculture	Industry	Service
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.179	0.969***	0.228	-0.004	0.221**	0.239***
	(0.444)	(0.274)	(0.140)	(0.231)	(0.109)	(0.089)
ENTRYCOST	-0.013	-0.085**	-0.005	-0.052*	-0.016	0.001
	(0.065)	(0.033)	(0.020)	(0.029)	(0.014)	(0.013)
LANDACCESS	-0.021	0.011	0.038***	-0.051***	0.023***	0.025**
	(0.041)	(0.019)	(0.013)	(0.019)	(0.009)	(0.010)
TRANSPARENCY	0.160***	0.009	-0.023**	-0.037*	-0.021**	-0.012*
	(0.048)	(0.023)	(0.011)	(0.021)	(0.011)	(0.007)
TIMECOST	-0.019	-0.015	-0.002	0.058***	0.076***	0.075***
	(0.026)	(0.012)	(0.007)	(0.016)	(0.006)	(0.005)
INFORMALCHARGE	-0.044	-0.035	-0.018	0.097***	-0.055***	-0.084***
	(0.035)	(0.030)	(0.016)	(0.034)	(0.013)	(0.012)
PROACTIVITY	-0.088**	-0.018	0.017**	-0.011	-0.032***	-0.010*
	(0.042)	(0.013)	(0.008)	(0.020)	(0.006)	(0.005)
SUPPORTSERVICE	-0.170***	-0.052***	0.007	0.054**	-0.019**	0.021***
	(0.046)	(0.018)	(0.008)	(0.022)	(0.008)	(0.007)
LABORTRAIN	0.140**	0.026	-0.031**	-0.063**	0.023**	-0.021**
	(0.064)	(0.024)	(0.013)	(0.028)	(0.012)	(0.009)
LEGAL	0.036	0.084***	0.002	0.042*	0.025***	0.020**
	(0.033)	(0.024)	(0.013)	(0.022)	(0.010)	(0.008)
EDUCATION	0.183*	0.028	0.026**	-0.037	-0.012	0.002
	(0.104)	(0.021)	(0.012)	(0.029)	(0.010)	(0.008)
AGE_ENT	0.001	-0.006***	-0.003***	-0.003**	-0.004***	-0.004***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
MALE	0.109***	0.052*	0.038***	-0.043	0.057***	0.013
	(0.039)	(0.028)	(0.011)	(0.029)	(0.009)	(0.012)
STRUCTURE	-0.051	-0.001	0.002	0.316***	0.018	0.004
	(0.072)	(0.005)	(0.001)	(0.066)	(0.018)	(0.006)
PUBLIC	-0.034	0.059***	-0.022	0.115**	0.064***	-0.025
	(0.067)	(0.019)	(0.019)	(0.050)	(0.012)	(0.020)

PRIVATE	0.270***	0.221***	0.133***	0.229***	0.163***	0.091***
	(0.078)	(0.018)	(0.017)	(0.052)	(0.008)	(0.023)
AGE	0.001	-0.009***	-0.003**	-0.002*	-0.004***	-0.004***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
SIZE	-0.001	0.001	0.002	0.000	-0.015***	0.001
	(0.002)	(0.013)	(0.001)	(0.001)	(0.005)	(0.001)
URBAN	0.155	0.041	0.040	-0.197*	-0.187***	-0.141**
	(0.204)	(0.065)	(0.036)	(0.113)	(0.023)	(0.057)
POPULATION	-0.005***	-0.000	-0.001	0.003***	0.004***	0.005***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
STUDENT	-0.001	0.001**	-0.000	0.000	0.001***	0.000
	(0.002)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
INVESTMENT	-0.001**	-0.000	0.000***	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hausman FE vs. RE	128.51	179.62	234.12	64.94	525.33	174.39
[p-value]	[.00]	[.00]	[.00]	[.00]	[.00]	[.00]
Sargan-Hansen statistic	86.34	73.24	163.72	504.8	229.75	n.a.
[p-value]	[.00]	[.00]	[.00]	[.00]	[.00]	n.a.
Observations	3,130	30,561	40,070	3,130	30,561	40,070
Number of enterprises	1,573	15,702	21,018	1,573	15,702	21,018

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

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