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

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Abstract

This study investigates the impacts of short-term precautionary selection and insurance on household decisions regarding the participation in different kinds of saving mechanisms in rural Vietnam. The two-part model is employed for the analysis and unlike other studies I investigate household decisions regarding both, participation and contribution to formal and informal saving intermediaries. Furthermore we control for the endogeneity of the short-term precautionary motive and of insurance in the model of household contribution. The finding suggests that the short-term precautionary motive reduces the household probability to engage into formal and informal saving intermediaries. In addition, insurance is found to be a substitute for short-term precautionary savings. Concerning 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 in influencing household contribution to saving intermediaries.

Key words

Short-term precautionary motive, insurance, saving intermediaries, cash hoarding, deposits, Vietnam

JEL classification: O12, O16, O17

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 I 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 I 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 cent 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 per cent 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 per cent in January to 15 per cent 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 organisations) 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 per cent 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 recognised 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 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, labourers, 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 possibility to save in banks rather than in *bisi*. Numeracy and literacy are important factors increasing the possibility 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 Fafchamps *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. I propose the first hypotheses:

Hypothesis 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). I, therefore form the second hypothesis:

Hypothesis 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. I 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 third and forth hypothesis.

Hypothesis 3: The participant's contribution to saving intermediaries is negatively affected by the precautionary savings motive.

Hypothesis 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 4: The number of insurance contracts that participants signed and hold will positively relate to their contribution to saving intermediaries.

In hypothesis 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, I 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, I 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 the study is as follows. Section II presents the empirical analysis. Section III introduces the results. Section IV will give some conclusions and policy implications of the paper.

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, I use the following reduced form of an equation:

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

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 household head 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 labour 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 heteroskedasticity¹, I 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 (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 (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 centre 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 organisations as this group makes up for 85.7 per cent of total population in 2009. The second largest ethnicity – the Tay group – accounts for only 1.89 per cent (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 2 of the descriptive statistics, the role of males in households seems to be dominant as the rate of male household heads is 82 per cent in the complete sample (82 per cent in the non-participant group, and 80 per cent 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 (Doerspingshaus *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 Labour Science and Social Affairs (ILSSA)². 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 I 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.

Table 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 per cent or 1158 over 1342 households) keep their monetary savings at home (non-participants), only 13.7 per cent of savers deposit monetary savings to saving intermediaries. However, among participants, formal and informal participants share quite equivalent portions with 44.6 per cent and 57.6 per cent, 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 reason 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 disaster, health care expenses, and buying agricultural inputs) is defined as those in which savings can be used for short-term, regular, and unforeseen circumstances. I add savings for agricultural inputs as one

of short-term precautionary motives since in rural Vietnam most households engage in agricultural production, what demands from households to keep an amount of money for inputs such as seeds, fertilizers, or labour. Farmers often face problems with these inputs such as the low quality of seeds and fertilizers, increasing working salaries for seasonal labours, 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 per cent) rather than short-term precautionary motives (44.26 per cent). 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 per cent) save for their long-term motives. Health care expenses within the short-term precautionary motives is the most concerned issue 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 I compare with the profit-making investment motive. Within non-participants, the investment motive accounts for only one per cent while those figures for groups of participants are much higher with 8.15 per cent, 6.1 per cent, and 9.43 per cent for all participants, formal participants, and informal participants, respectively.

Table 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 per cent). Only a low rate of household heads work outside their own households as a majority (70 per cent) of household heads work as self-employed workers within their own households. 20 per cent of household heads are employed by individuals, 6.2 per cent by the public or government sector, and 2.5 per cent 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 per cent most household heads are in this category. 8.1 per cent of household heads completed vocational training, professional high school or junior diploma (Vocational) while the tertiary education (Tertiary) represents 2.2 per cent of total household heads. The mean difference of the second educational level is statistically significant when I compare participants and non-participants or when I compare non-participants and formal participants.

Most households are located in the North (38.3 per cent) and in Central Vietnam (22.7 per cent). 28.2 per cent are from the Central Highlands and 10.8 per cent are from the Mekong River Delta. The ethnicity also seems to differ among non-participants and others. Kinh group – the largest ethnic group in Vietnam – makes up for 70.7 per cent of total observations, and other ethnics make up for the rest of 29.3 per cent. The dependency rate (the rate of under-16 and over-60 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 per cent 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 per cent significance level.

3. The results

3.1 Household participation in saving intermediaries

In the binary model, I 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. I compare the participation probability between 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, I add the household head variables as control factors, and the third estimation employs both household head's variables and household's characteristics, as control variables.

Table 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 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 in informal saving intermediaries when comparing with the probability of these households to deposit in formal saving institutions.

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 forms 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 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, I 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 first hypothesis 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 second hypothesis, stating that insurance can substitute for the short-term precautionary motive.

3.2 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 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 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 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 possibility that formal participants behave consistent with the precautionary motive in either participation or contribution. With a low-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 I speak about formal saving intermediaries, which may generate higher transaction costs as well as less liquidity compared to cash hoarding.

Hypothesis 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 the forth hypothesis.

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 recognised 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.

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, I 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 the first and the second hypothesis. The first hypothesis states that households which regard the precautionary motive as the primary reason for their savings will have higher probability of cash hoarding or less probability to join any saving intermediaries compared to those households who prefer long-term motives. The second hypothesis 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, 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 are empirically supported, while the third hypothesis is partially proven. The results lead to a rejection of the last hypothesis. 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, I 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.

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Table 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 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	.82	.82	.80	.79	.80
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 (.26)	.35 (.26)	.28 (.27)***	.31 (.31)	.24 (.24)***
Number of person in household	4.7 (1.82)	4.8 (1.84)	4.4 (1.6)***	4.2 (1.7)***	4.6 (1.5)
Location of household					
North	.383	.361	.522***	.476**	.566***
Centre	.227	.244	.120***	.220	.038***
Highlands	.282	.302	.152***	.256	.075***
South	.108	.093	.206	.048	.321
Number of insurance	1.33 (.93)	1.28 (.89)	1.64 (1.09)***	1.72 (1.09)***	1.6 (.92)***
Observations	1342	1158	184	82	106

Note: Numbers are means of variables, standard deviation is in parentheses.

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

Table 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*** (0.09)	-0.42*** (0.09)	-0.38*** (0.10)	-0.32*** (0.12)	-0.30** (0.12)	-0.24* (0.13)	-0.45*** (0.11)	-0.46*** (0.11)	-0.45*** (0.12)
Insurance	0.19*** (0.05)	0.17*** (0.05)	0.17*** (0.05)	0.21*** (0.06)	0.16*** (0.06)	0.20*** (0.07)	0.16*** (0.06)	0.16*** (0.06)	0.14** (0.07)
Household head's characteristics									
Lnage		0.30* (0.16)	0.32 (0.20)		0.64*** (0.21)	0.81*** (0.26)		0.02 (0.19)	-0.08 (0.24)
Vocational		0.13 (0.15)	0.05 (0.16)		0.44*** (0.17)	0.36* (0.18)		-0.23 (0.19)	-0.28 (0.22)
Tertiary		-0.06 (0.29)	-0.11 (0.32)		0.23 (0.32)	0.13 (0.34)		-0.35 (0.43)	-0.28 (0.50)
Gov		0.24 (0.18)	0.24 (0.19)		0.14 (0.23)	0.17 (0.23)		0.30 (0.22)	0.20 (0.25)
Firms		0.12 (0.26)	0.08 (0.28)		0.08 (0.32)	0.10 (0.33)		0.25 (0.30)	0.09 (0.32)
Private		0.02 (0.12)	0.13 (0.12)		-0.10 (0.17)	0.10 (0.18)		0.11 (0.13)	0.16 (0.14)
Household's characteristics									
Dependency rate			-0.37** (0.19)			-0.16 (0.23)			-0.57** (0.24)
Person			-0.09*** (0.03)			-0.15*** (0.05)			-0.03 (0.03)
LnWealth			0.34*** (0.06)			0.46*** (0.07)			0.22*** (0.06)
North			0.05 (0.15)			1.09*** (0.28)			-0.24 (0.16)
Centre			-0.56*** (0.17)			0.81*** (0.30)			-1.24*** (0.24)
Highlands			-0.55*** (0.17)			0.82*** (0.30)			-1.15*** (0.21)
Constant	-1.20*** (0.09)	-2.40*** (0.66)	-6.01*** (1.14)	-1.69*** (0.12)	-4.20*** (0.88)	-10.87*** (1.55)	-1.44*** (0.11)	-1.53** (0.75)	-3.10** (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, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

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

Appendix

Appendix 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)
Centre	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 2. Tobit estimation

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

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

¹Appendix 2

²<http://www.ambhanoi.um.dk/en/menu/AboutUs/News/NewsArchives2009/HouseholdSurvey2008Launched.htm>

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