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SOCIAL CAPITAL AND SAVINGS BEHAVIOR: EVIDENCE FROM VIETNAM

*Carol Newman, Finn Tarp and Katleen Van Den Broeck**

Abstract:

We explore the extent to which social capital can play a role in imparting information about the returns to saving where potential knowledge gaps and mistrust exists. Using data from Vietnam we find strong evidence to support the hypothesis that information transmitted via reputable social organizations increases the proportion of liquid assets held in the form of deposits that yield a return. Our results imply that targeting information on the benefits of deposit saving through formal networks or groups would be effective in increasing the number of households that save at grassroots level.

Keywords: Household Savings, Social Capital, Information Failure, Risk Aversion

JEL classification: D14, D71, D83, D91, O12, O16

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1. Introduction

Where formal institutions or the state fail to ensure the efficient operation of markets, social capital can play an important role. In this paper we examine the role that social capital can play in correcting for information failures in financial markets in rural communities. We consider a situation where information failures exclude households from interest-bearing savings products by artificially increasing the perceived level of risk associated with them leading households to choose either not to save or to save in a low yielding form (for example, cash held at home).² We propose a mechanism through which social capital corrects for such information failures through an endogenous network effect whereby the *informed* savings behavior of pre-defined groups within the community sends positive signals to individuals within the community, increasing their level of trust and reducing the perceived riskiness associated with formal saving. To test our hypotheses we consider the case of rural Vietnam and analyze how the savings behavior of formal socio-political groups impacts on individual household decisions in relation to precautionary saving. We find strong evidence to support the hypothesis that information transmitted via reputable social organizations increases the proportion of liquid assets held in the form of deposits that yield a return. In a policy context, our results imply that targeting information on the benefits of saving in financial institutions or local savings groups through formal social networks or groups would be effective in increasing the proportion of total saving held in interest-bearing form. This may also be the case for other developing countries, in particular, those that have well established formal groups already operating at grassroots level as is the case in many other Asian economies.

This paper is motivated by two separate considerations. First, household savings are an important determinant of welfare and so promoting savings at the household level is important for economic development. In particular, savings (along with the accumulation of other assets) act as an important buffer against income shocks, particularly where access to credit is scarce (Deaton, 1992). Moreover, savings constraints, coupled with credit constraints, may hinder productive investment.³ A key issue for developing countries, however, is the extent to which households can access financial products, particularly deposit products. Rosenzweig (2001) finds that the proximity of formal financial institutions crowds out other informal insurance arrangements. However, for low-income households there may be many barriers to saving in formal financial institutions aside from access including a lack of knowledge or information potentially leading to mistrust and uncertainty about available returns.⁴ Poor households are therefore more likely to save money as cash held in their homes, an insecure form of saving that does not yield a return (Banerjee and Duflo, 2007). In many cases, information and trust problems can effectively be eliminated at local level rather than requiring costly state-wide policies. This can be achieved through either the establishment of informal savings and credit groups to

² See Banerjee and Duflo (2007) for a general overview of the economic situation of households in developing countries.

³ Dupas and Robinson (2009) find that opening interest-free savings accounts had a positive impact on the productive investment levels of women in Kenya.

⁴ Other barriers include high opening balance requirements and minimum deposit amounts, complicated and unclear procedures, costs associated with travelling to the institution and impersonal or unfriendly service (ILO, 2007).

substitute for the formal market or through the sharing of information and expertise on the merits of formal saving and the process involved.⁵ While it is well established in the literature that risk-sharing among social groups through a system of transfers and loans is an important mechanism for risk coping among the rural poor (Coate and Ravallion, 1993; Townsend, 1994; Udry, 1994; Foster and Rosenzweig, 2001; Ligon *et al.*, 2002), the role of social capital in facilitating more prudent savings behavior is much less understood. Some recent advances in the literature have used experimental approaches to try and uncover the role of trust, financial information and social learning in financial decision making. For example, Ballinger *et al.* (2003) using experimental methods find that social learning improves individuals' ability to solve life cycle precautionary savings models. Cole *et al.* (2009) using a randomized field experiment in two rural regions of India find that trust and information are important in financial market participation. The second motivation for our paper is that the role of social capital, trust and information in the context of household savings decision has not yet been explored in the literature.

The role of social networks, particularly in developing country contexts, is well documented.⁶ Fafchamps (2006) provides an overview of the importance of social capital for development. Informal networks act as a substitute for formal institutions where the latter are weak. In particular, they can facilitate information sharing and efficient exchanges by eliminating information asymmetries associated with mistrust and search. A key consideration is how to define and identify the network or group that represents social capital. Most of the empirical literature identifies interpersonal relationships amongst members within villages or communities through conducting detailed surveys (see for example, Conley and Udry (2001), Fafchamps and Lund (2003) and Fafchamps and Gubert (2007) amongst others). However, Fafchamps (2006) suggests that the *personalized trust*, built up through interpersonal interactions, will only benefit the actual members of the network leading to social capital potentially having negative distributional effects. In contrast, *generalized trust* that arises from general knowledge about a group or a population is accessible to everyone. As such, groups that reach everyone in a community may be a more effective vehicle for eliminating information failures. Bowles and Gintis (2002) identify the role of communities in governance and highlight the fact that communities possess private information that neither the market nor the state has access to that may allow them to more effectively correct for local market failures. Communities have the ability to sustain the social norms of trust and cooperation both of which are necessary ingredients for effective community governance.⁷ Bowles and Gintis suggest that for community governance to work effectively it also requires a legal environment that facilitates their functioning. In other words, an institutional structure that allows the state, markets and communities to collectively govern and interact is essential.

⁵ Local insurance and credit markets may also act as substitutes for saving, particularly where savings are precautionary. However, in many developing country contexts access to formal insurance and credit markets may be even more limited than savings

⁶ For example, Conley and Udry (2001) illustrate the importance of social networks for technology diffusion in the household agricultural sector in Ghana. Bandiera and Rasul (2006) show the role of networks in the adoption of sunflower, a new cash crop, in Mozambique. Barr (2000) and Fafchamps and Minten (2002) show how social networks also affect entrepreneurial activity in Africa.

⁷ Communities also possess the ability to enforce these norms through retribution which is also essential for effective community governance although not relevant to the particular case we explore in this paper.

We combine both of these ideas by considering the network to consist of members of formal groups or organizations that operate within local communities. Vietnam provides an ideal case study for exploring both the role of community governance structures of the Bowles and Gintis kind in practice and for distinguishing between personalized and generalized trust as proposed by Fafchamps. As a centrally planned economy, the state plays a dominant role in the functioning of the Vietnamese economy, however, under the umbrella of the Communist Party, a variety of local socio-political organizations exist that play an important role, both socially and economically, in local communities. These organizations, the most prominent of which include Women's Unions, Farmer's Unions and Veteran's Unions, follow a hierarchical structure with official leaders (paid through government funds) operating at the central, province, district and commune level, managing the activities of the organization and working with members within the relevant unit. The nature of the organizational structure of these groups suggests that active members at grassroots level will have the right incentives to behave in a socially beneficial way so as to avoid retribution. In addition, since these groups operate under the umbrella of the State, the activities of these local organizations complement the strategy and policies of the State. Furthermore, active members of these organizations within regions potentially establish a form of *personalized trust* through their interpersonal interactions at meetings and so group membership can act as an important vehicle through which information can be shared. Moreover, if members are known to have superior information about markets, given that they operate under the mandate of the State, non-members in observing the behavior of members may also benefit through information spillovers (or positive externalities or reputation effects). In this way, these groups could even be thought of as possessing a form of *generalized trust* and as such the behavior of members may impact on the behavior of non-members thus benefiting everyone.

In this paper, we contribute to the literature in two ways. First, we develop a mechanism through which community based groups, in the form of formal socio-political groups behaving in the same way as other measures of social capital, can effectively correct for information failures in rural financial markets. This is achieved through the sharing of information about the security and returns to savings both within the network and with those outside the network through information spillovers. Second, we provide empirical evidence of this mechanism at work in local financial markets in Vietnam using a unique and carefully constructed dataset. Overall, this paper contributes to our understanding of the important role that social capital can play in the development process and is the first to link social capital to household savings decisions. The results can be generalized to other developing countries, in particular those with similar formal social networks operating at grassroots level.

The paper is structured as follows. We present the theoretical framework in Section 2, followed by the empirical approach in Section 3. The data are described in Section 4, while we present and discuss the empirical results in Section 5. Section 6 concludes.

2. Theoretical Framework

The motivations for household or individual savings have been extensively explored in the literature (see, for example, Gersovitz (1988)⁸ and more recently Browning and Lusardi (1996)). Precautionary motives are particularly relevant in developing countries where income is volatile and other consumption smoothing mechanisms are limited, including access to credit.⁹ Our starting point for analyzing precautionary savings follows most of the literature modeling savings behavior under risk in using a standard inter-temporal allocation model where in each time period the household must decide how much to consume and how much to invest in accumulating assets (including savings) which will act as a buffer against unexpected income shocks (see for example, Deaton (1991, 1992) and Fafchamps *et al.* (1998)). We assume households are credit constrained.¹⁰

A household's discounted expected utility function is given by

$$U_i = E_t \left[\sum_{t=1}^T \delta^t U_i(C_{it}) \right] \quad (1)$$

where δ is the rate of time preference and $U_i(C_{it})$ is the utility function. We assume that households are risk averse, i.e. $U_i''(C_{it}) < 0$, and have precautionary savings, i.e. $U_i'''(C_{it}) > 0$.¹¹

In each time period, each household randomly receives income, $y_{it}(s_{it})$, which depends on the state of nature s_{it} facing the household in time period t . The state of nature includes all exogenous shocks to income that can affect the whole community (such as a natural disaster) or the individual households (such as the death of the main income earner). Since households are risk averse they accumulate liquid wealth (or precautionary savings) to act as a buffer against such income shocks. Total wealth (liquid) of the household at time t is given by A_{it} which yields a return r_{it} . The Belman equation corresponding to the household's decision problem takes the usual form:

⁸ Gersovitz (1988) groups savings as follows: (1) Life cycle savings, where households consider the relationship between age and income as a savings motive, especially to secure welfare after retirement; (2) Precautionary savings, where households save to protect themselves in the event of shocks; (3) Investment saving, where the saving household is motivated by rates of return or investment opportunities; and (4) Bequest savings, where households save for the future benefit of other persons related to them.

⁹ Fafchamps and Pender (1997) find that while poor households save for both precautionary reasons and to finance investment, particularly where credit is not available, low returns on saving prevent them from investing in profitable investment, in particular, non-divisible larger investments. As such, in most cases precautionary motives prevail as households remain in a poverty trap.

¹⁰ Deaton (1991) presents a model of inter-temporal consumption behavior in the presence of liquidity constraints to explain precautionary motives for holding assets

¹¹ The former is required to ensure that the utility function is concave so households are risk averse and the latter is required to ensure that the marginal utility function is convex so uncertainty induces precautionary saving.

$$V_i(X_{it}, s_{it}) = \max U_i(X_{it} - A_{it+1}) + \delta_i EV_i[y_i(s_{it+1}) + (1 + r_{it+1})A_{it+1} | s_{it+1}] \quad (2)$$

where $X_{it} = A_t + y_t$ is ‘cash-in-hand’ and $A_{it+1} \geq 0$, i.e. no borrowing. This model allows for the accumulation and selling of assets to act as a buffer against income shocks.

In this paper, we are particularly interested in understanding the choice of different types of saving and so how the composition of the portfolio changes in the face of income shocks is our focus. Following Fafchamps *et al.* (1998), the distribution of the returns to accumulating assets will depend on the level and composition of A_{it} . We assume that the only way households can insure against income losses due to such shocks is to accumulate savings. Since we are not interested in analyzing the aggregate decision to save, nor are we interested in the decision to chose savings over other forms of insurance against shocks, to simplify the model we assume that purchasing formal insurance, borrowing, or accumulating other liquid assets are not possible. We allow for savings of different forms and so the household’s wealth portfolio can include cash, gold and jewelry held at home, informal savings held with local rotating credit groups or money lenders, or formal savings held in state and private owned banks.

We extend the model given in (2) to allow for two assets: cash held at home (W_{it}) and savings either in the formal or informal sector which we call deposits (D_{it}). We assume that the return to holding cash at home is negative ($-\theta$) given the risk of theft.¹² For simplicity we assume that this risk is constant across all households. The perceived return to saving in the form of deposits, either in the formal or the informal sector we assume to be a function of the information available to the household at time t , i.e., $\gamma_i(I_{it}) = \gamma_{it}$, where $\gamma_i'(I_{it}) > 0$. This will vary across households depending on how certain or uncertain they are regarding future returns. We assume that the level of certainty depends on how complete their information is on the perceived risk associated with deposit saving. Information can be transmitted to households through social networks. Membership of the social network is assumed to be randomly assigned across households and so is exogenous to the savings decision. For simplicity, we assume that the rate of return is independent of s_{it} .¹³

The combined returns to holding cash at home and deposit savings are given by:

$$(1 + r_{it+1})A_{it+1} = (1 - \theta)(A_{it+1} - D_{it+1}) + (1 + \gamma_{it+1})D_{it+1} - \eta_i D_{it+1} \quad (3)$$

where η_i is the cost associated with saving (for example, travel costs, filling out forms, etc.). In this setting, savings in the form of deposits are considered more risky

¹² The real value of cash held at home can also potentially be eroded from one year to the next due to inflation, and potentially significantly so in typically high inflation developing economies. However, since we also consider holding gold and jewelry as a form of home-saving, and they are often held as a hedge against inflation, this is not likely to be the case for all forms of home-saving considered.

¹³ This is not an unreasonable assumption to make given that most deposit savings accounts offer fixed rates of interest that are protected against external shocks.

than home-saving if $\gamma_{it} - \eta_i < \theta$. As such, information can play an important role in changing the perceived relative risk associated with different forms of saving.

The revised Belman equation can be written as:

$$V_i(X_{it}, s_{it}) = \max U_i(X_{it} - W_{it+1} - D_{it+1}) + \max_{D_{it+1}} \delta_i EV_i \left[y_i(s_{it+1}) + (1 - \theta)(A_{it+1} - D_{it+1}) + (1 + \gamma_{it+1})D_{it+1} - \eta_i D_{it+1} \right] \quad (4)$$

As before no borrowing is allowed so $A_{it+1} \geq D_{it+1} \geq 0$.

The focus of this paper is on the choice between saving in the form of cash held at home and deposit saving for a return (either in the informal or formal sector) so we focus on this decision rather than the overall decision to save. In a similar fashion to Fafchamps *et al.* (1998), assuming a negative exponential utility function and a normal distribution for future consumption, we take a mean variance approximation of the expected value function. Households will choose D_{it+1} to solve (approximately):

$$\max_{D_{it+1}} \left\{ \begin{array}{l} \bar{y}_i(s_{it}) + (1 - \theta)W_{it+1} + (\theta + \bar{\gamma}_i(I_{it}) - \eta_i)D_{it+1} \\ - \frac{1}{2} R_i \left[\sigma_{y_i}^2(s_{it}) + \sigma_{D_i}^2(I_{it})D_{it+1}^2 \right. \\ \left. + 2\rho_{iyD}(s_{it})\sigma_y(s_{it})\sigma_D(I_{it})D_{it+1} \right] \end{array} \right\} \quad (5)$$

where: R_i is the Arrow-Pratt absolute risk aversion coefficient, which for the exponential utility function exhibits constant absolute risk aversion.¹⁴ We define the expected value of income as $y_{it}(s_{it}) E[y_i(s_{it+1} | s_{it})] = \bar{y}_i(s_{it})$, its variance as $V[y_i(s_{it+1} | s_{it})] = \sigma_{y_i}^2(s_{it})$, the expected value of returns to deposit saving as $E[1 + \gamma_i(I_{it+1} | I_{it})] = 1 + \bar{\gamma}_i(I_{it})$ and its variance as $V[1 + \gamma_i(I_{it+1} | I_{it})] = \sigma_{\gamma_i}^2(I_{it})$, where $\sigma_{\gamma_i}^2(I_{it}) < 0$ implying that information reduces the perceived variance in the return to saving. $\rho_{iy\gamma}(s_{it})$ is the correlation between income and the returns to saving. Given that we assume returns are independent of income shocks we assume that this correlation is zero.

Solving the optimization problem yields:

$$D_{it+1}^* = \frac{\theta + \bar{\gamma}_i(I_{it}) - \eta_i}{R_i \sigma_{\gamma_i}^2(I_{it})} \quad (6)$$

¹⁴ That is, $R_i = -[U_i''(C_{it})/U_i'(C_{it})] = \delta$, which implies that as wealth increases households hold the same level of wealth in the form of risky (or in this case perceived to be risky) assets.

The model predicts that the level of deposit saving, D_{it+1}^* , will be an increasing function of the return to saving, $\bar{\gamma}_i(I_{it})$, and losses to cash held at home, θ . Moreover, D_{it+1}^* will be a decreasing function of the cost associated with saving η_i , the variance in the return to saving $\sigma_{D_i}^2(I_{it})$ and the level of risk aversion R_i . In this model, information plays an important role in determining the level of deposit saving. We assume that in the absence of information about the return to saving in banks or informal groups within the community, households perceive holding cash at home as a less risky form of saving.¹⁵ Formal groups transmit information to households on the various ways in which they can save to yield a return thus filling an information gap and increasing their knowledge about the perceived return, and the perceived variance in return, to saving in the form of deposits. This has the affect of increasing $\bar{\gamma}_i(I_{it})$ and reducing $\sigma_{\gamma_i}^2(I_{it})$ and thereby increasing the level of saving held in the form of deposits.

In this paper, we are interested in the proportion of total savings held in the form of deposits and so replace D_{it+1}^* with $d_{it+1}^* = D_{it+1}^*/A_{it+1}$ and let R_i represent the coefficient of relative risk aversion. The model as proposed above is restricted by the assumption of a negative exponential utility function which implies that the coefficient of relative risk aversion will be increasing in wealth, that is, $R_i = \delta \bar{A}_i$. Rewriting equation (6) yields:

$$d_{it+1}^* = \frac{\theta + \bar{\gamma}_i(I_{it}) - \eta_i}{\delta \bar{A}_i \sigma_{D_i}^2(I_{it})} \quad (7)$$

This model predicts that the proportion of liquid assets held in the form of household deposit saving will be a decreasing function of wealth if deposit savings are perceived to be the more risky asset. This underlying assumption of the model can be tested empirically by regressing the proportion of deposit saving in total saving held by the household on the household's level of wealth. Since households' perceptions of the relative riskiness of deposit saving compared with cash held at home will depend on the composition of their savings portfolio we decompose wealth into wealth held in the form of deposit saving and wealth held in the form of cash at home. The model also predicts that information transmitted through the social network improves households' perceptions of the potential returns available from deposit saving and as such may lead to an increase in the proportion of deposit saving. This prediction can be tested empirically by including a measure of such a network effect in the regression model.

¹⁵ Returns can also be thought of as incorporating security concerns of households.

3. Empirical Considerations

Following from the theoretical model, in a single period setting the reduced form savings equation that we are interested in estimating is given by:

$$d_{it} = \beta_0 + \beta_1 D_{it-1} + \beta_2 W_{it-1} + \beta_3 D_{n-it-1} + \beta_4 \eta_{it} + \beta_5 s_{it} + v_{it} \quad (8)$$

where: d_{it} is the proportion of deposit savings in total savings made by household i in time t ; D_{it-1} is the stock of deposit saving at the beginning of the period; W_{it-1} is the stock of cash saving at the beginning of the period; D_{n-it-1} is the average stock of deposit savings of network members at the beginning the period (excluding those of household i) which is used to proxy the level of information available to network members and as such the expected returns (and variance in returns) from saving in the form of deposits; η_{it} is a measure of the cost of saving in the form of deposits; and s_{it} are losses to household income as a result of external shocks. According to our theoretical predictions we would expect $\beta_1 > 0$, $\beta_2 < 0$, and $\beta_3 > 0$.

A key empirical consideration that must be made is how we identify the endogenous network effect D_{n-it-1} , that is, where the savings behavior of a household is causally influenced by the behavior of the group or network present in the local community (see also, for example, Manski, (1993, 2000), Brock and Durlauf (2001) and Aizer and Currie (2004)). The literature on network effects suggests that this can happen through two mechanisms: information, where an individual experiences information spillovers as a result of effective group behavior (Banerjee, 1992; Bikhchandani *et al.*, 1992; Foster and Rosenzweig, 1995); or social norms, where an individual's preferences are influenced by the behavior of the group either through directly affecting tastes or through social pressures (Akerlof, 1980; Borjas, 1992; Bertrand *et al.*, 2000). In our application, we might expect the behavior of both group members and non members to be affected by group behavior, the latter through information spillover effects. If household savings behavior is found to be significantly influenced by the behavior of group members within the region, then this provides evidence of effective social networks operating through the community governance structures of the socio-political organizations. From a policy perspective, this would imply that specific groups could be targeted for information dissemination in relation to sound savings advice as this result would indicate that the behavior of these groups can causally influence the behavior of households in general, both group members and non-members.

Identifying causality, however, is complicated by a number of factors. First, there is the possibility of the endogeneity of group membership. While in the theoretical model we assume that households are randomly assigned to networks and as such the decision to be part of a network is exogenous to the savings decision, in reality, individuals themselves decide whether or not to become members of formal social groups. The consequence for the empirical model is that the unobserved factors that determine the proportion of deposit savings in liquid asset holdings of a household may be the same as those that determine the probability that they are members of the group. To eliminate these factors from the model we use first differenced data and so factor out any unobserved household specific effects that may influence both the

portfolio composition of households' precautionary liquid asset holdings and the probability that they are group members.

The second identification problem is Manski's (1993) reflection problem, that is, the possibility of simultaneity between individual behavior and group behavior. To correct for reflexivity, the network variable is measured as the average stock of deposit savings by group members at time $t-1$, excluding the stock of saving held by household i , D_{n-it-1} .¹⁶ Third, the network effect may also capture correlated effects, where individuals from the same group tend to behave in the same way because they have similar characteristics or face similar constraints and, fourth, an exogenous effect, where the individual is influenced by an exogenous characteristic that defines group membership. Thus the characteristics of group members must be controlled for in the empirical model through the inclusion of time varying household characteristics and regional fixed effects. Since the model is estimated separately for group members and non-members we eliminate the need for the inclusion of group fixed effects.

We run a number of robustness checks to ensure that we have separated out the network effect from common unobserved shocks in the area. Using first differences, the network effect for group members is defined as the change in the average stock of financial saving of group members at the beginning of each year, where for each observation the savings of the household in question are excluded from the computation of the group average. For non-group members, the network effect is defined as the deviation in the average stock of saving of group members from the household stock of financial saving in the first period. In the main model the network effects are defined at province level and province fixed effects are included to control for common exogenous shocks that have affected all households within the network. The first robustness check we perform is to estimate the model using district level fixed effects to ascertain whether the results hold up to the inclusion of more detailed controls for unobserved heterogeneity across regions. The second robustness check is to redefine the network variable at district level and include district controls to check whether the results are dependent on the pre-defined regional scope of the network.

We also consider the possibility that the network effect might be driven by the density of the group in a particular region and so the degree of learning will depend on the density of the social network. More members within the network induce greater penetration of information in relation to savings. Alternatively, it could also be the case that the larger the network the more diluted their reach and so the less effective the group may be in sharing information. A group density variable interacted with the network variable is also included to capture these possibilities (see for example, Bertrand *et al.* (2000) and Aizer and Currie (2004)).

The empirical model we estimate is:

$$\begin{aligned} \Delta d_i = & \alpha_0 + \lambda_1 (D_{it} - D_{it-1}) + \lambda_2 (W_{it} - W_{it-1}) + \phi_1 \Delta D_{n-i} + \phi_2 \Delta den_{n-i} \\ & + \phi_3 \Delta D_{n-i} * \Delta den_{n-i} + \alpha_1 \Delta \eta_i + \alpha_2 s_{it} + \Delta Z_i' \alpha_3 + u_j + v_i \end{aligned} \quad (9)$$

¹⁶ Aizer and Currie (2004) use a similar approach.

where Δ indicates first differences, Δden_{n-i} is the change in the density of the network (less the household in question for group members), ΔZ_i is a vector of changes in time varying household characteristics and u_j are regional fixed effects. We use the change in the number of banks within the commune to proxy for the cost variable, $\Delta \eta_i$.

4. Data

The data are taken from the Vietnam Access to Resources Household Survey (VARHS) implemented in 2006 and 2008 in 12 provinces in Vietnam.¹⁷ The households for which a full panel is available are spread over 456 communes, 131 districts and total 2,158 households. Along with detailed demographic information on household members, the survey includes sections on financial behavior, in particular in relation to savings and borrowing. Due to the absence of total expenditure data we cannot use the standard ‘income minus expenditure’ measure of saving. Instead, the focus our investigation is on self-reported levels of saving in the following forms: deposits held in formal financial institutions; deposits held with informal savings and credit groups and money lenders; and cash and jewelry held at home.

The supply of institutional saving services for rural households is estimated to cover 65 percent of the poorest quarter of the population (ILO, 2007).¹⁸ This is also evident from our data which cover the more rural and remote provinces in Vietnam. In 2006, only 35 percent of communes included in the sample had a state bank located in their commune and only 19 percent had access to private banks and other types of credit organizations.¹⁹ However, 93 percent of communes report having access to formal savings deposits through institutions located outside of the commune. In 2008, access within communes increased with 56 percent of communes having a state bank and 29 percent having a private bank or some other form of credit organization.

The VARHS records membership in eight different groups/organizations, three of which fall directly under the hierarchical structure of the State.²⁰ Women’s Unions fall under the umbrella organization of the Vietnamese Women’s Federation (VWF), Farmer’s Unions operate under the umbrella of the Vietnamese Farmer’s Association (VFA) and Veteran’s Unions under the Vietnamese War Veteran’s Association (VWVA). All are formed on the basis of the same socio-political ideals. The duties and responsibilities of members range from fulfilling the duties of a citizen, actively participating in community meetings and mutually supporting the work of the community and the sharing of information to enhance the work of the organization. In

¹⁷ The survey was developed in collaboration between the Development Economics Research Group (DERG), Department of Economics, University of Copenhagen and the Central Institute of Economic Management (CIEM), the Institute for Labour Studies and Social Affairs (ILSSA) and the Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD), Hanoi, Vietnam.

¹⁸ Saving services are offered by five state-owned commercial banks, one social policy bank, one post office savings company, 37 joint stock commercial banks, 31 foreign owned bank branches, five joint venture banks, 934 People’s Credit Funds (PCFs) and 58 microfinance institutions (ILO, 2007 p.85).

¹⁹ Other credit organizations include People’s Credit Funds and International Organizations.

²⁰ In addition to the three groups used in this analysis, the VARHS also collects information on membership of the Vietnamese Communist Party, Youth Unions, religious organizations, irrigation cooperation and informal credit groups.

recent times the role of these organizations has extended to enhancing the economic activity of communities. For example, Farmer's Unions work toward disseminating information on new production technologies while Women's Unions work toward facilitating savings and credit teams and providing information on family planning and health. Almost all communes have an active organization operating within the commune. The VWF, VFA and VWVA have all established agreements with the two main state banks in Vietnam (The Vietnam Bank for Social Policy (VBSP) and the Vietnamese Bank for Agriculture and Rural Development (VBARD)) to support savings and credit groups in local communities. However, savings facilities are only offered directly through groups in 7 percent of communes in our sample.

Table 1 provides a description of the savings behavior of households in our sample. Our measure of savings includes deposits of which there are formal savings (which include postal savings, savings in state owned commercial banks, private banks and credit organizations), informal savings (which include ROSCAs²¹ and saving through private money lenders), and home-saving in the form of cash, gold and jewelry kept at home. In 2006, 54 percent of households reported having saved in one of these forms in the previous 12 months. This fell to 44 percent of households in 2008. Of particular note is the large proportion of households with home-saving (44 percent in 2006 and 38 percent in 2008) as compared with deposits (17 percent in 2006 and 9 percent in 2008). Also of note is the decline in the proportion of households with informal savings (from 13 percent in 2006 to 5 percent in 2008). Saving households save more in 2008 compared with 2006, even after adjusting for inflation. However in 2006, the savings level of the households that continued to save in 2008 was about the same (at around 11,153 VND). This suggests that the increase observed is in some part due to a fall off in savings by households who save small amounts. An increase in home-saving is also observed. Home-saving makes up 82 percent of all savings in 2008 compared with 73 percent in 2006. Savings as a proportion of income (for saving households) declined between 2006 and 2008.

[INSERT TABLE 1 ABOUT HERE]

In this paper, we are not interested in whether households save the optimal amount but instead are concerned with portfolio allocation of savings and how networks affect this allocation through the transmission of information. The dependent variable used in our empirical analysis is the change in the proportion of total savings made in the form of deposits in 2008 compared with 2006. For the sample as a whole this proportion fell from 14.6 percent in 2006 to 7.8 percent in 2008. The purpose of this paper is to explain what brought about such a decline focusing in particular on the role of information networks.

Household networks are defined on the basis of whether individuals within households are *active* members of different groups/organizations within the region defined in this paper separately by province and district. There is a high proportion of active group membership in households in Vietnam. Women's Unions and Farmer's Unions play a particularly important role, although the proportion of households with active group members declined for our sample between 2006 and 2008 (see Table 2).

²¹ Rotating Savings and Credit Associations (ROSCAs) are very widespread and very popular with low income households. They are small, operate locally, accept contributions in-kind (e.g. rice ROSCAs) as well as in cash and some have a mutual assistance mechanism.

While these groups share the same structure, they vary in the extent to which they have established the infrastructure at the village level for supporting local financial markets (through, for example, the establishment of savings and credit groups). An important assumption which we must make in the empirical model is that group membership itself is not endogenous, that is, that savings considerations are not the motivation for being a group member. We justify this assumption on the basis that, first, group membership is based on signing up to a set of socio-political ideals rather than on availing of facilities offered by the group such as financial advice or savings facilities, and second, we only consider *active* group members who attend meetings regularly and so are more likely to subscribe to these ideals.²² Nevertheless to circumvent the possibility that the effects we observe are due to selection into these groups we attempt to identify two effects: first, the effect of group behavior on group members; and second, the effect of group behavior on non-group members within the community.

Table 2 describes the savings behavior of these groups. Members of Women's Unions and Farmer's Unions are more likely to save than households that are non-members in both 2006 and 2008. In 2008, households with active members in Veteran's Unions are also more likely to save. In 2006, households with active members in Women's Unions and Veteran's Unions save more than other saving households, both in terms of the level of saving and savings as a proportion of income.²³ It is also the case in 2006 that deposits, and in particular formal deposits, make up a greater proportion of saving for group members compared with non-group members. This suggests that (at least in 2006) households that are active members of these groups have more information on (or a greater level of trust in) formal financial institutions. This is, perhaps, not surprising given that both Women's Unions and Veteran's Unions have a great deal of organizational support at grassroots level and a long history of cooperation and support on financial related issues among community members. The same picture does not emerge from the 2008 data, however, where saving households that are members of groups save on average less than other saving households in the sample. Moreover, saving households that are members of Women's Unions and Farmer's Unions hold a smaller proportion of their saving in the form of deposits, including formal deposits, than non-member households. The extent to which the change in behavior of these groups is causally related to the change in behavior of the population as a whole is what we try to uncover in this paper. In particular, we are interested in the extent to which the behavior of the network can influence the proportion of saving held in the form of deposits (that can yield a return) as opposed to home-saving. The behavior of the network is measured as the average level of deposits of group members within a province. Descriptive statistics are presented in Table 2.

[INSERT TABLE 2 ABOUT HERE]

²² Recent agreements between the VBSP and VBARD and these groups, aimed at helping these organizations reach low income communities, although not yet working on a wide scale, may influence group membership in the future (see ILO (2007) for more details).

²³ Members of Farmer's Unions in both years save less than the average. This may be in part due to the fact that in this paper we focus on financial savings and exclude savings in the form of assets such as livestock.

In addition to network effects, we consider how changes in other factors may affect changes in the proportion of savings held in deposit form. In the theoretical model we assume increasing relative risk aversion which implies that as wealth increases households will hold less of their savings in the form of (perceived risky) deposits as opposed to (perceived risk-free) home-saving. If we assume that households view deposits as the relatively riskier form of saving, due to the absence of complete information, we would expect that as households become wealthier they hold less savings in the form of deposits. The wealth measure that we include is the change in the stock of total saving (home-saving and deposits) held at the beginning of each year. We control for changes in access to saving (or the cost of saving) with the number of new banks located in the commune between 2006 and 2008. To control for income shocks we include the change in income between 2006 and 2008 and a dummy variable capturing whether the household had an unexpected income loss due to an exogenous shocks.²⁴ If savings are precautionary we expect households to dis-save in the event of a shock and it is also likely that they are not able to save in the immediate aftermath.²⁵ We also include changes in household size and whether households receive transfers from children living outside of the home as controls. A description of all variables included in the model and summary statistics for 2006 and 2008 are presented in Table 3. Regional controls are also included.²⁶

[INSERT TABLE 3 ABOUT HERE]

5. Empirical Results

We first estimate a basic model of household savings decisions where no controls for savings costs or network effects are included to ascertain the household characteristics that are of importance in households' decisions to hold deposits as opposed to home-saving. All variables expressed in VND are scaled by 1,000 before inclusion in the model. The results are presented in column (1) of Table 4. The wealth variable, measured by the change in the total level of saving (home-saving and deposits) held at the beginning of each year has a different effect depending on the type of saving considered. An increase in the stock of savings held in the form of deposits has a positive and significant effect on the change in the proportion of financial saving in the form of deposits made in the subsequent year. In contrast, an increase in the stock of savings held in the form of cash has a negative and significant effect on the change in the proportion of financial saving held in the form of deposits made in the subsequent year. Our theoretical model predicts that households are relatively risk averse meaning that as wealth increases they will hold less of it in the form of the perceived to be riskier asset. These results suggest that households with more deposit saving perceive deposit saving as less risky, holding more of it as wealth increases,

²⁴ Shocks include natural and biological shocks (such as floods, land slide, typhoons, storms, drought, pest infestations, crop diseases and avian flu). Data on economic shocks (such as shocks to food and crops prices, input shortages, unemployment, loss of land and crime) and idiosyncratic shocks to household members (such as divorce, abandonment, family disputes and serious injury or death of a household member) are also available however we only include truly exogenous shocks in our model.

²⁵ Empirical evidence to support the hypothesis that households dis-save when confronted with a negative income shock was provided for example by Udry (1995) using a sample of 200 farmers households in northern Nigeria.

²⁶ In the main models we include province fixed effects but also consider district level fixed effects as one of our robustness check.

while households with more cash saving perceive deposit saving as more risky, holding less of it as wealth increases. As expected, income has a positive and significant effect on the deposit ratio, although, the dummy variable capturing exogenous income shocks has no significant effect. This suggests that while higher levels of income lead to a greater proportion of deposit saving relative to home-saving, this ratio is not affected by unexpected shocks to income.

None of the other baseline factors considered are found to have a statistically significant effect. In column (2) we introduce the cost proxy to the model, that is, the change in the number of banks in the commune, however the effect is not statistically significant. In columns (3)-(5) we consider how changes in group membership (that is, whether the household has active group members), impact on the change in the deposit ratio, however, in all cases we find that these estimated coefficients are statistically insignificant. For the remainder of the analysis we exclude the cost proxy given its statistical insignificance and the fact that it yields a reduced number of observations due to missing data. Even though we find that the controls for changes in group membership are insignificant we exclude households that experience such a change from the remainder of the analysis to circumvent the possibility that the network effects we find are due to changes in the composition of the group rather than information sharing.

[INSERT TABLE 4 ABOUT HERE]

We now introduce the network variables to the model. The network effects are measured as the change in the average stock of deposits of households at the start of each year in each group, where the group is defined as households who have active group members within the province. For households with active group members, their own household savings are excluded from the computation of the average stock measure. For households that are not group members the network variable is computed as the deviation of network deposit saving from the household's deposit saving. We control for differences in the density of different groups, noting that the larger the group the greater the penetration of information across both group and non-group members. It may also be the case, however, that the larger the group the less effective they may be in influencing behavior since the extent of 'locality' of the group is lessened. The models are estimated separately for group and non-group members. The former capture endogenous network effects while the latter capture spillover effects of group behavior into the rest of the community. All models are estimated in first differences and so household specific effects are controlled for. In addition, changes in all baseline characteristics are controlled for and provincial fixed effects are also included. The results for group members are presented in Table 5.

[INSERT TABLE 5 ABOUT HERE]

Table 5, Panel A reports the results for the Women's Union networks. Once the interaction between the density of the group and the network variable is included in the model (column (2)), we find that the stock of deposit savings by households with active members of Women's Unions within the province has a positive effect on the proportion of deposit saving in total saving of other households with active group members. The magnitude of this network effect is large relative to the lifecycle and socio economic effects presented in Table 4. The interaction term between the

network effect and the density of the network is positive and significant indicating that the larger the network the greater the effect of group behavior on household behavior. Disaggregating deposits by formal and informal deposits helps to further explain the overall effect of networks. We find in column (3) that the level of formal deposits has a positive and significant effect while the level of informal deposits has no significant effect. This effect is robust to the inclusion of an interaction between formal and informal network effects and the density of the network. As column (4) reveals the interaction with the density variable is positive and significant indicating that the larger the network the greater the network effect through the formal savings channel. These results are robust to the inclusion of district level fixed effects in place of province level fixed effects (see Panel A of Table A1 in the Appendix). When the network is defined district level, however, no significant network effects are found.

Overall, these findings provide strong support for our theoretical predictions. Our theoretical model predicts that information is shared within groups, which reduces the perceived risk associated with holding deposits for group members, thereby increasing their perceived return relative to holding cash at home. Here, we measure this information through the actual savings behavior of other members of the group and find that it has a positive and significant effect on the deposit ratio. We also find that the larger the group the greater the effect suggesting that larger Women's Unions may be more effective in influencing household behavior. This is consistent with our finding that when networks are defined at district level no significant network effects are found.

We find similar results for Farmer's Unions as illustrated in Table 5, Panel B. The network effect, on aggregate, is positive and significant (column (1)), even when controlling for the interaction between this and the density of the network (column (2)). The overall positive effect is driven by informal deposits (column (3)), but this result is not robust to the inclusion of the interaction term between group density and the network effect (column (4)). These results are robust to the inclusion of district level fixed effects. Similar network effects are also found for Farmer's Unions when the network is defined at district level (see Panel B of Table A1 in the Appendix).

As revealed in Table 5, Panel C, for Veteran's Unions we only find evidence of a network effect when deposits are disaggregated by formal and informal savings and the interaction between the density of the network and the network effect is controlled for (column (4)). As for Women's Unions the level of *formal* saving of group members has a positive impact on the ratio of deposits to total saving. These findings are robust to the inclusion of district fixed effects, however, when the network is defined at district levels, as was the case for Women's Unions, no significant network effects are found (see Panel C of Table A1 in the Appendix).²⁷ These findings provide further evidence for our theoretical predictions, suggesting that networks can potentially play an important role in disseminating information on the perceived riskiness of savings mechanisms thus enabling households to make more efficient savings decisions. It does appear, however, that the size of the network may also be an important factor, particularly for Women's Unions.

²⁷ Some caution should be exercised in interpreting the results of the robustness checks for Veteran's Unions given the small number of observations on group members (150) and the inclusion of district fixed effects of which there are 131, although many of the latter are excluded due to multicollinearity.

Next we turn to non-group members and analyze how changes in the average level of deposit savings by group members relative to the household's initial stock of saving in 2006 impacts on the ratio of deposits to total savings for those households. The aim of this exercise is to establish the extent to which knowledge spillovers exist in the sense that the behavior of the group impacts on the behavior of non-group members. A positive result would indicate that the greater the change in the stock of group financial saving relative to the households initial stock of saving the more that household saves in the form of deposits in the subsequent period. The results for non-group members are presented in Table 6.

[INSERT TABLE 6 ABOUT HERE]

For Women's Unions we find that the change in the level of network deposit savings, relative to the households' initial stock of deposit savings, has a positive and significant effect on the ratio of deposits to total savings for non-group members. However, this effect is only found once we have controlled for the interaction with the density of the network. When district fixed effects are included, however, the network effect for non-group members is much stronger and of a higher magnitude. Moreover, when the network is defined at district level strong positive effects are also observed. (See Panel A of Table A2 in the Appendix for the latter two results). This suggests that for non-group members the behavior of network members in closer proximity has a more significant impact on household behavior.

For Farmer's Unions we only find a positive effect when savings are disaggregated by formal and informal saving with the latter found to have a positive and significant effect. However, once district fixed effects are included we find a positive and significant effect on aggregate, and for informal saving. As for Women's Unions, defining the network at district level also seems to be important with positive and significant effects observed (see Panel B of Table A2 in the Appendix). We find a very strong result for Veteran's Unions where the network effect is positive and significant regardless of whether the interaction with the density variable is included. The effect is driven by informal savings. These results are robust to the inclusion of district fixed effects and are also present when the network is defined at district level (see Panel C of Table A2 in the Appendix). These results suggest that the savings behavior of the group not only impacts on the savings decisions of group members but also spills over to non-group members in the same community. The magnitude of the effect, however, is lower than that for group members.

Overall, we find evidence that the savings behavior of socio-political groups in rural Vietnam has a positive influence on the deposit ratio of group members and non-group members. Our theoretical model predicts that information disseminated through networks of this kind reduces the perceived riskiness of the return to choosing deposit saving as opposed to saving in the form of cash held at home. The evidence presented in this paper supports this theoretical prediction. In a more general context, our results suggest that these groups can fill the role of formal institutions in enhancing the knowledge of individuals at local level.²⁸ This is not only the case for active members of these organizations but also for other households who benefit from information

²⁸ See Hardin (2009) for a full discussion of the role of institutions in spreading both *institutional* and *ordinary* knowledge.

spillovers. In a policy context, targeting information on the benefits of saving in financial institutions or local savings groups through groups of this kind could be effective in increasing the number of households that save at grassroots level.

6. Conclusion

Household savings are an important instrument for coping with risk in developing countries. Moreover, savings are an important means of financing productive investment, particularly where there are credit constraints. Savings at the household level, however, are hindered by the fact that financial markets are not particularly well developed in many rural communities and many households either do not possess the information required to set up formal deposit accounts or do not trust formal institutions with their money. As a result, households often opt to hold their savings in the form of cash held at home, an insecure form of saving that does not yield a return. In this paper, we have explored the extent to which social networks in the form of formal group membership can play a role in imparting information about the merits of saving where potential knowledge gaps exist, thus facilitating savings where they would otherwise not be possible. This paper thus provides evidence of an important role for social capital in influencing economic decision making where information failures prevent economic agents from behaving in an optimal way.

Our paper contributes to the literature in two ways. First, we have (i) proposed a model where the level of financial information a household has impacts on their perceptions of the returns to different forms of saving and (ii) suggested a mechanism through which social networks, may correct for such information failures by imparting knowledge about the returns to saving through the network, either through directly informing group members or through group members demonstrating optimal behavior to non-group members. Within our model, information of this kind has the potential to change households' perceptions of the riskiness of different forms of saving, thereby altering their savings responses to changes in wealth. Second, we have provided empirical evidence of such a model at work in rural Vietnam. Specifically, we have analyzed the role of group behavior in household savings decisions for both group and non-group members where the groups considered are well established socio-political organizations operating at various levels within communities. Vietnam provides a particularly interesting case study for two reasons: first, given the prominence of such organizations (namely, Women's Unions, Farmer's Unions and Veteran's Unions); and second given that households hold large amounts of liquid assets as cash at home, an insecure and unproductive form of saving that does not yield a return, suggesting that information failures do exist, particularly in rural communities. Our model suggests that disseminating information about the merits of saving through means that offer interest payments and opportunities for accessing credit could potentially stimulate more productive household savings. Controlling for endogeneity, reflexivity, exogenous and correlated group effects, and group density, we find evidence of this mechanism at work for all three groups considered. The results are robust to the inclusion of more disaggregated fixed effects and the regional level at which the network effect is defined.

Overall, our results suggest that socio-political groups in Vietnam play an important role in correcting for gaps in information on the merits of saving at the community

level. Our results imply that targeting information on the benefits of saving through these groups could be effective in increasing the number of households that save. This result can be generalized to other developing countries where well-established formal reputable groups operate at grassroots level. We propose that the mechanism through which this information sharing happens is through demonstration effects transmitted through reputable inter-personal networks, a mechanism difficult to replicate through formal institutions. The cost of this form of information sharing is small but the benefits could be significant. As suggested by Fafchamps (2006) fostering 'social capital' of this kind as well as ensuring that the information disseminated by these groups is both accurate and desirable may be an appropriate policy response. These findings also open the door for further research analyzing the role of social capital in addressing other local market failures such as access to credit, property rights and other infrastructural deficits.

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Tables

Table 1
Household savings behavior

	Total Savings	Deposits	Formal	Informal	Home
% hhs who save (2006)	54.22	17.15	5.10	12.93	43.65
% hhs who save (2008)	43.88	9.22	4.08	5.24	37.63
<i>For saving households:</i>	<i>VND</i>	<i>Of which (%):</i>			
Average (2006)	8,525	26.89	7.69	19.20	73.11
Average (2008)	12,237	17.72	7.94	9.78	82.28
<i>For saving households:</i>					
Savings/income (2006)	24.40	11.33	4.04	7.29	13.07
Savings/income (2008)	19.81	4.54	2.45	2.09	15.26

Note: All value figures are adjusted using regional price deflators and are expressed in terms of June 2006 prices. Inflation adjustment is based on Consumer Price Index figures available from the General Statistics Office of Vietnam.

Table 2
Group membership and savings

	Women's Union		Farmer's Union		Veteran's Union	
	2006	2008	2006	2008	2006	2008
% hhs active members	54.63	53.38	40.82	33.60	13.58	12.33
% hhs who save	55.81	47.66	55.62	49.79	52.56	45.86
<i>For saving households:</i>						
Mean level of saving	9,391	11,328	6,951	8,439	9,593	9,214
Total savings as % income	24.55	19.75	22.28	17.44	24.87	16.32
Deposits as % total	28.41	14.87	24.86	13.49	36.58	19.09
Formal deposits as % total	8.82	6.44	7.71	6.46	7.71	11.54
<i>Network savings:</i>						
Ha Tay	3,825	5,137	3,945	2,251	7,643	504
Lao Cai	1,755	298	1,472	314	278	1,905
Phu Tho	4,827	3,337	1,803	3,946	1,780	3,664
Lai Chau	388	0	0	0	852	0
Dien Bien	51	146	47	5	0	0
Nghe An	7,572	673	2,529	2,116	3,071	4,618
Quang Nam	3,799	2,809	5,496	1,258	7,047	678
Khanh Hoa	302	450	0	851	0	0
Dak Lak	7,709	1,029	4,890	363	29,249	0
Dak Nong	2,825	17,897	949	14,306	606	2,076
Lam Dong	1,228	1,262	2,636	2,087	406	0
Long An	3,018	2,900	2,435	2,146	3,496	809
Average	3,585	3,130	2,812	2,291	5,728	1,224

Network savings is defined as the average stock of savings in the form of deposits held by group members within an individual province at the beginning of the year.

Note: All value figures are adjusted using regional price deflators and are expressed in terms of June 2006 prices. Inflation adjustment is based on Consumer Price Index figures available from the General Statistics Office of Vietnam.

Table 3
Explanatory variables

	Description	Mean	Std. Dev.
Stock	Stock of deposit savings at beginning of year:		
	2006	3,828	21,306
	2008	3,237	23,152
	Stock of home savings at beginning of year:		
	2006	3,540	12,940
	2008	3,618	14,482
Number of banks	Number of banks located in the commune		
	2006	0.47	0.69
	2008	0.78	0.80
Income	Total household income		
	2006	26,948	39,453
	2008	40,942	66,737
Household Size	Total number of individuals in household		
	2006	4.55	1.76
	2008	4.53	1.79
		Frequency (%)	
Income shock	Dummy =1 if household suffered an unexpected loss to income between 2006 and 2008 due to an exogenous shock	37.77	
Children Support	Dummy =1 if household receives financial support from children		
	2006	33.09	
	2008	14.27	

Note: All value figures are adjusted using regional price deflators and are expressed in terms of June 2006 prices. Inflation adjustment is based on Consumer Price Index figures available from the General Statistics Office of Vietnam.

Table 4
Household savings model - baseline

Deposits/Total Saving (change)	(1)	(2)	(3)	(4)	(5)
Constant	-0.050** (0.020)	-0.048** (0.020)	-0.046** (0.021)	-0.049** (0.021)	-0.047** (0.021)
Change in Deposit Stock	0.003*** (0.0003)	0.003*** (0.0003)	0.003*** (0.0003)	0.003*** (0.0003)	0.003*** (0.0003)
Change in Home- saving Stock	-0.002*** (0.0005)	-0.002*** (0.0005)	-0.002*** (0.0005)	-0.002*** (0.0005)	-0.002*** (0.0005)
Income (change)	0.0005*** (0.0001)	0.0005*** (0.0001)	0.0005*** (0.0001)	0.0005*** (0.0001)	0.0005*** (0.0001)
Shock – Natural Disaster	0.005 (0.019)	0.014 (0.020)	0.014 (0.020)	0.014 (0.021)	0.014 (0.020)
Household Size (change)	-0.008 (0.008)	-0.009 (0.008)	-0.010 (0.008)	-0.009 (0.008)	-0.008 (0.008)
Children Support (change)	-0.005 (0.018)	-0.004 (0.019)	-0.003 (0.019)	-0.004 (0.019)	-0.004 (0.019)
Number of banks (change)		0.013 (0.011)	0.013 (0.011)	0.013 (0.011)	0.013 (0.011)
Became active WU			0.009 (0.026)		
Became inactive WU			-0.028 (0.025)		
Became active FU				-0.001 (0.029)	
Became inactive FU				0.004 (0.024)	
Became active VU					-0.044 (0.043)
Became inactive VU					0.005 (0.040)
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes
R ²	0.107	0.105	0.106	0.105	0.106
n	1,903	1,728	1,728	1,728	1,728

Standard errors are given in parenthesis, *** denotes significance at the 1 percent level, ** denotes significance at the 5 percent level, * denotes significance at the 10 percent level. Note: The drop in observations between column 1 and column 2 is due to missing commune level information.

Table 5
Household savings model - network effects on group members

Deposits/Total Saving (change)	(1)	(2)	(3)	(4)
Panel A				
Women's Union				
Network Variable (Total Deposits)	0.096 (0.075)	0.298** (0.123)		
Density	-0.001 (0.003)	-0.023** (0.011)		
Density x Network (Total Deposits)		0.008** (0.004)		
Network Variable (Formal)			0.138* (0.080)	0.406*** (0.131)
Network Variable (Informal)			0.0005 (0.097)	0.079 (0.159)
Density			0.002 (0.004)	0.00002 (0.019)
Density x Network (Formal)				0.013*** (0.005)
Density x Network (Informal)				-0.003 (0.009)
Province Fixed Effects	Yes	Yes	Yes	Yes
R ²	0.1406	0.146	0.144	0.153
n	689	689	689	689
Panel B				
Farmer's Union				
Network Variable (Total Deposits)	0.214** (0.107)	0.225* (0.118)		
Density	-0.010 (0.006)	-0.014** (0.007)		
Density x Network (Total Deposits)		0.001 (0.006)		
Network Variable (Formal)			0.152 (0.175)	0.153 (0.194)
Network Variable (Informal)			0.207** (0.109)	0.177 (0.162)
Density			-0.005 (0.006)	-0.006 (0.011)
Density x Network (Formal)				0.002 (0.007)
Density x Network (Informal)				-0.002 (0.011)
Province Fixed Effects	Yes	Yes	Yes	Yes
R ²	0.232	0.232	0.233	0.233
n	424	424	424	424
Panel C				
Veteran's Union				
Network Variable (Total Deposits)	0.012 (0.030)	0.049 (0.033)		
Density	-0.0005 (0.018)	-0.194** (0.080)		
Density x Network (Total Deposits)		-0.036** (0.016)		
Network Variable (Formal)			0.012 (0.030)	0.059* (0.034)
Network Variable (Informal)			0.003 (0.061)	0.028 (0.061)
Density			0.002 (0.023)	-0.238*** (0.083)
Density x Network (Formal)				-0.020 (0.018)
Density x Network (Informal)				-0.063*** (0.021)
Province Fixed Effects	Yes	Yes	Yes	Yes
R ²	0.211	0.240	0.211	0.260
n	153	153	153	153

Standard errors are clustered at the commune level and are given in parenthesis, *** denotes significance at the 1 percent level, ** denotes significance at the 5 percent level, * denotes significance at the 10 percent level.

Note: All baseline controls are included in each model.

Table 6
Household savings model - network effects on non-group members

Deposits/Total Saving (change)	(1)	(2)	(3)	(4)
Panel A				
Women's Union				
Network Variable (Total Deposits)	0.001 (0.001)	0.001* (0.001)		
Density	-0.001 (0.002)	-0.001 (0.002)		
Density x Network (Total Deposits)		0.0001* (0.00003)		
Network Variable (Formal)			0.001 (0.001)	0.001 (0.001)
Network Variable (Informal)			0.001 (0.001)	0.001 (0.002)
Density			-0.001 (0.002)	-0.001 (0.002)
Density x Network (Formal)				0.0001 (0.00004)
Density x Network (Informal)				0.0001 (0.00004)
Province Fixed Effects	Yes	Yes	Yes	Yes
R ²	0.080	0.085	0.080	0.085
n	553	553	553	553
Panel B				
Farmer's Union				
Network Variable (Total Deposits)	0.0005 (0.0005)	0.0004 (0.0005)		
Density	0.001 (0.002)	0.001 (0.002)		
Density x Network (Total Deposits)		-0.0001*** (0.00002)		
Network Variable (Formal)			-0.0004 (0.0006)	-0.001 (0.001)
Network Variable (Informal)			0.004*** (0.001)	0.009*** (0.002)
Density			0.002 (0.002)	0.001 (0.002)
Density x Network (Formal)				-0.0002*** (0.00004)
Density x Network (Informal)				0.0002*** (0.00005)
Province Fixed Effects	Yes	Yes	Yes	Yes
R ²	0.082	0.096	0.092	0.142
n	887	887	887	887
Panel C				
Veteran's Union				
Network Variable (Total Deposits)	0.001*** (0.0004)	0.001*** (0.0004)		
Density	-0.005*** (0.002)	-0.008*** (0.002)		
Density x Network (Total Deposits)		-0.0003*** (0.0001)		
Network Variable (Formal)			0.0001 (0.0005)	-0.0003 (0.0005)
Network Variable (Informal)			0.006*** (0.001)	0.008*** (0.001)
Density			-0.005*** (0.002)	-0.006*** (0.002)
Density x Network (Formal)				-0.001*** (0.0001)
Density x Network (Informal)				0.0005** (0.0002)
Province Fixed Effects	Yes	Yes	Yes	Yes
R ²	0.103	0.100	0.120	0.139
n	1,519	1,519	1,519	1,519

Standard errors are clustered at the commune level and are given in parenthesis, *** denotes significance at the 1 percent level, ** denotes significance at the 5 percent level, * denotes significance at the 10 percent level.

Note: All baseline controls are included in each model.

Appendix

Table A1

Robustness checks of household savings model - network effects on group members

Deposits/Total Saving (change)	(1)	(2)	(3)	(4)
Panel A				
	Women's Union			
	Province level network		District level network	
Network Variable (Total Deposits)	0.302** (0.135)		0.001 (0.007)	
Density	-0.011 (0.009)		-0.046*** (0.017)	
Density x Network (Total Deposits)	0.008* (0.004)		0.002 (0.001)	
Network Variable (Formal)		0.268** (0.147)		-0.002 (0.009)
Network Variable (Informal)		0.224 (0.176)		0.007 (0.008)
Density		-0.024 (0.023)		0.047 (0.028)
Density x Network (Formal)		0.008 (0.005)		-0.001 (0.002)
Density x Network (Informal)		0.010 (0.010)		0.009* (0.005)
District Fixed Effects	Yes	Yes	Yes	Yes
R ²	0.285	0.289	0.278	0.284
n	689	689	683	683
Panel B				
	Farmer's Union			
	Province level network		District level network	
Network Variable (Total Deposits)	0.237* (0.146)		0.011** (0.004)	
Density	-0.006 (0.010)		-0.026 (0.023)	
Density x Network (Total Deposits)	0.006 (0.007)		0.001 (0.001)	
Network Variable (Formal)		0.169 (0.223)		0.008 (0.011)
Network Variable (Informal)		0.464** (0.189)		0.015*** (0.005)
Density		0.028* (0.017)		0.003 (0.029)
Density x Network (Formal)		-0.004 (0.009)		-0.003 (0.003)
Density x Network (Informal)		0.027** (0.013)		0.002* (0.001)
District Fixed Effects	Yes	Yes	Yes	Yes
R ²	0.415	0.422	0.421	0.425
n	424	424	424	424
Panel C				
	Veteran's Union			
	Province level network		District level network	
Network Variable (Total Deposits)	0.238** (0.112)		0.023 (0.028)	
Density	-0.369*** (0.121)		-0.007 (0.189)	
Density x Network (Total Deposits)	-0.058*** (0.020)		-0.013** (0.006)	
Network Variable (Formal)		0.263** (0.134)		-0.003 (0.034)
Network Variable (Informal)		-0.317 (0.529)		-0.058 (0.069)
Density		-0.367** (0.145)		0.289** (0.149)
Density x Network (Formal)		-0.029 (0.028)		-0.005 (0.009)
Density x Network (Informal)		-0.095*** (0.032)		-0.023** (0.011)
District Fixed Effects	Yes	Yes	Yes	Yes
R ²	0.638	0.650	0.562	0.573
n	153	153	130	130

Standard errors are clustered at the commune level and are given in parenthesis, *** denotes significance at the 1 percent level, ** denotes significance at the 5 percent level, * denotes significance at the 10 percent level.

Note: All baseline controls are included in each model.

Table A2
Robustness checks of household savings model - network effects on non-group members

Deposits/Total Saving (change)	(1)	(2)	(3)	(4)
Panel A				
	Women's Union			
	Province level network		District level network	
Network Variable (Total Deposits)	0.003*** (0.001)		0.006*** (0.001)	
Density	0.006 (0.006)		0.018** (0.009)	
Density x Network (Total Deposits)	0.0001*** (0.00003)		0.0004*** (0.0001)	
Network Variable (Formal)		0.006*** (0.001)		0.008*** (0.002)
Network Variable (Informal)		-0.0006 (0.002)		0.006** (0.002)
Density		0.006 (0.006)		0.019** (0.009)
Density x Network (Formal)		0.0002*** (0.00004)		0.0004*** (0.0001)
Density x Network (Informal)		0.00002 (0.00005)		0.0008*** (0.0002)
District Fixed Effects	Yes	Yes	Yes	Yes
R ²	0.321	0.340	0.325	0.3434
n	553	553	535	535
Panel B				
	Farmer's Union			
	Province level network		District level network	
Network Variable (Total Deposits)	0.001** (0.001)		0.002** (0.001)	
Density	0.015** (0.007)		-0.019** (0.009)	
Density x Network (Total Deposits)	-0.0001** (0.00003)		0.000 (0.000)	
Network Variable (Formal)		-0.0001 (0.001)		0.0002 (0.0009)
Network Variable (Informal)		0.008*** (0.002)		0.007*** (0.002)
Density		0.015** (0.007)		-0.018** (0.009)
Density x Network (Formal)		-0.0002*** (0.00004)		-0.0001 (0.0001)
Density x Network (Informal)		0.0002*** (0.00005)		0.0003*** (0.0001)
District Fixed Effects	Yes	Yes	Yes	Yes
R ²	0.273	0.307	0.271	0.280
n	887	887	810	810
Panel C				
	Veteran's Union			
	Province level network		District level network	
Network Variable (Total Deposits)	0.002*** (0.0005)		0.005*** (0.001)	
Density	-0.009 (0.021)		0.003 (0.005)	
Density x Network (Total Deposits)	-0.0003*** (0.0001)		0.0001** (0.00005)	
Network Variable (Formal)		0.0005 (0.0005)		0.005*** (0.002)
Network Variable (Informal)		0.008*** (0.001)		0.005** (0.002)
Density		-0.008 (0.021)		0.003 (0.005)
Density x Network (Formal)		-0.0007*** (0.0001)		0.0001** (0.00006)
Density x Network (Informal)		0.0006*** (0.0002)		0.0001 (0.0001)
District Fixed Effects	Yes	Yes	Yes	Yes
R ²	0.207	0.228	0.200	0.200
n	1,519	1,519	1,243	1,243

Standard errors are clustered at the commune level and are given in parenthesis, *** denotes significance at the 1 percent level, ** denotes significance at the 5 percent level, * denotes significance at the 10 percent level.

Note: All baseline controls are included in each model.



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