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1 Introduction

Social capital can facilitate access to credit, but also affect repayment behavior of borrowers (van Bastelaer, 2003). Many studies link repayment performance to social capital, for example Cassar *et al.* (2007), or to social ties, for example Ahlin and Townsend (2007) (see section 2.1 below). However, these scholars use joint liability credit groups as the unit of analysis. Little research exists on repayment performance of individual borrowers and social capital or social ties. Studies focus predominantly on social ties crossing power differentials in which powerful individuals exploit the credit program. In addition, they are often anecdotal (Vaessen 2001). Moreover, the literature on loan performance within credit groups concentrates on intragroup ties, but excludes ties to persons outside the group. An important aspect of social capital is thus excluded from previous analyses. Research in development economics has only recently begun to pay heed to social relations or ties.

Often, measurement of these ties has been rather crude, focusing for instance on role relationships like friends, relatives, or neighbors. Our approach to measuring social

ties is more elaborate. We use a survey tool from the field of sociology that is rarely applied in agricultural economics research.¹ This technique involves the use of instruments referred to as ‘name generator’ and ‘position generator’ to measure the personal network, or preferably a sample of the respondent’s personal network. These network data are then used to create measures of the individual social capital of borrowers.² We define social capital as interpersonal networks (ties) plus resources.

The empirical part of this work focuses on the influence of social capital on repayment behavior of rural borrowers in Northern Vietnam. Substantial empirical work exists on the rural credit market in Vietnam (Barlund and Tarp 2008, Buchenrieder and Theesfeld 2000, Dufhues 2003, Dufhues et al. 2004, Dufhues et al. 2002, Duong and Izumida 2002, Izumida and Duong 2001, Pham and Lensink 2007). On the subject of social capital in Vietnam, too, some research has been conducted (Chen 2005, Dalton et al. 2002, Dalton and Ong 2005, De Silva et al. 2006, Ha et al. 2004, Ha et al. 2006, Mutz and Schmidt 2002, van Staveren and Knorringa 2007). No research so far, however, has applied the concept of social capital to the rural credit market in Vietnam.

The Vietnamese Government offers various credit lines to support rural households. Most of them are issued by the Vietnam Bank for Social Policies (VBSP). Another major player in the rural credit market is the Vietnam Bank for Agriculture and Rural Development (VBARD). Both have an enormous outreach – every second rural household is indebted to one of the banks. The enormous outreach has a trade-off (Dufhues et al. 2004). Many of the loans have gone to borrowers that are not creditworthy. Hence, rescheduling of loans is common, driving up the amount of non-performing loans (Dufhues 2003, Izumida and Duong 2001). The underlying hypothesis of this study is that social capital influences loan repayment. Empirical

evidence suggests that social capital can have an ambiguous effect on loan repayment.

The paper is organized as follows. Section two reviews the theoretical and empirical literature on individual social capital and its influence on loan repayment performance of borrowers organized in groups and individual borrowers. Section three describes the methodological approach with regard to measuring the different forms of social capital, the data collection method, and the data sample. The model and econometric issues are discussed in section four. Section five presents the results. The paper concludes with a brief summary and policy recommendations.

2 Loan repayment and social capital

2.1 Credit groups, social ties and repayment: An overview

Hardly any scholarly literature is available on social capital or ties and individual credits. Our review therefore focuses to a large extent on social capital affecting credit groups. However, some of the empirical findings may be also applicable to individual credits.

Being aware of the perils of free-riding or shirking, credit institutes working with group credit schemes usually incorporate a number of safeguards. The most prominent of these is that borrower groups are self-selecting, the expectation being that credit group members choose trustworthy persons from their personal network to join the group and that close social ties enhance peer pressure and group solidarity. It thus seems plausible that social ties and group homogeneity³ are indirectly linked to repayment performance as they can facilitate peer monitoring and increase the potential social sanction of peer pressure (Besley and Coate 1995, Godquin 2004).

However, the evidence relating to the impact of 'social ties' on repayment performance of credit groups is rather mixed. On the one hand, this is likely due to the

fact that in one situation the effect of social and/or financial sanctions associated with the solidarity group arrangements are important, while in other setups the incentive of continued access to credit is the driving factor behind repayment (Ito 2003). On the other hand, this ambiguity may also be due to the great diversity of studies in this area. Credit groups can have different traits and exist in many countries and cultures. Also, the studies use diverse methods and terminology (see **Fehler! Verweisquelle konnte nicht gefunden werden.**). Furthermore, all existing studies on social ties, social capital, and homogeneity and group repayment focus on intra-group social ties. Only a few studies look at social ties outside the group. For instance, Woolcock (1999) states that group-based programs in Bangladesh do not facilitate transitions into nonfarm employment, while group-based programs in Indonesia that seek explicitly to encourage nonlocal exchange, do facilitate this transition. Montgomery (1996) points out that individual group members of the Bangladesh Rural Advancement Committee (BRAC) who faced repayment problems turned for help to relatives or close friends outside the group rather than to other members.

Because of the ambiguous empirical results, it is rather difficult to draw any general conclusion. In the case of Vietnam, any form of direct peer pressure is rather unlikely as the credit groups do not apply the joint liability rule. Defaulting borrowers are simply excluded from the group, but the group is not held liable for them (Dufhues et al. 2004). Moreover, collateral is rarely seized and troubled loans are frequently rescheduled, thus further disguising defaulting borrowers. Nevertheless, one may still assume that some peer pressure is exerted. A defaulting borrower who is publicly known may be shunned by his fellow villagers. By circulating information, social capital can magnify reputational sanctions (Durlauf and Fafchamps 2005). Nevertheless, peer pressure is more frequent in informal loan arrangements (among

persons who are living in the same dwelling).

(Table 1 about here)

2.2 Different forms of social capital and loan performance

The standard criticism leveled at the social capital concept is that it is usually defined too broadly and is thus analytically useless. We therefore emulate scholars such as Foley and Edwards (1999) or Lin (1999a), and define social capital more narrowly and leanly as *interpersonal networks (ties) plus resources*.⁴ Social structures are not independent from their context and not every social structure will result in social capital (Jans 2003). It is the resource that turns the social structure into social capital.

The research analytically distinguishes three forms of social capital: bonding, bridging, and linking. Bonding social capital relates to ‘strong ties’, while bridging social capital relates to ‘weak ties’ (Woolcock and Narayan 2000). Weak ties are characteristic of the infrequent interactions and peripheral relationships among more or less dissimilar individuals. Strong ties are characteristic of the intimate social circle of individuals with rather similar characteristics, such as can be found in relatively homogenous groups, for example family and close groups of friends (Lin 1982). Linking social capital refers to ties to people in positions of authority, such as representatives of public (for example police) and private (for example banks) institutions. In this classification, bonding and bridging social capital are horizontal. They connect people of similar economic, social, and political status, such as one farmer to another farmer (Woolcock and Narayan 2000). Linking social capital is more vertical, connecting people to key players across power differentials, for example connecting a farmer to credit officer, as described by Grootaert et al. (2003).

Sanders and Nee (1996) outline three mechanisms of social capital that positively

affect economic success. Social capital can offer or provide 1. instrumental support, 2. productive information, and 3. psychological aid. Instrumental support drawn from social capital can directly affect performance by providing such things as start-up capital or 'free' labor, for instance. Social capital can also disseminate productive information. Information is important in providing a basis for action. But acquisition of information is costly. As a minimum, it requires attention and time, which are always in scarce supply (Coleman 1988). Finally, social relations provide psychological aid. Maintaining social relations can prevent business dissolution caused by personal problems and can ensure that effort and motivation are not seriously impaired during times of emotional stress.

The aforementioned three mechanisms have distinct effects on the different forms of social capital. Bonding capital provides an individual with information that helps preserve his/her interest even when the individual has not actively searched for this information (Lai and Wong 2002). It also may help households to surmount periods of illiquidity, lack of labor, or periods of illness and in this way it reduces the probability of malperforming loans. Bonding social capital is important for coping with and mitigating idiosyncratic shocks. However, it may be less useful in times of covariate shocks. As Devereux (2001) points out, the core network is vulnerable to covariant risk, as it is likely to be hit as a whole. Furthermore, it is assumed that information or resources accessed through different strong ties are redundant; that is, everybody in the core network of strong ties has the same resources available. Thus, the strength of bridging social capital lies in its access to additional resources through its connection to other networks outside one's core network. By breaking out of one's own, close social circle using weak ties, one can access resources not otherwise available (Lin 1982). Households with a high amount of bridging social capital may therefore

perform better in their business activities and have a higher resilience towards covariate income shocks, and are thus assumed to have better loan repayment performance. Gine and Karlan (2006) however, point out that borrowers with weaker social networks may have less to lose from the shame of being seen to default, and hence may default more readily.

The strength of linking social capital lies in accessing positions vertically higher in the social hierarchy. The higher the rank of the person with whom they are formed, the more useful are the ties. An individual is likely to be able to draw on more resources if s/he is connected to a rich and influential person than to a person far removed from the seats of power (Lin 1999b). It may also help in periods of covariate shocks because vertical networks are often unaffected by such shocks. Linking social capital may thus work even better than bridging social capital and hence further improve loan repayment performance. If linking social capital is connected by way of a strong tie, however, it may prove counterproductive in terms of loan repayment as collusion and political protection may occur.

What can we expect in the Vietnamese context? Winkels and Adger (2002) show that access to resources is intimately linked to social networks as access to land and other resources is often dependent on membership in descent groups, local farming communities and other networks. In the rural context, informal self-help networks of villagers help with building houses or working the farm during peak seasons. During the socialist era in Vietnam, special cadre networks developed to create access to scarce resources and to circumvent certain policies (Dalton and Ong 2005). The question is, are those networks still active and do they play a role in the rural financial market? Buchenrieder and Theesfeld (2000) and Dufhues et al. (2002) highlighted the prominent role of local politicians in the targeting, screening, and enforcement

process of the Vietnam Bank of the Poor (VBP) (now known as the VBSP). Furthermore, Saigenji and Zeller (2009) found that the linkages between politics and economy via party membership in Northern Vietnam are still very strong.

3 Methods and data

3.1 Sample and data

Our survey focuses on the Son La province.⁵ In 2007/2008 we re-interviewed the households of the Vietnamese Household Living Standard Survey (VHLSS) (2004).⁶ According to the General Statics Office (GSO) in Hanoi, those households are a representative sample of households in Son La province. However, in two districts of Son La, local research permission was denied due to their sensitive border location and other security issues. Some households could not be located again due to migration. Migration was prompted mainly by the construction of a huge hydroelectric dam. For instance, all of the inhabitants of one survey village migrated and we were not able to track them down. Hence, our sample is somewhat smaller (minus 25% households) than the VHLSS for Son La, resulting in a total of 411 observations.

The survey was divided into two phases (with a three to four-month time interval). Two reasons played a role in adopting this procedure: (1) An extensive interview in which the respondent had to answer all the questions in one interview might have been perceived as too burdensome. (2) Some of the data from the first interview were used as input for the second round. Due to the time lag between the two survey rounds we also experienced a low level of attrition (less than 5%) caused by migration, death, and refusal. The two survey rounds covered all information concerning social capital and social networks of the households, as well as information on basic income and

other household assets. In the end, the sample size consisted of 411 households, 172 of which had formal or semiformal credits. Because some households had more than one credit, our final sample size comprises 195 credits.

3.2 Measuring social capital and its different forms

There are as many ways to measure social capital as there are definitions. However, if social capital is to be more than a metaphor, it needs to refer to things that can be observed and measured (Uphoff and Wijayaratna 2000). In contrast to human capital, which is based on individuals, social capital resides in relationships (Coleman 1988). Social capital is rooted in social networks and social relations, and must thus be measured relative to its roots (Lin 1999a). Relational data in the form of network data would be ideal for measuring social capital (Herrmann-Pillath and Lies 2001). Our measurement of social capital was therefore based on the personal network of respondents. A personal network is defined as the sum of all relationships an individual has. Only ties that are connected to resources are measured, thus enabling us to identify the resource network of the respondent. The extent to which an individual has access to resources depends on that person's ties and on the strength of those ties (Sobel 2002).

The data gathered from the personal network of the respondent are used as the basis for our different measures of social capital. We applied two different cluster analyses (k-means) for measuring tie strength and social distance to identify our social capital variables. After excluding missing values, the network members of the 411 sample households comprised 4261 persons.

Cluster analysis - tie strength: Bonding and bridging social capital are distinguished by the strength of the tie between the respondent and the personal network member.

To measure tie strength we employed a similar approach to that of Zhao (2002), who used four variables (core family, other family, friend, acquaintance) to estimate tie strength: role relationship, frequency of contact per month, duration of relationship in years, and closeness.⁷ In the case of tie strength, two clusters were determined at the outset (weak ties, strong ties).

Cluster analysis - social distance: Linking social capital is differentiated by the social distance between the respondent and his personal network member. Social distance is measured using three different variables: 1. whether the respondent considers that he or she has a higher or lower social status than the other person, 2. the difference in occupations as measured by the Standard International Occupational Prestige Scale (SIOPS) developed by Ganzeboom and Treiman (1996),⁸ and 3. whether the interviewed person has a leading position in any group he is attending in comparison to his personal network member. In case of social distance, three clusters were determined at the outset (very low, low, high). Theoretically, linking capital can become negative (see left-hand side of **Fehler! Verweisquelle konnte nicht gefunden werden.**). Imagine a high ranking government official in a small village. All his ties to the villagers would be across a power differential. But the social distance from his viewpoint would be negative while the social distance from the villagers' point of view would be positive. However, such persons are by definition rarely found and make up only a very small share of the sample. Particularly in research concerning peasants in northern Vietnam, this problem can be disregarded because poorer people often lack ties to people in power. We also assume small changes in social distance to be negligible. Thus, the two lower clusters of the cluster analysis (negative and low distance) have been grouped together.

Bonding and bridging capital can also be regarded as positive or negative. However,

we assume all relationships to be positive or at least neutral to the person's social welfare.⁹ Hence, for the econometric analysis, we will only have positive social capital to deal with. Linking social capital can be connected either to bridging social capital, when the link is connected by way of a weak tie, or to bonding social capital, when the link is connected via a strong tie. Consequently, we have four different measures of social capital: 1. bonding, 2. bridging, 3. bonding_{link}, and 4. bridging_{link}. For the analysis, these four different measures of social capital are added up for each person, leaving us with four different social capital variables.

(Figure 1 about here)

3.3 Personal network data collection

We used the name and position generator to measure personal networks and to create measures of individual social capital. These are well established survey tools in sociology, but are rarely applied in development economics. The name generator asks questions about certain domains of the personal network, such as: 'Whom can you ask to help you fix your motorcycle?' Then the name of this person is recorded. Later, more questions can be asked about that person, for instance to ascertain the person's sex, age, occupation, and so forth, or to establish the relationship of this person to the respondent. This part of the survey is called 'name interpreter'.¹⁰ The name generator has often been criticized for being biased towards strong ties, because the first names that people recall are usually those of persons who have been known to them for a long time, or whom they meet more often, and so forth. As a result, the amount of bonding social capital may be overstated. The 'position generator' partly corrects for this. In its pure form it does not create names and it has no name interpreter. The respondents are asked whether they know or do not know persons from a list of

occupations, such as: ‘Do you know a primary school teacher’ or ‘Do you know a judge’? However, a simple yes/no answer does not suffice for our social capital measures. The name of the ‘teacher’ and so on were therefore also recorded, and a name interpreter was applied to each of the names.

Name generator: A single name generator question may generate results biased towards a single form of social capital; for example the question ‘whom would you ask to borrow a large amount of money?’ will reveal a large number of close relationships such as core family members and ultimately result in a very large amount of bonding social capital (Marin and Hampton 2007). In the light of this, we applied ten different name generators (see Box 1 in the Appendix for exact wording). The name generator questions are all based on specific resources, skills or knowledge that can potentially be exchanged among rural people, such as borrowing money or obtaining information about formal credits. This leaves little room for the respondents to interpret the questions differently. The specific items, skills, or knowledge were determined during several group discussions with farmers in northern Vietnam. The name generator questions ask only about areas important to rural inhabitants and in which a more or less regular exchange is taking place. We restricted the number of persons named per question to a maximum of three to limit the interview burden on the respondent.

Position generator: The position generator was primarily applied to measure weak ties. This data collection tool builds on a sample of occupations and asks respondents to indicate contacts in each of the occupations. The position generator utilizes a person’s occupation as an indicator of the resources available to that person. A person’s occupation is a good indicator of his/her social roles and resources, and hence the kinds of help that s/he might be able to provide. The sample of occupations

should range widely in prestige and represent different sectors of the economy in order to meet the theoretical goal of measuring access to different parts of the social structure and their differing resources. The occupations should have fairly large populations since few people, if any, will know anyone in a very rare occupation. The occupations should have clear titles that all respondents will understand. If good census information is available, one should always use occupational titles from the census (Erickson 2004). Erickson (2004) further points out that 15-30 different occupations is a good number to gain meaningful results. In Vietnam no detailed labor statistics were available. For this reason, and to enhance comparability, in the Vietnam survey we used the same list of occupations as we used in Thailand.¹¹ We asked a representative sample of 26 different occupations, selected from the national ‘labor force survey’ in Thailand. The complete list of chosen occupations can be seen in **Fehler! Verweisquelle konnte nicht gefunden werden.** in the Appendix.

4 Modeling repayment performance and rescheduling

The underlying hypothesis of the econometric model is that social capital in general plays a pivotal role with regard to loan repayment performance. Nevertheless, the above theoretical discussion made clear that the direction of the impact may vary across different forms of social capital. Bonding and bridging social capital should influence loan repayment positively, although the effect of bonding social capital in Vietnam is not wholly evident. We hypothesize that bonding_{link} social capital has a negative influence on repayment behavior due to possible nepotism or collusion with local elites.

4.1 The models

The default rate is perhaps the single most important credit performance indicator

(Karlan 2007). However, regressing social capital on credit default may lead to biased results, because we employ cross-sectional data that ignore the time lag between these variables (the social capital variables are measured after the credit default). Vietnam uses its own definition to classify loans as non-performing, which prolongs the time lag: interest accrual on non-performing loans is tolerated for up to 180 days for unsecured loans and 360 days for secured loans. Loans overdue for up to 90 days are not adequately classified (Dufhues 2003). But Karlan (2007) also points out that default typically begins somewhere in the middle of the loan term when the client stops making the scheduled loan payments. We therefore use a binary logit regression to estimate the effects of social capital on repayment performance, where the dependent variable is one for all loans that have not been repaid on time (either principal and/or interest) and zero otherwise (Y1). This includes a subjective measure, which is based on self-assessment by borrowers of their ability to pay back a running loan on time. If a borrower responded 'can't pay' or 'can pay only with difficulty', the loan is considered to be doubtful and it will receive a one. If a borrower responded 'can pay', his loan is deemed safe and it receives a zero. We realize that a possible distortion may occur with this proxy. Some doubtful loans may not have defaulted when matured and some safe loans may have turned troublesome in the end. However, Pham and Lensink (2007) point out that the potential of default could be an appropriate proxy for an actual event because the information is derived from the subjective risk perception of borrowers, rather than from risk assessment by lenders.¹²

Y1: Have you ever been late in paying interest or principal? Do you have difficulties in paying back the loan on time or at all? (yes = 1, no = 0)

Twenty-two credits were classified as doubtful according to the above classification. Our regression coefficients may be biased due to the low number of positive

observations. We therefore ran a 'rare event logit' and compared the results with our standard logit regression. The rare event logit produced very similar results to the standard logit regression, indicating robust results.¹³ Furthermore, we applied a sensitivity analysis of our results with respect to the variables included, following the procedure used in Barslund et al. (2007), which also confirmed the results.

A second indicator for potential default is the number of months that a credit has already been rescheduled (Y2). A zero-inflated negative binomial regression model (ZINB) was used to model the number of months that the credit was rescheduled. We use the zero-inflated model because most credits have never been rescheduled. Zero-inflated negative binomial models assume that the zeros are generated by two distinct processes. Other count models assume that every borrower has the same probability of being rescheduled in any given number of months. In that case, the probability differs across individuals but all borrowers have some probability of rescheduling their loan. This is unrealistic if, based on their credit history or loan contract, some borrowers are institutionally prohibited from rescheduling their loan. Thus, zero-inflated models are better suited as they allow for the two sources that may have generated the zero counts (Long and Freese 2006).

Count variables frequently have a variance greater than the mean, which is called overdispersion (Long and Freese 2006). This is also the case with our dependent variable Y2 (see **Fehler! Verweisquelle konnte nicht gefunden werden.**) and the ZINB model is able to deal with overdispersion. We followed the procedure proposed by Long and Freese (2006) and confirmed our choice of model by conducting various tests and measures (likelihood ratio chi-square (LRX2), Akaike's Information Criterion (AIC), the Bayesian Information Criterion (BIC), and the Vuong test) to compare the fit of count models (Poisson, negative binomial, zero-inflated Poisson

and zero-inflated negative binomial models). In our case, the AIC and BIC both favored the ZINB model. Moreover, the Young test preferred the ZINB over the negative binomial regression model and the LR test advocated the ZINB over the zero-inflated Poisson regression model.

The ZINB regression estimates two separate models and then combines them. First, a logit model is generated for the "certain zeros" that predicts whether or not a credit would be in this group. Then a negative binomial model calculates the counts for those credits which are not certain zeros. Finally, the two models are combined, which is done by computing the observed probabilities as a mixture of the probabilities for the two groups. When running ZINB in Stata, both models must be specified (Long and Freese 2006).¹⁴

Y2: How many months was the loan rescheduled? (60-0)¹⁵

Long and Freese (2006) propose the rule of thumb of ten observations per parameter for OLS regression. They also state that zero-inflated models require more observations than OLS regressions. The inflation variables used in the ZINB regression can be the same as the independent variables but do not have to be. We therefore decided to reduce the numbers of parameter for the ZINB model by conducting a stepwise logistic regression upfront with a 10% significance level. The dependent variable is one for all credits that have been rescheduled and zero otherwise. Two variables are significant in the stepwise regression: 1. Bad credit history measured by defaulted credits, late payment of interest or principal (yes=1/no=0; c_bad), and 2. age of running credit in months (c_age).¹⁶ Instead of using all independent variables as inflation variables, we used only these two significant variables from the stepwise logistic regression, and thus reduced the parameters to be estimated within the ZINB.

Repayment problems and loan rescheduling are determined by a function of loan variables, household variables, and village-specific factors that are included by village clustering. Outstanding loans older than one year were counted for as not performing and added to the credit history. After excluding households with missing values, villages with only one observation, and instances where the household head was not the interview respondent, our sample consisted of 195 credits within 172 households. The full list of variables can be viewed in **Fehler! Verweisquelle konnte nicht gefunden werden.**

(Table 2 about here)

4.2 Econometric concerns

In empirical research econometric concerns are most frequently raised with regard to three areas: sample selection bias, endogeneity, and correlated unobservables. In about 3% of the interviews we were unable to interview the household head and another person from the household was interviewed. These households, however, were excluded from the analysis. Nevertheless, due to the very limited number of cases we believe this bias is negligible.

Simultaneity: Social ties are the basis for our social capital measures and may be endogenous to good credit performance. Microcredit is supposed to widen the personal network of borrowers (a vast amount of literature exists, for example, on empowerment of women and microcredits). This is particularly true for group loans but may also apply to individual borrowers. However, this fraction of the personal network consists almost only of relationships with a lifespan longer than three years (more than 95% of the relationships). This implies that our measures of social capital are not endogenous. It might also be argued that bad loan performance could have an

effect on network ties. Bad loan performance may cut loose one or the other tie, for instance due to shame or social punishment. Our measures of social capital could thus be endogenous to bad loan performance. While this argument is probably valid for group loans with joint liability (Karlan 2007), it does not hold in Vietnam (see discussion in section 2.1: credit groups in Vietnam do not have joint liability). Moreover, it is hard to see how, in the short term, social capital could be influenced by positive or negative repayment behavior on the part of individual borrowers. Furthermore, we mentioned in section 2.1 anecdotal evidence that no such effects are present in the event of defaulting on a formal loan. This leads us to the conclusion that our measures of bonding, bridging, linking social capital are not endogenous.

A badly performing loan may reduce the social status of the respondent. This would leave one of our measurement variables for linking social capital (that is, assessment of social status) endogenous to loan performance, and hence the measures of linking social capital may be endogenous. Nevertheless, qualitative evidence from our field research suggests that social status tends to drop only when the loan is nonperforming. There is a considerable time lag, however, between a defaulting loan and its visible outcome, in other words the seizing of collateral such as land or vehicles. Moreover, this information has to travel to personal network members. As this study focuses on current or recently completed loans, we believe that it does not suffer from simultaneity bias.

Unobserved variables: We apply a range of control variables to deal with the problem of unobserved variables (see Table 2). Two groups of unobserved effects cause particular concern in regression analysis of rural finance: leadership and entrepreneurial skills. To control for leadership, we used a variable indicating whether the household head holds a special position in formal and semiformal groups, such as

that of cashier. When social capital is measured in terms of involvement with others in the community, then an omitted variable may exist as households with stronger entrepreneurial spirit may also have stronger social capital (Karlan 2007). While we could not measure entrepreneurial skills directly, we incorporated a dummy variable to measure lack of entrepreneurial skills. The dummy indicates whether the loan was used for nonproductive purposes such as consumption smoothing and was repaid or is going to be repaid by unproductive means such as borrowing from another source. In such cases the entrepreneurial skills are assumed to be low. However, this dummy is a rather weak dummy as Barslund and Tarp (2008) state that formal loans in Vietnam are almost entirely for production and asset accumulation. This is also confirmed by our data. About 93% of the loans are used for productive purposes and are paid back using productive sources.

5 Empirical results and discussion

The overall fit of the regression model is satisfactory and the correlation tables and the variance inflation factor showed no problems with regard to multicollinearity.

(Table 3 about here)

The social capital variables do not have any affect on the probability of having problems with loan repayment. Three variables in our model have a significant influence (**Fehler! Verweisquelle konnte nicht gefunden werden.**). First, credit age has a negative sign and the older the loan the lower the chance of having repayment problems. This is surprising and one explanation could be that within the timeframe of data collection, 2007/2008, rising food prices and high inflation rates in Vietnam made life more difficult for rural households, thus leading to repayment problems. Nevertheless, it could also indicate a general reduction in rigorousness of checks on

borrowers' creditworthiness, or hint at an increasing moral hazard problem among rural borrowers. The second significant variable is the individual credit dummy. Having an individual credit instead of a group credit lowers the chance of having repayment problems by about 83%. This is not surprising as most individual credits – about 80% of the VBARD loans in our sample are individual loans – are provided by the VBARD, which usually caters for the wealthier households. Furthermore, VBARD loans are secured by collateral. In contrast, group loans are not secured by any collateral and, as mentioned before, joint liability does not apply. Unexpectedly, a lagged higher income per head raises the chance of having repayment problems. One explanation may be that richer households are more prone to moral hazard while poorer households, as often stated in the microcredit literature, have better repayment discipline. However, the lagged income variable is only significant at the 10% level and for 20% of the observations (see the sensitivity analysis in **Fehler! Verweisquelle konnte nicht gefunden werden.** of the Annex).¹⁷ Nevertheless, the direction of the coefficient's sign is stable.

Bonding social capital has no significant effect on the probability of the loan being rescheduled. But it has a significant effect on the number of months the loan is rescheduled. Obviously, bonding social capital will only be activated in cases where the household has difficulties in repaying and the decision of the household to reschedule or to ask for rescheduling has already been made. It is safe to assume that those households with more bonding social capital also use their strong ties to receive more informal help to cope with difficult situations such as loan repayment problems. Hence, while the main positive feature of bonding social capital (support in hard times, see section 2.2) is supported by our research, other positive features, such as better access to information, assigned to bonding social capital, are not supported.

Another explanation for the positive effect of bonding social capital on reducing the length of the time that the loan is rescheduled could be that households with a higher number of strong ties are more deeply and better connected within the village society. Hence, shame or social pressure may also play a role. Bridging_{link} is on the brink of being significant, but the sensitivity analysis reveals that this variable is not very robust and only significant in about half the cases. But the direction of the sign is stable. The results must therefore be interpreted with caution. The greater the number of personal network members with higher social status and connected through a weak tie, the longer the time the loan was rescheduled. It may be rather premature to talk of collusion here. Nevertheless, the chance of default is higher for loans extended for a long time. Furthermore, Vietnam is famous for its ‘old boys’ networks. Anecdotal evidence from our survey showed that the biggest loan (VND 300 mn, which is by far the biggest outlier we have in our survey; the official maximum amount is 30 mn) is not with the VBARD but with the VBSP. The mandate of the VBSP, however, is to cater to the poor. Apparently the head of household is a relative of a credit officer. At the moment this seems to be an isolated case of such behavior. Moreover, as evidence from Thailand has shown, bending the rules in special cases does not lead automatically to bad repayment behaviors (Coleman 2006). But the crashes in rural finance caused by local elites during the 1970s and 1980s have not been forgotten and it is therefore worthwhile keeping a close eye on personalized lending.

A one-month increase in loan age increases the chance of the credit being rescheduled for another month by about 4.2%. This result is not surprising as the older a loan gets the more often it can be rescheduled. However, the sign from the inflation variable is at first puzzling as it has the opposite sign from the ‘normal’ independent variable in the ZINB model. As pointed out by Long and Freese (2006), when interpreting zero-

inflated models the direction of the coefficients is easily confused. Inflation variables have to be interpreted in the following way: the age of the loan reduces the odds of belonging to the zero group. This means that age increases the odds of being rescheduled. Hence, there is no contradiction in the interpretation of the variable.

A male household head significantly increases the chance that a loan is rescheduled for a longer time period. This can be seen as further evidence that women are the better borrowers. Even when their loans have to be rescheduled, their loans are rescheduled for shorter periods. Yet, female-headed households are usually much poorer and less well integrated into village society. They may thus simply be afraid to bargain for a longer extension period for fear of losing access to future loans. As Cleaver (2005), for example, points out, the poor and vulnerable are often structurally excluded due to their high level of poverty and thus lack access to fruitful relationships with powerful allies. At the same time one can argue that, in the case of men, the 'old boys' network puts them in a much better bargaining position for loan extension.

The variable 'recovered from an income shock' is significant and has a positive sign. This means that having recovered from an income shock raises the chance that a loan will be extended for a longer time. Intuitively one would have expected the opposite. Nevertheless, one way of interpreting this is that the loan or part of the repayment due have been diverted to recover from the income shock and thus, more time is needed for loan repayment.

Similar to our regression on repayment problems, lagged income is significant and positive. This result can be interpreted as follows: the higher the household income, the greater the chance that the loan will be rescheduled for a longer period. Richer households are usually better connected and may use their ties to extend the loan for

longer or allow the loan to be extended for ever longer periods. However, our variable for lagged wealth has the opposite sign. Being poorer raises the chance of the loan being rescheduled for longer. This may indicate that the relationship between income/wealth and the rescheduling period is non-linear (inverse u-shaped).¹⁸ Poor households may simply not have the means to pay back the loan and therefore have their loan term rescheduled for longer. Rich households may have the advantage of nepotism.

The variables group and employ are only weakly significant and not robust. Thus, we refrain from interpreting them.

6 Conclusions

In our analysis we distinguish between three different forms of social capital: bonding, bridging, and linking. The hypothesis is that different forms of social capital have a distinct influence on the loan repayment performance of borrowers. Bridging social capital has no significant influence on our dependent variables. This is surprising as most theoretical literature suggested the opposite following the famous argument of Granovetter (1973) 'the strength of weak ties'. However, bonding social capital exerts some influence on loan rescheduling. This finding supports another example from Asia, namely Bian (1997) who brought the positive effects of strong ties back into the discussion. It also partly confirms our hypothesis that bonding social capital plays a positive role in loan repayment performance. The most obvious measures for credits institutes to foster bonding social capital among its clients would be the use of credit group schemes with joint liability to strengthen the relationships of the members. Furthermore, group members should be encouraged to cooperate in a variety of activities even private ones to further strengthen their relationships.

Nevertheless, as social capital is context specific in another context those recommendations could lead to collusion of group members and thus resulting in increasing default rates.

In contrast to bonding social capital, linking social capital has a negative effect on loan rescheduling. On the one hand, our hypothesis that having close relationships with influential persons has negative effects on repayment behavior can be accepted at least in part. On the other hand, we must reject the assumption that knowing influential persons on a casual basis has positive effects on loan repayment performance, for example through information sharing. Consequently, we assume that the negative effects of linking social capital, such as collusion and nepotism, outweigh its positive effects. The widely assumed positive effects of social capital did not fulfill their promise. On the contrary, linking social capital in particular proved to have the opposite effect. In contrast to most other studies on repayment behavior, our measure of social capital went beyond intra credit group ties and our unit of analysis included also individual credit. Social capital does play a role but not as much as the literature has implied.

Although it seems not to be a problem at present, linking social capital has the potential to increase the rate of credit default. Therefore, any lender would be well advised to keep those informal links of borrowers to better positioned persons under control to avoid crashes in the rural finance system such as those caused by local elites during the 1970s and 1980s. The best way of doing this would be to make the procedures for credit approval, delays, etc. as transparent as possible. As stated for instance by Brinton (2000), high transparency is the best way to overcome 'old boys' networks. Another possible solution would be to assign credit officers regularly to new areas, or to areas distant from their region of origin. Frequent transfer of

government personnel and reorganization of supervisory responsibilities might help prevent individuals from building personal bureaucratic empires (Appold 2001).

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8 Appendix

(Box 1 about here)

(Table 4 about here)

(Table 5 about here)

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- ¹ Exceptions include Kajisa (2007), for instance, who used a position generator tool to measure personal networks, and Fletschner and Carter (2008) or Matuschke and Quaim (2009), who used name generators to create a reference group.
 - ² Scientists have not yet agreed upon a uniform definition of social capital. Great care must therefore be taken when quoting earlier works on the topic. Nevertheless, social networks or social ties are part of almost all definitions of social capital.
 - ³ Group homogeneity is an often-discussed topic in group lending. The concepts of group homogeneity and social ties are related. For example, close social ties are often found between people who are homogenous in terms of social strata. This is due to the sociological phenomenon of homophily, see McPherson et al. (2001). A good review on group homogeneity and group loans can be found in Godquin (2004).
 - ⁴ One example of a resource is the ability to borrow from network members.
 - ⁵ The Son La province is located in the mountainous region of Northern Vietnam. Despite this, it is fairly well connected to regional markets (Son La town) and even to greater Hanoi.
 - ⁶ The idea behind re-interviewing the households participating in the VLSS 2004 was to save interview time by using some of the VLSS2004 data, such as data on income, expenditure or human capital. In the VLSS 2004 only a subsample was included in a detailed expenditure survey. We therefore had to rely on total household income measures, which is a fairly accurate measure of household income when it is asked in detail, although in general expenditure data are to be preferred (McKay 2007).
 - ⁷ The respondents' perception of the 'closeness' or intensity of the relationship is a good measure for the strength of the relationship. We used a 5-point Likert scale to estimate the closeness of a relationship, with higher scores indicating greater closeness.
 - ⁸ Prestige measures are generated from the popular evaluation of occupational standing. They reflect the classical sociological hypothesis that occupational status constitutes the single most important dimension in social interaction (Ganzeboom and Treiman 1996).
 - ⁹ This may not always be the case. Particular vertical relationships – manifested here in linking social capital – may in a different context result in a patron-client relationship which often has a very exploitative character (Szreter and Woolcock 2004). But bonding social capital, too, may have negative effects, for example through excessive claims from personal network members connected via strong ties (Portes and Landolt 2000).
 - ¹⁰ Earlier research has shown that survey respondents can report on many characteristics of their personal network members with reasonable accuracy (White and Watkins 2000).
 - ¹¹ A similar research project was carried out simultaneously in Northern Thailand.
 - ¹² A similar argument can be made for late payment of principal or interest.
 - ¹³ Michael Tomz, Gary King, and Langche Zeng. 1999. RELOGIT: Rare events logistic regression, Version 1.1 Cambridge, MA: Harvard University, October 1, <http://gking.harvard.edu/>
 - ¹⁴ Stata annotated output: Zero-inflated negative binomial regression. UCLA (University of California, Los Angeles): Academic Technology Services, Statistical Consulting Group. from http://www.ats.ucla.edu/stat/stata/output/Stata_zinb.htm (accessed January 11, 2010).
 - ¹⁵ We use an identical equation structure for both regressions (Y1 and Y2) as this will enable direct comparison. Moreover, the socio-economic principles underlying repayment behavior relating to interest and to principal are very similar.
 - ¹⁶ Results from the analysis are not shown here, as they are not relevant to the research topic.
 - ¹⁷ Specifically, we divided the variables of Table 3 into two groups. One group contains what we denote as core variables (those statistically significant). These are included in all subsequent regressions. The remaining variables belong to the second group. The dependent variable is then regressed on all possible linear combinations of the second group variables including, in all the regressions, the full set of core variables.
 - ¹⁸ We added the square term of the lagged income variable as an independent variable. However, income and squared income were highly correlated. We therefore centered the income variable on the mean and then took the square term. But both variables were still highly correlated. Consequently, we refrained from using the square term.

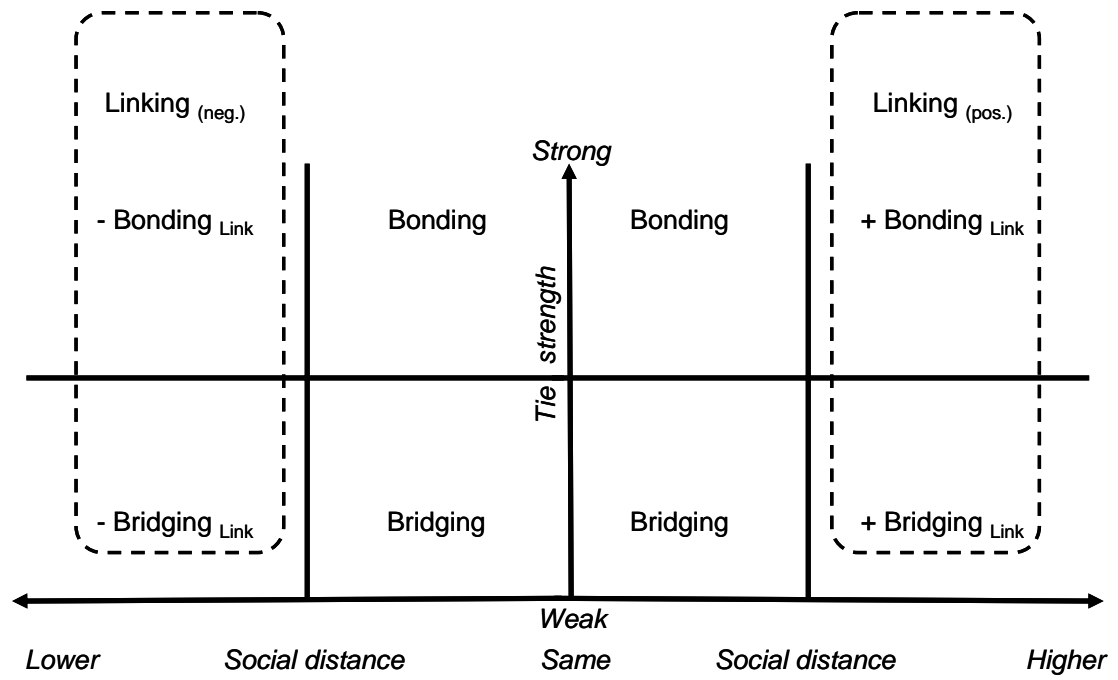
Figures and Tables

Table 1 **Review - Social ties and credit group repayment**

Studies	Method/Area	Measurement of social ties and related measures	Findings
<i>Positive effects</i>			
Abbink et al. (2006)	Experiment	'Level of acquaintances between group members' - contact frequency; 7 point-Likert-scale	Social ties have a moderate effect on repayment; closer-knit groups have higher repayment rates but only in the beginning
Besley and Coate (1995)	Game modeling	Indirect via social penalties	High degree of social connectedness has positive effects on repayment
Cassar et al. (2007)	Experiment/ South Africa, Armenia	'Social ties' - group homogeneity and measures of trust between members	Social ties have positive effects of on repayment
Karlan (2007)	Survey/ Peru	'Strong social connection' - living in closer proximity or being of a similar culture	Stronger connections within groups induce higher repayment
Ghatak and Guinnane (1999)	Theoretical /different case studies	-	Strong social ties support repayment through social penalties; if ties are too weak they have the opposite effect
Zeller (1998)	Survey/ Madagascar	'Social cohesion' - ethnicity, location of dwelling, kinship, sex	Groups with higher levels of social cohesion have better repayment rates
<i>Ambiguous effects</i>			
Hermes et al. (2006)	Survey/ Eritrea	'Social ties' - member knows the other group members before forming the group, number of years the group member has lived in the survey area	Social ties of the group leader do have a positive effect on repayment performance, whereas this is not true for social ties of other members
Hermes et al. (2005)	Survey/ Eritrea	'Social ties' - member is born in the survey area, member knows the other members before forming the group, member been member of another group	Social ties of the group leader have a positive effect on repayment, via controlling moral hazard, whereas this is not true for social ties of other members
Kritikos and Vigenina (2005)	Survey/ Georgia	'Social ties' – common characteristics of group members: gender, age, education, income, place of living	The effect of social ties among members is statistically insignificant
Wydict (1999)	Survey/ Guatemala	'Social ties' - same sex groups, all members were friends before the group, joint social activities, number of years members were acquainted before forming group	The effect of social ties among members is statistically insignificant
<i>Negative effects</i>			
Ahlin and Townsend (2007)	Survey/ Thailand	'Strong social ties' - sharing among non-relatives, cooperation, clustering of relatives, village-run savings and loan institutions	Strong social ties have adverse effects on repayment performance
Godquin (2004)	Survey/ Bangladesh	'Social ties' - the age of the group	Social ties had a negative impact on the repayment rate
van Bastelaer and Leathers (2006)	Survey/ Zambia	'Personal bonds' - members of the same church	Strong church-based personal bonds can weaken the enforcement of repayment
Sharma and Zeller (1997)	Survey/ Bangladesh	'Social ties' - kinship	A high proportion of relatives in the group negatively effects repayment

Note: This collection of literature is by no means complete. It is simply intended to depict the diversity of approaches and the ambiguity of results.

Figure 1 The different forms of social capital



Source: Authors' figure.

Table 2 Descriptive statistics of dependent and independent variables

Dependent variable	Mean	Std. dev.	Min.	Max.
<i>Personal network variables</i>				
Y1 Repay_probs = repayment problems (yes = 1, no = 0)	0.89	0.32	0	1
Y2 Reschedule = Loan was rescheduled (yes = 1, no = 0)	0.76	0.43	0	1
Y3 Reschedule_month = How many months was the loan rescheduled?	2.17	6.61	0	60
Independent variables				
<i>Personal network variables</i>				
SC_Bo = Social capital bonding (number of ties)	5.02	2.31	0	11
SC_BoLi = Social capital bonding-link (number of ties)	0.92	1.18	0	6
SC_Bri = Social capital bridging (number of ties)	3.73	2.79	0	14
SC_BriLi = Social capital bridging-link (number of ties)	1.78	1.38	0	8
<i>Loan and financial control variables</i>				
C_age = Age of running credit (month)	17.01	17.02	0	106
C_size = Loan size (in million VND)	14.44	27.56	0.1	250
C_individual = Individual loan (yes = 1, no = 0)	0.33	0.47	0	1
Lack_skills = Lack of entrepreneurial skill measured by loan use or source of loan repayment (nonproductive = 1, others = 0)	0.08	0.27	0	1
C_bad = Bad credit history; defaulted credits, late payment of interest or principal (yes = 1, no = 0)	0.11	0.32	0	1
<i>Other control variables</i>				
Ethnic = Ethnicity of HH-head (Kinh/Thai = 1, non-Kinh/Thai = 0)	0.82	0.39	0	1
Sex = Sex of household head (male = 1, female = 0)	0.83	0.38	0	1
Leader = Special position in any group (yes = 1, no = 0)	0.18	0.38	0	1
Group = Number of groups per household head Lagged*	1.41	0.80	0	4
Employ = Regular employment, formal jobs, pensions of HH-head (yes = 1, no = 0)	0.07	0.26	0	1
Shock = Number of income shocks during the last five years	1.42	1.10	0	5
Shock_recov = Recovered from shock (no = 1, yes = 0)	0.45	0.50	0	1
Income = Total household income 2003/2004 in 100,000 VND/person/month	2.83	1.82	0.49	10.39
Wealth_cat = Wealth categories from 1 poorest – 5 wealthiest in 2003**	2.84	0.51	2	4

*All group memberships younger than the oldest credit have been excluded. **Once a year every household in Vietnam is ranked according to its wealth status into one of five categories by the poverty reduction board of its respective commune (Dufhues et al. 2002).

Table 3 Modeling repayment problems and loan rescheduling

Dependent variables	Logit Y1: Repayment problems (yes = 1, no = 0)			ZINB Y3: Months rescheduled (60 - 0)		
Independent variables	Odds ratio	Robust std. Err.*	P > z	Coef.	Robust std. Err.*	P > z
SC_Bo	1.06	0.19	0.733	-0.22	0.07	0.002
SC_BoLi	0.77	0.36	0.578	-0.04	0.18	0.815
SC_Bri	0.94	0.14	0.674	0.04	0.07	0.541
SC_BriLi	0.92	0.16	0.613	0.18	0.11	0.109
C_age	0.88	0.02	0.000	0.02	0.00	0.000
C_size	1.00	0.01	0.799	-0.01	0.01	0.354
C_individual	0.16	0.13	0.024	-0.43	0.41	0.293
Lack_skills	2.98	3.64	0.373	0.98	0.65	0.133
C_bad	0.86	1.10	0.904	0.20	0.22	0.360
Ethnic	0.35	0.27	0.170	0.07	0.40	0.855
Sex	2.62	1.74	0.147	1.82	0.93	0.051
Leader1	0.79	0.51	0.717	0.46	0.33	0.158
Group*	0.96	0.46	0.929	-0.30	0.17	0.087
Employ	0.13	0.20	0.171	-1.50	0.86	0.080
Shock	1.19	0.33	0.525	0.14	0.15	0.348
Shock_recov	0.31	0.27	0.180	0.99	0.33	0.003
Income	1.43	0.31	0.095	0.31	0.13	0.015
Wealth_cat	1.72	1.30	0.471	-0.66	0.32	0.040
Constant	XXX	XXX	XXXX	1.12	1.70	0.512
Pseudo R ²	0.46	Inflation variables (logit)				
Wald chi ² (18)	115.86	C_bad		-1.72	0.44	0.000
Prob > chi ²	0.00	C_age		-0.04	0.02	0.020
Sensitivity**	84.39%	Constant		1.90	0.35	0.000
Specificity**	77.27%	/lnalpha		-1.54	1.72	0.371
Correctly classified**	83.59%	alpha		0.21	0.37	XXXX
N	195	N		195		
		Wald chi ² (18)		8903.58		
		Prob > chi ²		0.00		
		Nonzero observations		47		
		Zero observations		148		

Note: *Standard error adjusted for 27 clusters in village. **Unbalanced samples with a poor fit are typical for survey analyses in the social sciences. In a binary logit/probit analysis with unequal sample frequencies of the two outcomes, the less frequent outcome always has lower estimated prediction probabilities than the other outcome. As suggested by Cramer (1999), one can replace the standard cut-off point of 0.5 by the relative share, which in our case is 0.88 for the dependent variable. Figures in bold are statically significant at the 10% level or higher.

Box 1 Name generator questions

Areas	Questions
Agricultural inputs	1) In times of need, whom would you ask for external agricultural inputs such as chemical fertilizer, manure, seeds, seedlings?
Agricultural machinery	2) Whom would you ask to lend you farm machinery, like mover, sprayer, plowing machine)?
Information exchange	3) If you have a problem on your farm, whom would you ask for advice/information concerning this problem? 4) Whom would you ask for information about a bank credit or a bank account? 5) If you need any information about input outputs prices, traders or any other market related information, whom would you ask?
Labor	6) Whom would you ask to help you on the farm or building a house?
Money	7) Whom would you ask for a small sum of money as a credit? (approximately VND 1.5 million ^a) 8) Whom would you ask for a large sum of money as a credit? (approximately VND 10 million ^b)
Skill exchange	9) Whom would you ask to help you to fix a motorbike or agricultural machinery?
Transport	10) Whom would you ask to borrow draught animals like buffaloes or cattle?

Note: We did not selected food exchange related items as those were mentioned only in a few cases and never regarded as important. For the same reason we did not choose any of the luxury items, which were exchanged among farmers.

^a is about EUR 60, ^b is about EUR 400

Table 4 Occupation sample for position generator

ISCO-88*	SIOPS**	Occupational title*
1130 ^a	63	Head of commune
1220	63	Production and operations department manager (25 and more employees)
1310	50	Small enterprise managers (including shop owner, restaurant manager, etc.)
2140	63	Architects, engineers, etc.
2230	54	Nursing and midwifery professionals (registered nurses or midwives)
2331 ^b	57	Primary school teacher
2410	57	Business professionals (accountants, auditors etc.)
3152	54	Safety, health, and quality inspectors
3220	51	Modern health associate professionals (except nursing)
3310^b	50	Primary education teaching associate professionals
3430	49	Administrative associate professionals (e.g. bookkeepers)
4140	37	Library, mail and related clerks
4210	37	Cashiers, tellers and related clerks
5120	26	Housekeeping and restaurant service worker
5220	32	Shop salespersons and demonstrators
6110	40	Market gardeners and crop growers
6200	38	Subsistence agricultural and fishery workers
7120	34	Building frame and related trades workers
7230	43	Machinery mechanics and fitters
7310	45	Precision workers in metal and related materials
7430	34	Textile, garment and related trade workers
8130	31	Glass, ceramic and related plant operators
8280	33	Assemblers
8320	32	Motor vehicle drivers
9110	25	Street vendors and related workers
9210	23	Agricultural, fishery and related laborers
9310	16	Mining and construction laborers

Sources: * NSO (2007); ** Ganzeboom and Treiman (1996)

Notes: ^a Our sample focuses on rural areas in Vietnam. Most villages are small and everybody knows the village head and the village head knows everybody. Therefore, instead of 'village head' we use the position 'head of commune'.

^b The 3310 code was selected in the first place, too. But the description of 'teaching associate professionals' is too close to the description of 'primary and preprimary education teaching professionals'. The slight difference could not be seen by many farmers. We therefore left this group out, to avoid confusion.

Table 5 Sensitivity analysis of logit (Y1) and ZINB (Y2) models, selection of core variables

Core var	Max	Min	Mean	AvgSTD	PercSig	Perc+	Perc-
Y1 logit	Number of regressions run for core variables: 32.768						
c_age	-0.10	-0.13	-0.12	0.02	1.00	0.00	1.00
c_group	-1.04	-2.14	-1.57	0.68	0.80	0.00	1.00
in_rescale	0.44	-0.03	0.21	0.18	0.19	0.99	0.01
Y2 ZINB	Number of regressions run for core variables: 512						
sc_bo	-0.12	-0.25	-0.18	0.05	0.98	0.00	1.00
sc_brili	0.23	0.06	0.14	0.08	0.46	1.00	0.00
c_age	0.03	0.02	0.03	0.00	1.00	1.00	0.00
Sex	2.50	1.44	1.99	0.62	0.97	1.00	0.00
group	-0.13	-0.38	-0.22	0.15	0.13	0.00	1.00
employ	-0.28	-1.58	-0.87	0.72	0.00	0.00	1.00
shock_recov	1.16	0.51	0.80	0.31	0.71	1.00	0.00
in_rescale	0.33	0.16	0.24	0.11	0.83	1.00	0.00
wealth_cat	-0.43	-0.82	-0.60	0.29	0.59	0.00	1.00

Note: Max, Min, and Mean are respectively the maximum, minimum, and mean value of the point estimate over all regression. AvgSTD are averages over the standard deviations. PercSig gives the percentage times the coefficient was significant at 5% level. Perc+ indicates the number of times the coefficient had a positive sign and analogously for Perc-. Selection equation as specified in Table 2.