Individual social capital and access to formal credit in Thailand

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Abstract: This study shows how different forms of individual social capital affect access to formal credit in rural Thailand. In the context of agriculture economics, an innovative data collection approach is used that originates from the field of sociology (personal network survey). We measure social capital according to: 1. the tie strength between the respondent and the personal network member (bonding/bridging); and 2. the social distance between the respondent and the personal network member (linking). Strong ties (bonding) in combination with access to socially distant network members (linking) reduce the chances of being access-constrained.

Introduction

Perfect markets are characterized by efficient transactions independent of personal relationships between the market actors. However, markets are never perfect and that is particularly true for developing countries, where economically fruitful transactions may either not take place at all or be rationed because of prohibitively high transaction costs. Nevertheless market imperfections, such as lack of information, which are common in rural financial markets in developing countries, may be overcome by social capital.[1] Fafchamps and Minten (2002) state that social capital may be at least as important as human capital for reaching efficiency in economies that are characterized by high transaction costs and poor market institutions. As pointed out by van Staveren and

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[1]   As discussed further in Section II, scholars have not yet agreed upon a uniform definition of social capital. Nevertheless, social networks or social ties are part of almost all definitions of social capital. We define social capital as interpersonal networks (ties) plus resources.

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Knorringa (2007) the most general definition of social capital is that "relations matter". But this simplistic view hardly advances our understanding of the social economy. Therefore, we go beyond simply measuring social relations and focus our work on "what kind of" social relations matter. However, research in 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 hitherto rarely used in economics.[2] This technique involves the use of instruments referred to as the "name generator" and "position generator" to measure the personal network or, since this is rarely possible, a sample of the respondent's personal network. These network data are then used to create measures of the individual social capital of the survey respondents.[3]

The formal rural financial market in Thailand served as the empirical base for this work.

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[2] Exceptions include Kajisa (2007) who used a position generator tool to measure personal networks. Fletschner and Carter (2008) or Matuschke and Qaim (2009) employed name generators to create a reference group.

[3] As pointed out by Glaeser *et al.* (2000) social capital can be defined at several levels: country, community, and the individual. Although social capital is a relational concept we call it individual social capital, which may sound contradictory at first. By calling it individual social capital we delineate our concept of social capital from definitions, which consider social capital to be a public good (e.g. Coleman 1988), benefiting all members in a network. We, however, follow the conceptual approach of Bourdieu (1983), who regards social capital at an individual level. In his eyes, social capital is an instrumental resource for individuals, which facilitates access to other resources.

We were particularly interested in a rural household's access to credit, taking into account its social capital.[4] A number of scholars have done profound work on the rural credit market in Thailand, for example Ahlin and Townsend (2007), Coleman (2006), and Siamwalla *et al.* (1990). So far, the concept of social capital has not been applied in research with regard to the question whether or not social ties influence access to formal credit in Thailand. If they do, then how do different types of social ties exert an influence? In general, the smaller the network of an individual, the lower his/her level of social capital. But this view is rather simplistic. Social capital is not a homogeneous entity (Woolcock and Narayan 2000). The distinguishing features of social capital are, first, the tie strength between the respondent and the personal network member (bonding and bridging) and, second, the social distance (linking social capital) between the respondent and the personal network member. Section II discusses the theoretical underpinnings of these forms of social capital. We distinguish four different measures of social capital: (1) bonding; (2) bridging; (3) bonding in combination with linking; and (4) bridging in combination with linking. The hypothesis is that these different forms of social capital have a distinct influence (positive or negative, see discussion below) on access to credit.

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[4] Formal lenders are generally bureaucratic organizations, often under the supervision of the central bank. Under this definition we include semiformal credit institutions extending credit, such as cooperatives. Hence, in the rest of the paper we do not distinguish between formal and semiformal credit but simply label it "formal credit".

The paper is organized as follows. Section II discusses the different forms of social capital and their measurement. Section III briefly introduces the social capital concept and sets out how various forms of social capital and social ties influence access to credit. Section IV describes the sample, the data collection method and the operationalization of different forms of social capital. Section V then presents the econometric model and discusses the results. The paper concludes with a brief summary.

Different forms of social capital and its measurement

The standard criticism leveled at the social capital concept is that it is usually defined too broadly, thus making it analytically useless (Durlauf and Fafchamps 2005). Scholars such as Bowles (1999) or Fine (1999) suggest discarding the term social capital altogether. Bowles (1999: 6) argues: "As with other trendy expressions, it attracts disparate meanings like flypaper. So many are now so firmly attached that it seems better to abandon the term in favor of something more precise." However, as Robison *et al.* (2002: 8) rightly point out, the recommendation to abandon the term social capital comes too late.' The term is already firmly entrenched in the language of social scientists and economists.

Broad definitions of social capital have encouraged amalgamating strikingly different factors, for example trust, norms, and networks, but offered no reasons why such an inclusive definition would prove useful for our understanding of the social world (Dasgupta 2005). We therefore emulate scholars such as Lin (1999a) by defining social capital more narrowly and leanly as interpersonal networks (ties) plus resources. This definition has the connotation that members of a social network share their property and

use rights to resources with other ties in their network. This specification of social ties will result in social capital. It is the possible access to the resource that turns the social tie into social capital.[5] Hence, instead of measuring social relationships through group membership and/or trust and the like as done by others, we focus on measuring relationships directly. Social capital is after all a relational concept.

As briefly mentioned above, our work is based on 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 relatively similar socio-economic characteristics, for example, family and close groups of friends (Lin 1982). A third classification is referred to as linking social capital (Szreter and Woolcock 2004). Linking social capital describes a person's ties to people in positions of authority. In this classification, bridging social capital is horizontal. It connects people of similar economic, social, and political status (Woolcock and Narayan,

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5   Our approach is closely related to the social resource approach which is already around for some decades (see e.g. Campbell *et al.* 1986). However by replacing the term "resource" with "capital" we underline its capital like features (although there is still a discussion among scientist whether social capital really is capital). Nevertheless, network ties clearly require investment (of time, money, information, and prestige) that can yield a benefit flow (Uphoff 1999). Some networks come free of cost, e.g. we are born into certain networks and others can be entered only through a costly process. Joining a social network or establishing a relationship involves however costs, as does maintaining it (Dasgupta 2005; Glaeser *et al.* 2002).

2000). Linking social capital is more vertical, connecting people to key political players and across power differentials (Grootaert *et al.* 2003).

There are as many ways to measure social capital as there are definitions. However, if social capital is to be a useful concept, it needs to refer to things that can be observed and measured (Uphoff and Wijayaratna 2000). In contrast to human capital for example, 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 is therefore based on the personal network of respondents. A personal network is defined as the aggregate of the person's social ties. However, 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 the resources of his/her network members depends on his/her ties and on the strength of those ties (Sobel 2002). Thus, we measure our different social capital variables according to: 1. the tie strength between the respondent and the personal network member, and 2. the social distance between the respondent and the personal network member. Tie strength is applied to bonding and bridging social capital. Social distance gives an indication of linking social capital. 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$_{link}$. By combining relational data with the three forms of bonding, bridging, and linking social capital, we

have derived a new and innovative way of measuring individual social capital.

Social capital, transaction costs, and access to credit

In general, transaction costs decrease the efficiency of exchange relationships (Grindle 2001). At the extreme, transaction costs can inhibit economically beneficial transactions or result in rationing (Richter and Furubotn 1996). First, according to social capital theory, the economic function of social capital is to reduce the transaction costs associated with coordination mechanisms such as contracts, hierarchies, bureaucratic rules and the like (Fukuyama 2001). Second, acquisition of information is costly. The costliness of information is the key to the costs of a transaction. Hence, reducing the cost of information implies reducing the transaction costs (Stiglitz 1986). An important feature of social capital is, third, the potential for information exchange that is inherent in social relations. Information sharing through and within social networks reduces transaction costs and thus improves peoples' access to resources, such as financial services for instance (Fafchamps and Minten 2002).

In general, each form of social capital (bonding, bridging, and linking) may improve access to credit by providing access to new and innovative information. In this context, the literature particularly highlights bridging and linking social capital. Nevertheless, the strength of bridging social capital lies in enabling access to information through its connection to other networks outside one's core network. By breaking out of one's own close social circle by way of weak ties, one can access information not otherwise available (Lin 1982). The strength of linking social capital might lie in enabling access to social positions vertically higher in the social hierarchy. The higher the rank of the person

with whom the ties are formed, the more useful the ties are. One can surely draw on more resources if one has rich and influential friends than if one has poor friends far from the seats of power (Lin 1999b). However, possessing a large amount of linking social capital also increases the chance of political patronage and nepotism. While this will improve access for farmers who have such connections, it will hamper access for those who do not. It therefore comes as no surprise that the local elites often capture the biggest loans (Sarap 1990; Adams and Fitchett 1992; Coleman 2006). Bonding social capital might also be important for the transmission of new, innovative information. Furthermore, persons are usually more likely to act on information received from these sources since they are perceived to be more trustworthy (Haythornthwaite 1996). Moreover, bonding capital provides individuals with helpful information even when the individual has not actively searched for this information (Lai and Wong 2002). Bonding social capital can also reduce credit constraints by enabling participation in credit groups.

Transaction costs for credit institutions arise, for instance, through the monitoring and screening of borrowers. Lenders often protect themselves by limiting their loans to clients they know and are thus more likely to lend to well-connected rather than less well-connected borrowers, even when there is no difference in their productivity (Banerjee 2001). This would indicate that linking social capital positively affects access to credit.

It is also possible to construct a case in which social capital reduces access to credit through exploitative links. Vertical relationships may result in patron-client relationships, which are often very exploitive in character (Szreter and Woolcock 2004). Linking social capital, when connected via a weak tie, is particularly prone to produce patron-client relationships. In such a setup vital information for reducing access constraints may be

withheld by the party in power. But bonding social capital, too, may have negative effects, for example, through excessive claims from personal network members connected via strong ties, thus lowering the household's physical collateral base (Portes and Landolt 2000). Finally, over-investing in any form of social capital can induce negative effects via income. When the costs of creating or maintaining social relations are higher than the benefits, household income can be reduced, thereby lowering the physical collateral base. In light of these potential ambiguities, empirical evidence is required to sort out the theory.

Methods and data[6]

Sample and data

A representative sample of households was drawn from the Chiang Dao district, Chiang Mai province, in northern Thailand,[7] using a two-stage random sampling procedure. We randomly selected around 50 percent of the villages, resulting in 41 villages out of a total of 79 villages in Chiang Dao district. In each of the villages, we drew a random sample of ten households. Our survey was divided into two rounds/phases because it would have

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[6] The methodological section is to some extent similar to prior works in international journals. Authors and journals are not yet disclosed to maintain anonymity.

[7] The Chiang Dao district is located in the upper watershed area of the Ping River. The north of Chiang Dao shares a border with Myanmar and most of the area is classified as highland. Different ethnicities dwell in Chiang Dao, such as Northern Thai, Shan, Karen, Mhong, Lisu, Lahu, Palong and Arkha. Households in Chiang Dao depend mainly on agriculture and forest resources.

been too burdensome for the respondents to answer all the questions in a single interview and, in addition, some of the data collected in the first round were used as input for the second round questionnaire. Due to the time lag between the two survey rounds, there was a degree of attrition, albeit small (below 5 percent), caused by migration, death and refusal. After excluding households with missing values, the final sample consisted of 391 households. The two survey rounds covered all information concerning the household's social capital and social networks, as well as information on income and expenditure, including human capital and other household assets.

Personal network data collection[8]

The focus of our paper is on personal network data (ego-networks). For personal network data, which are usually collected for larger and less definable networks, conventional sampling procedures can be used. In contrast to complete network data, personal network data are based on individuals and enumerate the social ties surrounding them. This approach gives a representative sample of the social environments of respondents and is compatible with conventional statistical methods of generalization to large populations (Marsden 1990). Personal network studies focus on a focal actor and the relationships in her/his locality. A complete network study usually compiles a roster of actors before data collection begins, which means that except for snowball sampling procedures, the network boundary is determined upfront. In personal network studies, however, the alters

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[8] Due to length limitation of this journal we refer the reader for the exact wording of the name and position generator questions to our prior work in another international journal. Authors and journal are not yet disclosed to maintain anonymity.

in a respondent's network are not known beforehand, so setting network boundaries must rely on respondent recall e.g. through the mentioned name and position generators (Marsden 2003).

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 not in economics. Both generators reveal the members of the respondent's personal network. Later, more questions can be asked about that the network member, 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 the "name interpreter".[9]

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 if you needed 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. 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 on job opportunities. 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 Thailand. The name generator questions relate only to areas important to rural inhabitants

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[9] Earlier research has shown that survey respondents can report on many characteristics of their personal network members with reasonable accuracy (White and Watkins 2000).

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:[10] The position generator was primarily applied in order 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) also points out that 15-30 different occupations are a good number to obtain meaningful results. We used a representative sample of 26 different occupations, selected from the national "labor force survey" in Thailand. For our sample, we used the official translation of the National Statistical Office (NSO) in Bangkok. Occupational groups are

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[10]   The position generator was first proposed by Lin and Dumin (1986) and has since then been used in numerous sociological studies. We like to point out that the term 'position' in position generator is not to be confused with position in a social network.

classified in the survey according to the four-digit code ISCO-88 from ILO (NSO 2007).[11]

Operationalyzing social capital

The data gathered from the personal network of the respondent were used as the basis for our four measures of social capital. After excluding missing values, the sample comprised 3,621 persons. We applied two different cluster analyses (*k*-means) for measuring tie strength and social distance to identify our social capital variables. *K*-means clustering is a method of cluster analysis which aims to partition *n* observations into *k* clusters in which each observation belongs to the cluster with the nearest mean (Härdle and Simar 2007). With the generator tools, we collected 3,679 relationships from the 391 household heads.

Cluster analysis – tie strength: Bonding and bridging social capital are distinguished by the strength of the tie between the respondent and his/her personal network member. To measure tie strength we employed an approach similar to that of Zhao (2002), who used four different variables to estimate tie strength: role relationship (core family, other family, friend, and acquaintance); frequency of contact per month; duration of

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[11] To ensure that the selection process is not arbitrary, we applied the following procedure: from each two-digit section occupation code, we chose the three-digit occupational code with the highest number of employed persons. In one case, the second highest was chosen: within the group of "senior officials", the four-digit code with the highest number of people was "legislators" and second highest "traditional village chiefs". As our survey was limited to rural areas, we decided that the category of traditional chiefs and village heads was more appropriate.

relationship in years; and closeness (see Table 1).[12] In the case of tie strength, two clusters were determined upfront (weak ties, strong ties).

Table 1: **Cluster analysis: cluster tie strength**

Variable	Mean	Std. Dev.	Min.	Max.
Cluster 1, strong ties N = 1,773				
Duration of relationship in years	34.22	11.75	13	78
Frequency of contact per month	24.83	10.60	0.02	30
Role relationship*	1.97	1.15	1	4
Closeness of relationship**	4.12	0.89	1	5
Cluster 2, weak ties N = 1,848				
Duration of relationship in years	13.54	9.30	1	37
Frequency of contact per month	7.65	10.89	0.02	30
Role relationship*	1.27	0.66	1	4
Closeness of relationship**	3.07	1.11	1	5

Note: * Core family = 4, extended family = 3, friend = 2, acquaintance =1

   ** 5-point Likert scale: 5 = very close; 1 = not close at all.

Cluster analysis – social distance: Linking social capital is distinguished by the social distance between the respondent and his/her personal network member. The indicator for social distance is thus the difference in occupational prestige of the household head and his/her personal network members measured according to the Standard International Occupational Prestige Scale (SIOPS) of Ganzeboom and Treiman (1996).[13] More specifically, social distance is generated by the household head SIOPS minus the SIOPS of the personal network member.

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[12]   The respondents' perception of the "closeness" or intensity of the relationship is a good measure of 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.

[13]   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).

Social distance can also be negative (see left hand side of Figure 1). Small negative distances are grouped together with small positive distances (Table 2). Huge negative distances may also exist, as in the case of linking capital on the right hand side of Figure 1. Imagine a high ranking government official dwelling in a small village. All his ties to his co-villagers would be across a power differential. But the social distance from his viewpoint would be negative while the social distance from his co-villagers' point of view would be positive. However, such persons are by definition rare and constitute only a very small part of the sample. In order to evaluate our assumption that huge negative differences in SIOPS between the respondent and his/her personal network members are rare, we applied the same boundary used with positive links from the cluster analysis (which is a positive difference of 17 between the SIOPS of the household head and the SIOPS of his/her personal network member) to the negatives ones (-17) (see Table 2). Only 6.6 percent of all ties fall into this category. Hence we believe that these ties will not create a bias in our analysis. The two lower clusters have therefore been grouped together completely (negative and low distance). Nevertheless, the number of bonding connections that are "upward" is also likely to be correlated with a household head's having relatively low social status, while the number of bonding connections that are "downward" or lateral is likely to be correlated with relatively high social status. The SIOPS of the household head and the percentages of bonding$_{link}$ relationships in the total number of relationships are negatively correlated. The correlation is rather strong (-0.62). We address this bias later in the model by controlling for the household head's own status measured according to the SIOPS and by adding the average SIOPS of all personal network members for each household, which is also an indicator of the status of the

household head.

Table 2:   **Cluster analysis: social distance**

Variable	Mean	Std. Dev.	Min.	Max.	
Cluster 1, N = 1,120					
Difference between SIOPS of household head and personal network member	24.92	7.48	17	57.0	Linking ties
Cluster 2, N = 1,112					
Difference between SIOPS of household head and personal network member	8.40	4.47	1	16.5	
Cluster 3, N = 1,389					Grouped into non-linking ties
Difference between SIOPS of household head and personal network member	-6.93	9.11	-65	0.5	

Figure 1   **The different forms of social capital**
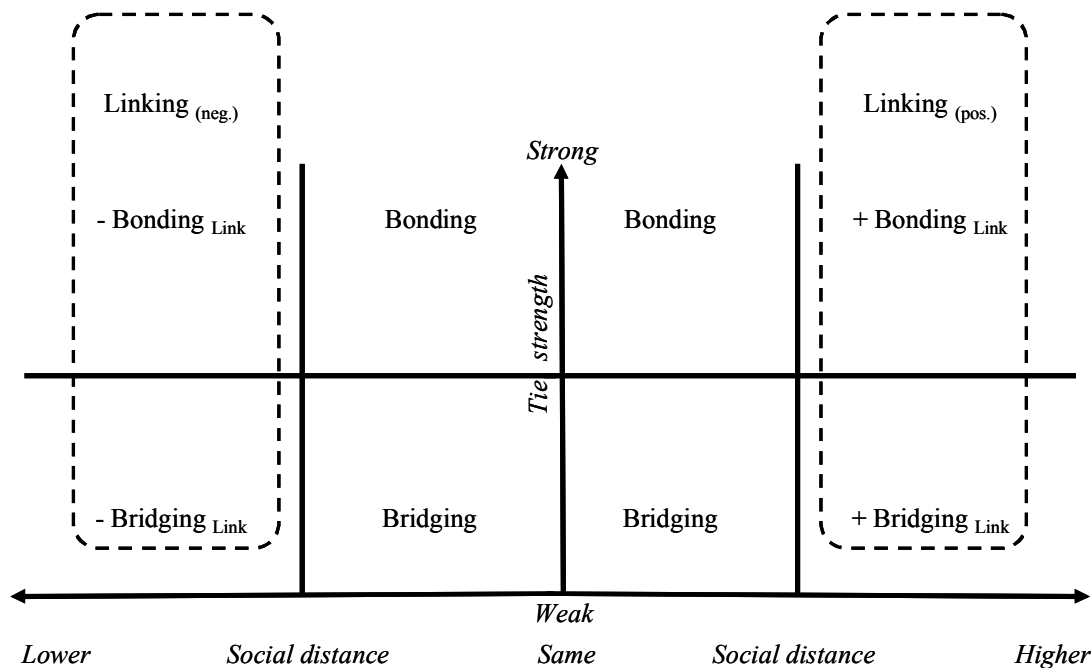
Linking social capital can be connected either to bridging social capital, when the link is connected by way of a weak tie, or to bonding social capital, when the link is connected via a strong tie. Consequently, we have four different measures of social capital: 1. bonding, 2. bridging, 3. bonding$_{link}$, and 4. bridging$_{link}$. For the analysis, these different

measures of social capital are added for each person, leaving us with four different social capital variables.

The influence of different forms of social capital on access to credit

The model

Access to finance is not the same as use of financial services. Access refers to the availability of a supply of reasonable quality financial services at reasonable total costs, with these costs reflecting all pecuniary and non-pecuniary costs. Use refers to the actual consumption of financial services (Claessens 2006). Our measure of access to credit is binary and based on extensive questioning in the face-to-face interviews. Borrowers who have been granted a formal loan were considered to have access, even if their credit had been rationed. The group of people who did not have credit was then divided into two groups: those who did not want or need to borrow but potentially could; and those who had applied and been rejected plus those who had not applied for fear of refusal or because of high transaction costs. In adopting this procedure we follow Mushinski (1999) who divided non-applicants into two groups: (a) preemptively rationed and (b) not interested respondents. He argued that households in group (a) may well have had some notional demand for credit, although in effect they did not apply because – according to statements made in interviews – they feared their loan application would be rejected or entail high transaction costs. Hence, our dependent variable (Y1) is one for all households with access to credit and zero otherwise, and we use a binary logit model to

estimate access to credit.

Y1: Access to formal credit constrained (1=yes/0=no)

Table 3:   Descriptive statistics of dependent and independent variables

Dependent variables	Mean	Std. dev.	Min.	Max.
Y1 = Access constrained (yes = 1, no = 0)	0.13	0.33	0	1
Y2 = Credit size of all formal running credits per household in 1,000 THB	61.15	128.25	0	900
Independent variables				
Personal network variables				
SC_Bo = Social capital bonding (number of ties)	3.33	2.73	0	14
SC_BoLi = Social capital bonding$_{link}$ (number of ties)	1.07	1.77	0	14
SC_Bri = Social capital bridging (number of ties)	2.62	2.63	0	15
SC_BriLi = Social capital bridging$_{link}$ (number of ties)	1.50	1.67	0	11
SIOPS Net_average = Average SIOPS of personal network members of household head	40.98	4.37	25	58
Household control variables				
C_past = Number of formal past credits	1.91	1.85	0	7
Education = School years of household head	3.94	3.15	0	16
Ethnic = Ethnicity of household head (Thai = 1, non Thai = 0)	0.76	0.43	0	1
Thai-ID = Thai ID-card (yes = 1, no = 0)	0.93	0.25	0	1
Sex = Sex of household head (male = 1, female = 0)	0.72	0.45	0	1
Age = Age of household head	52.52	13.49	24	92
Leader1 = Special position in a group[a] (yes = 1, no = 0)	0.14	0.35	0	1
Dep_ratio = Dependency ratio	38.51	31.95	0	100
SIOPS HH head = SIOPS of household head	32.56	9.81	6	78
Income = Total household income 2003 (decitiles)[b]	2.90	2.20	1	10
In_village_w = Number of survey households known by the household head inside his village weighted by village size	22.78	23.09	0.62	151.8
Out_village = Number of survey households known by the household head outside his village.	6.87	9.84	0	100
Six dummies for seven subdistricts (descriptives are not shown)	-	-	-	-

Note: n = 391 households; THB = Thai Baht; [a] Group membership taken up by the household head after

the disbursal of the oldest running credit in the household have been excluded; [b] The highest

category consists of the average monthly income in 2003 in Chiang Mai plus 25 percent.

On the one hand, our categorization of a respondent into access-constrained or not

constrained contains an objective measure of access (the household has a running credit).

On the other hand, it also relies on the respondent's own subjective assessment of his/her

situation as regards accessing a loan. We realize that a distortion may occur with this

proxy. Some households that assumed they would be able to access credit might not in

fact have succeeded in doing so, while others that were assessed as access-constrained might ultimately have obtained credit. Hence the validity of this assessment may be questioned. As pointed out by Petrick (2005), however, there are no plausible arguments why subjective information should be any less valid than any other information collected in field surveys. Access to credit is determined as a function of social capital, household variables, and commune-specific factors. Table 3 depicts the full list of variables.

Econometric concerns

Simultaneity: Social ties are the basis for our social capital measures and may be endogenous to credit access. At the same time, credit is supposed to widen the personal network of borrowers (a vast amount of literature exists, for example, on the empowerment of women by means of credit). Thus, our measures of social capital could be endogenous owing to a simultaneity bias with regard to loan access. To correct for this, we have excluded all social ties from the personal network of the respondents which were created after the disbursement of the oldest current loan, which matured during the past year. Furthermore, all ties which were created within one year after the credit disbursement were also excluded from the analysis. Through this procedure we feel comfortable that any simultaneity bias concerning social ties has been eliminated. However, all of the excluded relationships were weak ties. Thus, we may have created a bias towards strong ties. However, this potential bias is relatively small as less than 4% of ties were excluded from the analysis. Relationships created by former formal loans were controlled for by adding the variable "past formal loans" into the regression. One can also argue that access constraints may have a negative influence on farm income and wealth

(Boucher *et al*. 2009). Basically, the less access-constrained the farmer, the less risk-averse and more able to invest in the farm s/he is likely to be, thereby increasing his/her income. If this is the case, then household income is endogenous in the access to credit model. However, we were able to address this problem because we have income data going back to 2003, which is older than most credits.

Correlated unobservables: When social capital is measured by involvement with others in the community, then an omitted variable may exist as households with greater leadership qualities may also have stronger social capital. To control for leadership, we used a variable indicating whether the household head holds a special position such as cashier in formal and semiformal groups.

Social attitudes, entrepreneurial spirit, and proximity to social services may influence both network size and access to credit. We cannot directly control for social attitudes and entrepreneurial spirit. We can, however, control for total network size of households via two proxy indicators. The first is the number of households in our survey within the village known by the household head, weighted by village size. The second is the number of households in our survey outside the village known by the household head. Wealth also influences the ability to access credits and at the same time the size of the personal network. While we do not have data on total household assets, we can proxy household wealth by past income. Social status may have an effect similar to that of wealth. We control for social status using the occupation of the household head by adding his SIOPS into the model. Unobserved regional characteristics are controlled for by using sub-district dummies in the model.

Empirical results and discussion

The regression diagnostics are all within the standard range. The overall fit of the model is satisfactory and the correlation tables and the variance inflation factor showed no problems with regard to multicollinearity (Table 4). Observations may not be independent within the village. This bias we controlled for by village clustering. Our estimates of the odds ratio may be biased due to the low share of zero observations (implying that only 12 percent are credit access constraint). We therefore ran a "rare event logit" and compared the results with our standard logit regression (Tomz et al. 1999). The rare event logit produced somewhat more conservative results, but finally confirmed our standard logit results for our variables of interest. Furthermore, we applied a sensitivity analysis of the logit results with respect to the variables included, following the procedure used in Barslund *et al*. (2007). The sensitivity analysis implies that our results from the logit model are robust. The results are shown in the Table 5.

Bonding$_{link}$ social capital has a significant and negative effect on the likelihood of being access-constrained. This indicates that the greater the number of socially higher ranking personal network members to whom one is connected through a strong tie, the fewer the access constraints one is likely to face. Credit institutions in Thailand often require a guarantor as social collateral. About 35 percent of all loans in our survey involve a guarantor (only 23 percent of the loans are secured by collateral). In such cases, strong ties linked with high social distance are likely to function as social collateral for the loan. The more bonding$_{link}$ social capital an individual has, the bigger the pool of potential guarantors, and hence the lower the chance of that individual being access-constrained. Moreover, well connected households may also obtain more, or better, loan-relevant

information. Another explanation could be political patronage or nepotism. Households

with many strong links may be able to receive more credit than unconnected persons.

Personalized lending is a widespread phenomenon in developing countries. Anecdotal

evidence from our research confirmed that the credit sometimes exceeded the amount

allowed by the regulations of the credit institution. We ran a zero-inflated negative

binominal (ZINB) regression in which the dependent variable was the total loan size from

formal credit sources of the respondent (see Table 6). If political patronage or nepotism

were widespread we could assume that bonding$_{link}$ social capital would be positive and

significant. But this was not the case. We therefore believe that these instances of

personal lending are relatively isolated cases. Nevertheless, as shown in the ZINB

regression in Table 6, respondents who occupy leading/special positions in organizations

borrow significantly more money than other households. Hence, we have evidence that

local elites capture the bigger loans. Our findings are supported by other research from

Thailand. For instance, Coleman (2006) reports on village banks in which committee

members abused their positions by borrowing much more money than rank and file

members and giving out preferential loans to privileged persons, resulting in conflicts

with other members. Furthermore, Korff *et al.* (2006) describe a case in Thailand where

local leaders paid out loans to favored individuals by circumventing loan procedures.

The variable "Thai ID card" is highly significant and has a high economic impact on the

chance of being access-constrained. Thai ID cards are usually required by formal lenders

as a precondition of accepting the loan request. Respondents without an ID card are

poorer and own less land. In particular, members of ethnic minorities often do not possess

an ID card, but the variable ethnic minority is not significant. It does not become

significant (results are not shown) even when the variable ID card is excluded from the regression. However, the ZINB model in Table 6 reveals that being a member of the ethnic majority (Thai) increased a person's probability of having a running credit and borrowing larger amounts. This indicates that ethnic minority households may lack the managerial ability or market opportunity to use credits. It could also be a sign of better functioning or more active reciprocity in social networks (sharing of resources and gift exchange) resulting in a lower demand for consumption-smoothing credits.

Table 4:   Modeling access to credit

	Logit			Rare event logit		
	Coef.	Robust Std. Err.*	P > z	Coef.	Robust Std. Err.	P > z
SC_Bo	0.079	0.113	0.483	0.063	0.117	0.590
SC_BoLi	-0.619	0.262	**0.018**	-0.444	0.243	**0.068**
SC_Bri	-0.147	0.128	0.251	-0.095	0.134	0.476
SC_BriLi	-0.162	0.198	0.414	-0.098	0.193	0.612
SIOPS Net_average	0.036	0.076	0.632	0.028	0.062	0.656
C_past	-3.134	0.868	**0.000**	-2.189	0.880	**0.013**
Education	-0.369	0.167	**0.027**	-0.265	0.141	**0.061**
Ethnic	1.080	1.064	0.310	0.722	0.930	0.437
Thai-ID	-4.949	1.273	**0.000**	-2.941	1.463	**0.044**
Sex	-0.572	0.485	0.238	-0.463	0.526	0.378
Age	-0.056	0.024	**0.018**	-0.040	0.023	**0.077**
Leader1	0.320	1.166	0.784	0.537	1.090	0.622
Dep_ratio	0.014	0.007	**0.044**	0.010	0.007	0.147
SIOPS HH head	-0.045	0.047	0.333	-0.033	0.040	0.412
Income	-0.172	0.125	0.170	-0.111	0.106	0.293
In_village_w	0.017	0.010	**0.097**	0.010	0.011	0.332
Out_village	-0.070	0.040	**0.082**	-0.050	0.047	0.290
Mae Na	-1.473	0.518	**0.004**	-1.134	0.716	0.113
Muang Kong	-1.708	1.259	0.175	-1.187	1.124	0.291
Muang Na	-4.902	1.432	**0.001**	-2.893	1.618	**0.074**
Muang Ngai	-1.145	0.921	0.214	-0.818	0.891	0.359
Ping Kong	-0.776	0.580	0.181	-0.636	0.653	0.330
Thung Kao Pwang	-0.229	0.983	0.816	-0.101	1.022	0.921
Constant	9.220	3.151	0.003	5.953	3.874	0.124
Pseudo R^2	0.58			-		
Wald chi^2 (23)	175.43			-		
Prob > chi^2	0.00			-		
Sensitivity in percent	94.00			-		
Specificity in percent	85.92			-		
Correctly classified in percent	86.96			-		
N	391			391		

Note: Robust standard errors adjusted for 41 village clusters. For a definition of the dependent and

explanatory variables see Table 3. Unbalanced samples with a poor fit are typical for survey analyses in the social sciences. In a binary logit 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 cutoff point of 0.5 with the relative share, which in our case is 0.128 for Y1.

Table 5:   Sensitivity analysis of logit (Y1) models

Core var	Max	Min	Mean	AvgSTD	PercSig	Perc+	Perc-
Y1 logit	Number of regressions run for core variables: 1,024						
SC_Bo	0.114	-0.038	0.028	0.112	0	0.726	0.274
SC_BoLi	-0.353	-0.626	-0.506	0.227	0.860	0	1
SC_Bri	-0.108	-0.276	-0.200	0.129	0.083	0	1
SC_BriLi	0.068	-0.206	-0.078	0.166	0	0.117	0.883
C_past	-2.838	-3.224	-3.016	0.899	1	0	1
Education	-0.232	-0.466	-0.352	0.122	1	0	1
Thai-ID	-4.129	-5.326	-4.815	1.402	1	0	1
Age	-0.041	-0.065	-0.053	0.022	1	0	1
Dep_ratio	0.017	0.012	0.015	0.008	0.479	1	0
In_village_w	0.028	0.016	0.023	0.013	0.057	1	0
Out_village	-0.047	-0.114	-0.084	0.045	0.492	0	1
Mae Na	-0.868	-1.821	-1.237	0.721	0.136	0	1
Muang Na	-4.320	-5.380	-4.771	1.462	1	0	1
Test variables							
SC_Bo	0.051	-0.010	0.024	0.058	0	0.943	0.057
SC_Bri	1.648	0.977	1.309	0.918	0	1	0
SC_BriLi	-0.416	-0.836	-0.627	0.523	0	0	1
SIOPS Net_average	0.444	-0.553	-0.070	1.232	0	0.412	0.588
Ethnic	-0.017	-0.056	-0.040	0.038	0	0	1
Sex	-0.131	-0.209	-0.167	0.112	0	0	1
Leader1	-0.962	-1.852	-1.393	1.273	0	0	1
SIOPS HH head	-0.602	-1.319	-0.930	0.889	0	0	1
Income	-0.275	-0.976	-0.570	0.683	0	0	1
Muang Kong	0.426	-0.808	-0.163	1.031	0	0.391	0.609
Muang Ngai	0.051	-0.010	0.024	0.058	0	0.943	0.057
Ping Kong	1.648	0.977	1.309	0.918	0	1	0
Thung Kao Pwang	-0.416	-0.836	-0.627	0.523	0	0	1

Note: Max, Min, and Mean are the maximum, minimum, and mean value respectively of the point estimate over all regressions. AvgSTD are averages over the standard deviations. PercSig gives the percentage times the coefficient was significant at the 5% level. Perc+ and Perc- indicate the number of times the coefficient had a positive or negative sign respectively. For a definition of the dependent and explanatory variables see Table 3.

The "past credit" variable is significant and its negative sign implies that households with past credit have a lower chance of being access-constrained. This is not surprising as one might expect that having had credit in the past would have created a formal credit history and a social relationship with the credit officer. Market entry barriers for the borrower would thus be much lower. Neither does it come as a surprise that a higher level of education lowers the chance of being access-constrained. Better-educated people are usually wealthier and possess more assets that can be used as collateral. Better-educated people can more easily complete complicated application forms and find it easier to engage with bank staff and formal procedures. The older the household head the lower the chance that the household is access-constrained. This is also straightforward to interpret as older households are more likely to possess sizeable collateral and are better connected in society. Finally, some of the sub district dummies have a major influence on the chances of a household being access-constrained. Hence, not only relationships matter, but also location. In the case of rural finance, this relates not only to the physical infrastructure like roads, markets, etc., but also to the organizational infrastructure of rural financial institutions. Different districts are handled by different branches of the financial institutions, with different staff and different approaches. Internal comparison of branches, training and exchange of staff could help to reduce credit constraints even more.

The variables "dependency ratio", "number of survey households known by the household head inside his village weighted by village size", and "number of survey households known by the household head outside his village" are significant in the standard logit but not in the rare event logit. The sensitivity analysis in Table 5 also

indicates that some of the results of those variables are not robust. We therefore refrain from interpreting them.

Table 6:   ZINB modeling of households' actual credit uptake (Y2)

Independent variables	Coef.	Robust Std. Err.*	P > |z|
SC_Bo	0.055	0.035	0.124
SC_BoLi	0.056	0.039	0.158
SC_Bri	-0.024	0.034	0.490
SC_BriLi	0.076	0.052	0.145
SIOPS Net_average	0.035	0.019	0.067
C_past	0.224	0.056	0.000
Education	0.130	0.036	0.000
Ethnic	1.317	0.332	0.000
Thai-ID	-0.119	0.641	0.853
Sex	0.056	0.153	0.715
Age	0.009	0.007	0.201
Leader1	0.393	0.203	0.053
Dep_ratio	-0.007	0.003	0.018
SIOPS HH head	0.017	0.012	0.161
Income	0.019	0.044	0.658
In_village_w	-0.005	0.003	0.091
Out_village	0.009	0.007	0.176
Mae Na	0.477	0.263	0.069
Muang Kong	-0.383	0.281	0.173
Muang Na	0.544	0.356	0.127
Muang Ngai	-0.130	0.205	0.525
Ping Kong	-0.481	0.293	0.101
Thung Kao Pwang	-0.157	0.193	0.415
Constant	-0.746	0.973	0.444
Inflation variables (logit)			
SC_Bo	-0.010	0.114	0.933
SC_BoLi	-0.138	0.129	0.285
SC_Bri	0.020	0.129	0.876
SC_BriLi	0.329	0.220	0.134
SIOPS Net_average	-0.121	0.069	0.080
C_past	-2.194	0.531	0.000
Education	0.011	0.087	0.896
Ethnic	0.020	0.940	0.983
Thai-ID	-1.769	0.929	0.057
Sex	-0.742	0.510	0.146
Age	0.032	0.021	0.119
Leader1	0.659	0.681	0.333
Dep_ratio	0.018	0.008	0.021
SIOPS HH head	0.015	0.039	0.695
Income	-0.167	0.136	0.219
In_village_w	0.008	0.009	0.373
Out_village	-0.073	0.035	0.037
Mae Na	0.267	0.522	0.610
Muang Kong	-0.555	0.571	0.331
Muang Na	-1.604	0.817	0.050
Muang Ngai	0.203	0.503	0.687
Ping Kong	-0.613	0.761	0.420
Thung Kao Pwang	1.395	0.896	0.120
Constant	6.602	2.625	0.012
/lnalpha	0.043	0.110	0.700
Alpha	1.043	0.115	
N	391		
Nonzero observations	236		
Zero observations	155		
Log pseudo likelihood	-1345.387		

Note: *Standard error adjusted for 41 clusters in village. For a definition of the dependent and explanatory variables see Table 3.

Conclusions

Most of the literature on credit access has either ignored social capital in its analysis or has applied oversimplified explanatory measures such as group membership. Moreover, such measures have mostly been attributed to the individual. However, social capital is basically a relational concept. Our measure of social capital therefore focuses on its relational character, namely the social ties of survey respondents and the associated access to resources. In our analysis we distinguish four measures of social capital (1. bonding, 2. bridging, 3. bonding$_{link}$, and 4. bridging$_{link}$) based on three different forms of social capital: bonding, bridging, and linking. The results suggest that strong ties connected to socially distant network members (bonding$_{link}$ social capital) have a significant influence on reducing the chance of a household being access-constrained as regards formal credit. However, we find no significant evidence for an effect of bridging and bridging$_{link}$ social capital on access constraints. This is surprising, since most of the literature has suggested the opposite, following the well-known argument of Granovetter (1973) on "the strength of weak ties", which highlights the informational gains to be made through weak ties. This could be another example from Asia supporting the findings of Bian (1997) in China, which brought the positive effects of strong ties back into the discussion. We were able to exclude political patronage or nepotism behind this effect. However, we still observed some evidence for elite capture. We found no evidence that ethnic minority households face credit constraints from formal credit institutions. However, households without a Thai identity card are constrained, and members of the Thai majority usually possess an identity card. As these households are usually rather poor, the loosening of this requirement by the credit institutions could therefore benefit poorer households in particular. Nevertheless, almost 60 percent of the households in our survey do in fact have a formal loan and only about 12 percent of all households are credit-constrained. Hence, the credit outreach is enormous and the issue of

access to credit does not seem to be critical. Any loosening of general credit constraints, thereby further lowering general creditworthiness requirements, could create drawbacks in the form of an increasing credit default rate. In particular, the heavy reliance on social collateral in the form of guarantors and the evidence of elite capture may lead to deterioration in future repayment rates.

Our work has shown that social capital matters. As mentioned above we could rule out political patronage or nepotism as the driving force behind the results. Therefore, our results confirm social capital theory which highlights the informational advantage and, thus, the reduction of transaction costs. The significant influence of bonding$_{link}$ social capital on credit access points to some basic infrastructural weaknesses in the rural financial market of Thailand. As mentioned in the introduction, in a perfectly functioning credit market, social capital would not be needed. Based on this result one could call for promoting this special kind of social capital to reduce access constraints to formal credit. But two arguments are against this. First, it is quite difficult to give a valid policy recommendation to government or financial organizations that social capital in general be fostered. Second, such policy measures are likely to produce a number of unintended and unwanted side effects and may even further increase social exclusion. Hence, it seems more appropriate to give recommendations to reduce the use of social capital and to move towards a perfect market (although the ultimate goal of a perfect rural financial market will never be achieved). Therefore, we think it is more important to reduce the importance of social ties in granting formal credits. First, this could be achieved by spreading the information on loan application procedures more widely and more generally to reduce the transaction costs of potential clients. Second, the high use of guarantors may exclude less well-connected potential borrowers. Thus, in the case of a borrower who cannot provide physical or social collateral, dynamic incentives may lower risk (in case of perfect repayment history access to bigger loans and if not, losing of future access) and a closer look at the business plan may be warranted.

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