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The Influence of Social Capital on Farm Household's Borrowing Behavior in Rural China

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Abstract: This paper evaluates whether social capital affects the ability of farm households to obtain formal and informal loans. We test for the impact of two measures of social capital. The first measure, *kinship*, captures the traditional aspects of bonding social capital in rural areas that might affect the probability of getting informal loans. As the economic reforms in China have changed the traditional rural way of life and weakened the role of kinship, more mobile farmers are likely to develop a different kind of social capital also based in the Chinese tradition but not focused exclusively on kin. This *friendship* social capital is hypothesized to affect farmers' ability to get both formal and informal loans. We use the Chinese Household Finance Survey data from 2013 and estimate the probability of obtaining credit, while also accounting for the reverse causality. In addition, we use the Heckman selection model to establish how social capital affects not only the probability of getting loans but also the size of the loan. Empirical results suggest that social capital affects borrowing by farm households. In particular, the *friendship* social capital has a positive effect on farm household's ability to get formal loans, and has a substitution effect on informal borrowing, while *kinship* has a positive effect on farm households' ability to get informal loans. *Friendship* and *kinship* are positively associated with the amount of a farm household's formal and informal loans, respectively.

Keywords: kinship; friendship; farm household's informal loans; formal loans; sustainable development in rural China

1. Introduction

Finance is at the core of economic activities and rural finance is an important force for agricultural development, rural economic growth, and farmer income growth. However, imperfections in rural financial markets and limitations of formal financial institutions lead to credit constraints in most developing countries [1,2]. Rural people often have limited or no access to formal credit because their incomes are unstable, they have limited or no collateral, and high transaction costs because information asymmetries [3]. Thus, informal loans from friends and family have been the main source of loans to farm households and small business in developing countries [4,5]. According to the official Chinese statistics, only 27 percent of farm households can get formal loans and 40 percent of the farm households who need a loan are not able to obtain a formal loan. The Chinese Household Finance Survey shows that 42.2 percent and 44.97 percent of households in rural China had informal loans in 2011 and 2013, respectively. Informal borrowing is still the main way to meet the financial needs of farm households [6]. A common explanation for this is that rural people do not have collateral and face high borrowing costs attributed to the lack of credit history, financial illiteracy, insecure property,

inefficient courts, etc., which all lead the rural poor being rationed out of formal credit. Informal credit has information or enforcement advantages that mitigate moral hazard, adverse selection, and limited commitment problems. Thus, interpersonal loans based on social ties are an important source of credit in rural areas [7,8]. Heterogeneous farm households likely have different needs that can be met by informal and, to a lesser extent, formal finance that play different roles in the rural financial market.

Farm households rely more on informal reciprocal arrangements through social capital [9–11]. The relationship between social capital and access to bank financing has been well researched [12,13]. In this paper, we focus on differential impacts of various types of social capital important in rural China on the probability of getting and the size of formal and informal loans. To date, few studies have attempted to empirically test the role of different kinds of social capital in farm household's formal and informal borrowing simultaneously [14]. This paper evaluates how two kinds of social capital labeled kinship and friendship affect farm household's ability to get formal and informal loans. Understanding if and how social capital affects a farm household's access to loans can contribute to promoting more sustainable development in rural China.

We offer a novel framework of analyzing the different role that social capital plays in a farm household's formal and informal borrowing behavior. We specify the social capital as kinship and friendship based on the reality in rural China, and then analyze how kinship and friendship influence whether farm household were able to get a loan (including formal and informal loans), and how kinship and friendship affect the formal and informal loan amount of farm household, respectively.

This paper contributes to existing literature on two aspects. First, we consider two aspects of the social capital in rural china, kinship, and friendship, which is different from classifying it as bonding and bridging social capital. Second, we analyze how the two types of social capital influence farm household's formal and informal borrowing. More specifically, we first compare the social capital variables between farm households with and without credit, and then between farm households with formal or informal loans. Next, we use the Probit model to evaluate whether social capital helps farm households obtain formal and informal loans. Since the level of social capital as we define it may be endogenous to the ability to get a loan, we use a two-stage instrumental variable (IV) Probit to resolve this issue. Finally, we employ the Heckman two-step selection model to analyze not only how social capital affects the ability to get a loan but also how social capital affects the size of both formal and informal loans.

Our measures of social capital, friendship, and kinship, are country specific and have more differences from than resemblances with the more traditional, but also generic, notions of bonding and bridging social capital. Within the context of rural China, kinship is an important informal institution that exists in stable and old rural communities and clans and plays a unique role in facilitating (mostly) informal lending and borrowing. It is similar to bonding social capital as it relates to relationships and associations within a community. However, the variables that we use to measure it—number of relatives for scale and observance of important cultural traditions for strength—are location specific and quite different from the traditional measures for bonding social capital. Similarly, while the friendship measure is related to bridging social capital, the variables that proxy it in our study are location specific and thus mostly related to participation in the gift exchange and donation traditions that come to the fore with the further liberalization of the labor movement in rural China. Our results show that both types of social capital, kinship, and friendship, contribute to farm households' borrowing capacity. Friendship has a positive effect on whether farm households get formal loans, and has a strong substitution effect on informal borrowing, while kinship has a positive effect on whether a farm household obtains an informal loans. Friendship has a significant positive effect on the amount of a farm household's formal loan, and there is weaker evidence that kinship has a significant positive effect on the amount of farm households' informal loans.

The rest of this paper is organized as follows. Section 2 offers a conceptual framework for our analysis by describing the relationship between kinship, friendship, and a farm household's borrowing.

The data, variables, and methodology are described in Section 3. Section 4 presents the empirical results, and Section 5 concludes.

2. Framework of Analysis: The Nexus between Social Capital and Borrowing/Lending

2.1. Background: The State of Social Capital in Rural China

The Chinese anthropologist Fei [15] made a comparison between the West and China and concluded that, structurally, the Chinese society is composed of numerous personal networks, and is neither an individual-based nor a group-based society, but a relation-based society. Traditional agriculture is at the base of the Chinese rural livelihood with land at its core. Thus, many farm households are reluctant to leave the land where their predecessors have lived for generations.

For Chinese farmers connected to their rural way of life, access to loans is essential to improve their productivity and welfare while remaining in farming. Access to loans typically depends on the availability of collateral as well as on the ability to generate returns, which shows a reliable repayment capacity. Repayment capacity can be signaled via real capital or through social capital. Kinship, which takes advantage of reputation and trust mechanisms in a rural society, is the main type of social capital for a farm household. However, the opening-up of the Chinese economy and the transition toward a market-based economy has allowed farm workers to move between rural and urban areas. The introduction of the farm household contract responsibility system permitted exchange of land management rights which, in turn, allowed rural residents to benefit from their comparative advantages by leaving the countryside in pursuit of better incomes. These transitions have contributed to the breaking down in the Chinese rural traditional social structure [16]. The value of the traditional kinship social capital is rooted in a stable life cycle. With the movement of farmers, the dominant role of social capital determined by blood and geography is being replaced by a new type of social capital—*friendship*.

The increased mobility of rural resident changes weakens the work of traditional reputational and trust mechanisms of traditional kinship. Farmers who move to find work no longer confine themselves to the original region and can form a new type of social capital that can be conceptualized as "friendship". Different lifestyles and farm household production models utilize different types of social capital [17]. The old and the new mechanisms have different impact on the farm household's ability to borrow and lend to each other (See Figure 1).

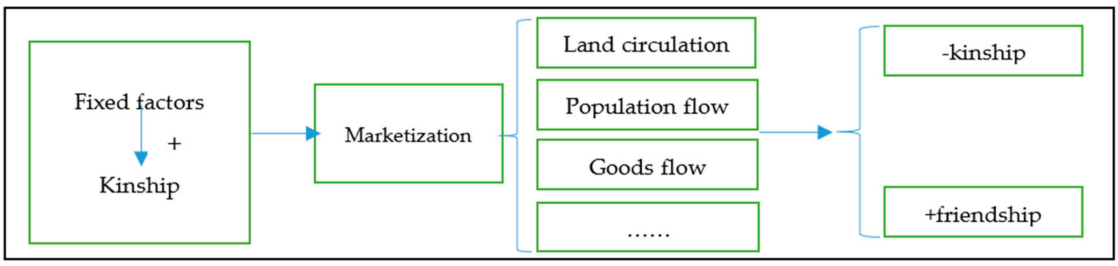

Figure 1. Differentiation of Social Capital with Marketization.

2.2. The Effect of Two Kinds of Social Capital on Farm Household's Borrowing Behavior

Putnam defines social capital as connections that are based on social relationships, networks, and associations that create shared knowledge, mutual trust, social norms of reciprocity, and unwritten rules [18,19]. Social capital is also "a propensity of people in a society to cooperate to produce socially efficient outcomes" and includes "the norms of reciprocity and trustworthiness" that arise from connections among individuals [20]. The concept of social capital is also widely used in economics, finance, and other social sciences [21–25]. Researchers, including those focused on the development of rural economics, subdivide social capital into measurable components. For example, Woolcock [26] divides social capital into bonding and bridging capital and identifies them. The former

refers to the resources embedded in the strong ties among immediate family members, neighbors, and close friends that can provide immediate assistance [27,28]. Bridging social capital, which is more heterogeneous, is gained through contact among people of different ethnic, geographical, and occupational backgrounds [28]. Levien [29] distinguishes between collective and individual social capital. Krishna [30] classifies social capital as structural social capital and cognitive social capital [21–24].

Within the context of rural China, kinship is an important informal institution with stable social (bonding) capital, which plays a unique role [15,31]. It exists in fixed communities and in clans. In rural China, farm households promote the value of family, live close by, and these typical characteristics still exist and have important roles. Thus, kinship social capital is an important resource for farm households, particularly in rural financial markets where borrowers often lack available collateral [32–34]. In financial exchange, social capital can function as a collateral in both formal and informal borrowing behavior, such as vouching for their kin, a farm household serves as what is called "Personalized collateral". The threat of loss of kinship in the case of defaulting is called "Abstract collateral" [35]. The foundation and the main carrier of kinship social capital is the kinship social networks [36].

Informal borrowing and lending have two key features-reciprocity and enforcement. People lend to each other because they expect to be able to borrow from others when they need it. The reciprocal relationship between a lender and a borrower is built on the understanding that the borrower is obligated to reciprocate by becoming a lender in the future [37,38]. Therefore, the kinship social capital used in this context also has an insurance function. Farm households with kinship capital share close social relations and follow strict social norms and customs, which regulates their repaying behavior and ensures contract enforcement. Deviating members, those who defaulted or who do not want to lend, will bear social sanctions and risk being excluded from the community [39]. Given the great significance of informal borrowing and the fear of losing the insurance provided by informal lending, households value their kinship capital as an important determinant of the ability to get an informal loan [40].

On the other hand, various types of (bridging) social capital can improve the information flow between a farm household and a formal lender [41]. Formal credit is rationed, and not everyone can get a loan from a formal financial institution because of the asymmetric nature of information between the bank and the borrower [1]. The high costs of searching for borrower information (screening) and supervising farmer's credit behavior (contract enforcement costs) also affects formal lending. For farm households living in a fixed area, information asymmetries can be alleviated in many ways, including available social capital. Financial institutions can decrease their screening, monitoring, and contract enforcement costs through social networks. Mechanisms such as farm household group business loans, special repayment schedules, follow-up loan incentive mechanisms and other designs improve repayment rates, reduce the need for costly monitoring, and decrease the transaction costs through both institutional pressures within the organization and social pressures from outside the financial institution. This is possible because farm households attach great importance to personal reputation, social evaluation, family reputation, and so on [42].

While kinship is determined by birth, friendship develops among individuals by mutual choice and, thus, represents a distinct form of social capital. Making and maintaining connections and friendships is a purposeful investment in China. In fact, this social capital is a set of different social assets that can produce a revenue stream and people can increase its flow and stock through purposeful behavior.

Farm households with significant friendship capital have larger networks unrelated to their kinship because friendship is formed after birth and can be extended while the kinship capital is relatively fixed. People form friendships due to common interests and for common purposes. They invest in social capital expecting returns in the future. Friendship forms when people believe that the cost of forming and sustaining friendship is lower than the future returns it will bring. It may be

useful in formal lending decisions because the wider social network helps farmers to obtain better information about markets, understand better the availability of financial products, and to seek and find preferential policies [40,43]. All these attributes may help farm households to have a better overall access to formal loans.

Since people with friendship capital may not live in the same community, this type of social capital is less valuable in informal lending. Defaults cannot be punished locally because defaulting on informal loans is less costly to borrowers but is costlier to lenders. In the absence of the mutual insurance function of informal lending, the roles of the two types of social capital diverge even further leading to different cost-benefit tradeoffs.

Based on these considerations, we hypothesize that formal and informal loans in rural China are likely affected by the two types of social capital differently. Specifically, since the traditional way of life is giving way to more market oriented transactions, we hypothesize that kinship and friendship affect the households' probability of getting formal and informal loans differently. We expect the results to show the degree to which the process of economic development and the movement of people out of rural areas have changed the value of traditional social capital at least as it pertains to its use in informal loans, while at the same time providing space for friendship to fill in some emerging social capital gaps. The main hypotheses about the effect of social capital on the probability that households get formal and informal loans are:

Hypotheses 1 (H1). *Kinship social capital is positively associated with the probability that a household has an informal loan and with the size of that loan*;

Hypotheses 2 (H2). *Friendship capital is positively associated with the probability that a rural household has a formal and informal loans and possibly the size of these loans*.

3. Data, Variables, and Methodology

3.1. The Data

The data for this analysis comes from the 2013 Chinese Household Finance Survey (CHFS) from the Southwestern University of Finance and Economics. CHFS is the first representative survey of household finances in China. For more specification about the dataset, please see Gan et al. (2014) [44] and contact us about the questionnaire and details about the data. The data for 2013 were collected from 29 provinces, 262 counties, and 1048 villages in all areas of China in 2013. The sampling was done according to the principle of uniform sample selection in three stages and using the probability proportional to size (PPS) sampling method. The primary units of interest were 2585 cities/counties in China (excluding Tibet, Xinjiang, Inner Mongolia and Hong Kong and Macao). The first stage was to select 280 cities/counties from 2585 cities/counties in China following the principle of uniform geographical distribution and uniform economic development. The second stage was to select randomly the neighborhood committee/village committee from the city/county directly. Lastly, households that were interviewed were randomly selected from the list of residents of a given neighborhood committee/village committee (for more information see https://chfs.swufe.edu.cn/zhixingdiaocha.aspx). The rural sample consists of 832 households from rural China, which comprises 31.74% of total sample, and includes 3044 households in the east, 3320 in the central region, and 2568 in the west. We only use observations where the interviewee is the head of the household so the final sample consisted of 6096 households.

3.2. Variables

Researchers agree that social capital can be too abstract a concept [32,44,45]. Because of its multidimensional nature, social capital is also hard to define [39]. Our measures of social capital are determined by the available data and grounded in the concepts used in existing studies.

Different countries have different social capital characteristics, such as the caste-based social networks in India, clubs in the United States, networks linked by tribe in some African countries, and clan networks linked by family ties (kinship) in rural China [46]. Kinship is defined as parenthood and conjugal relationships, including lineal generational bonds (children, parents, grandparents, and great grandparents), collateral bonds (siblings, cousins, and aunts and uncles), and ties with in-laws [47,48]. In China, kinship is defined and measured from two perspectives: kinship's scale and strength. Zhang et al. [49] define kinship by scale, such as the number of relatives, Fafchamps [39] defines it as the population scale of the first common surname, while Tsai [50] describes kinship based on "whether there is a shrine in the village". Although a household is a unit in rural China, households share a clan organization linked by blood relationship and geographical relationship [51]. Based on these insights, we choose to measure the *scale* of kinship by the number of siblings (brothers and sisters). We construct a measure kinship *strength* based on information on whether the farm family participated in the family sacrifice or tomb sweeping activities last year.

While kinship is determined by birth, friendship develops among individual by mutual choice. This social capital can be thought of as an integrated function of history, culture, tradition, as well as the social and economic condition of a society. Friendship includes personal investment in relationships between relatives and strangers and can bring positive economic and non-economic benefits. In China, an important means of social contact and maintaining relationship is mutual gift-giving. Therefore, from this perspective, a gift given to friends or relatives can be regarded as a proxy for friendship. We choose the sum of revenue from and expenditure on gifts as a proxy for *friendship*. This variable includes "expenditure in Chinese Spring Festival, Mid-Autumn Day, and other holidays (including lucky money)", "weddings and funerals, birthday expenditure", "revenue in Chinese Spring Festival, Mid-Autumn Day and other holidays (including lucky money)" and "weddings and funerals, birthday revenue".

Besides kinship and friendship representing social capital, political capital may also be an important factor influencing farm households' borrowing behavior. For example, some studies use as proxy variables a dummy for "Whether the head of a farm household is a party member or not", "Whether the head of a farm household is a party cadre or not", and "Whether the farm household joins in a rural cooperative organization". We choose "the head of farm household is a party member or not" to control the effect of political capital on a farm household's borrowing behavior.

Based on the available data and following existing literature, we also control for several demographic characteristics of the head of household and of the household itself. These variables are household head gender, their age, and age squared, education, and whether the person is employed or not. We also control for the size of the family and the size of the family and relatives (See Table 1).

Table 1. Definition of Each Variable.

Categories	Variables	Definition
Kinship	Numsib	The number of the brothers and sisters in the family
	Sacrifice	Whether do household family members have participated in a family sacrifice or tomb-sweeping in 2012
Friendship	Expenditure in holidays	Expenditure in Chinese Spring Festival, Mid-Autumn Day, and other holidays (including lucky money) (Ten Thousand Yuan)
	Weddings and funerals, birthday expenditure	Weddings and funerals, birthday expenditure (Ten Thousand Yuan)
	Income in holidays	Income in Chinese Spring Festival, Mid-Autumn Day, and other holidays (including lucky money) (Ten Thousand Yuan)
	Weddings and funerals, birthday income	Weddings and funerals, birthday income (Ten Thousand Yuan)
	Friendship	The sum of above four variables about income and expenditure (Ten Thousand Yuan)
Formal and informal borrowing behavior	Informal loan	1 = the farm household has a loan from an informal source, 0 = otherwise
	Formal loan	1 = the farm household has a formal loan, 0 = otherwise
	Informal loan amount	The informal loan amount (Ten Thousand Yuan)
	Formal loan amount	The formal loan amount (Ten Thousand Yuan)
Control variables	Male	1 = male, 0 = female
	Age	Current age in years
	No education	1 = yes, 0 = no
	Primary school	1 = yes, 0 = no
	Junior high school	1 = yes, 0 = no
	Senior high school	1 = yes, 0 = no
	High education	1 = yes, 0 = no
	Work	1 = employed, 0 = unemployed
	Numfamily	The number of household members
	Numrelatives	How many relatives live in the same county/city with you?
	Party member	1 = party member, 0 = otherwise
Other variables	Transportfee	How much was the average transport expense in your home last year? (Ten Thousand Yuan)
	Market liberalization level	What is the average market liberalization in this province/city?

3.3. Methodology

To evaluate the link between social capital measures and access to credit in rural China, we first start by identifying the differences between farm households with and without credit, followed by differences between farm households with formal and informal loans. The descriptive statistics for all variables are listed in Table 2. Table 3 summarizes the means and standard deviations (in brackets) of social capital variables and control variables in the farm households with credit (column 1), that of farm households without credit (column 2), and the *t*-tests of the mean differences (column 3). Columns (4) and (5) summarize the means and standard deviations of social capital variables and control variables in the farm household with formal and informal loans, while column (6) shows the results of *t*-tests of the mean difference of these variables.

Table 2. Statistical Analysis of Each Variable.

Variable	Observations	Mean	Std. Dev.	Min	Max
Sacrifice	3816	0.717	0.451	0	1
Numsib	6091	3.410	1.931	0	16
Friendship	6096	0.323	0.798	0	30.1
Informal loan	6095	0.450	0.497	0	1
Formal loan	6095	0.136	0.343	0	1
Size Formal Loan	6096	6590.643	24,563.52	0	500,000
Size Informal Loan	6096	2.356	69.411	0	4000
Male	6096	0.854	0.353	0	1
Age	6096	55.088	12.562	17	113
Education variables					
No_edu	6096	0.154	0.361	0	1
Primary	6096	0.391	0.488	0	1
Junior	6096	0.354	0.478	0	1
Senior	6096	0.099	0.299	0	1
High_edu	6096	0.002	0.050	0	1
Work	6096	0.816	0.388	0	1
Num_family *	6096	3.854	1.905	1	19
Party member	6096	0.117	0.322	0	1
Num_relatives **	6095	2.761	1.148	1	4
Transport_fee	6055	0.015	0.053	0	2.1

** people who are related by blood and by marriage, including parents, sons, and daughters; * family denote only the parents, sons and daughters.

Next, we evaluate if the social capital variables affect farm household's ability to get a loan (formal and informal). Following [10] Asante-Addo et al. [52], and Wossen et al. [53], we estimate two Probit model specifications:

$$\text{Prob}(Formalloan = 1) = \Phi(\alpha_0 + \alpha_1 Friendship + \alpha_2 Kinship + \alpha_3 Control + \mu_1) \quad (1)$$

$$\text{Prob}(Informalloan = 1) = \Phi(\beta_0 + \beta_1 Friendship + \beta_2 Kinship + \beta_3 Control + \mu_2) \quad (2)$$

The dependent variable takes the value of one if farm household has a formal (informal) loan and zero otherwise. The social capital is measured by the two variables described above, *Friendship and Kinship*, while *Control* denotes the group of control variables.

In the specification (1) above, the social capital measure for *Friendship* may be endogenous. Specifically, if a farmer wants to get a formal loan, he/she may be willing to give more money or a gift to the banker who extends the formal loan. Thus, when that banker is anticipating an important event such as a wedding, a gift in return for a loan may be expected. And when he obtains loans and his income is raised, he can increase friendship. Therefore, reverse causality may exist between *Friendship* and formal borrowing, thus making the friendship social capital endogenous. There is no similar link

between the number of siblings and the probability of getting a formal or an informal loan. In order to correct for this occurrence, we use an instrumental variable for friendship.

Table 3. The Variables' Comparison among Different Groups.

	With Credit (1)	Without Credit (2)	*t*-Test (3)	With Formal Loan (4)	With Informal Loan (5)	*t*-Test (6)
Kinship Strength	**0.739** (0.440)	**0.699** (0.459)	−0.040 ***	0.730 (0.444)	0.742 (0.438)	0.032
Kinship Size	**3.543** (1.930)	**3.282** (1.924)	−0.261 ***	3.614 (1.905)	3.542 (1.928)	−0.036
Friendship	**0.344** (0.781)	**0.302** (0.814)	−0.042 **	**0.426** (0.853)	**0.331** (0.763)	−0.158 ***
Male	**0.866** (0.341)	**0.842** (0.365)	−0.024 ***	**0.893** (0.309)	**0.863** (0.345)	−0.045 **
Age	**51.923** (11.237)	**58.182** (13.012)	6.260 ***	**50.265** (10.511)	**52.044** (11.244)	1.856 **
No edu	**0.123** (0.328)	**0.184** (0.388)	0.061 ***	**0.079** (0.271)	**0.127** (0.333)	0.055 **
Primary	**0.379** (0.485)	**0.404** (0.491)	0.025 **	0.336 (0.473)	0.383 (0.486)	0.057 *
Junior	**0.386** (0.487)	**0.321** (0.467)	−0.065 ***	**0.440** (0.497)	**0.382** (0.486)	−0.068 **
Senior	**0.110** (0.313)	**0.089** (0.284)	−0.021 ***	**0.142** (0.349)	**0.107** (0.309)	−0.046 **
Work	**0.863** (0.344)	**0.770** (0.421)	−0.093 ***	0.904 (0.295)	0.860 (0.347)	−0.042 *
Party member	0.118 (0.323)	0.117 (0.322)	−0.001	**0.202** (0.402)	**0.098** (0.298)	−0.104 ***
Num family	**4.189** (1.815)	**3.527** (1.935)	−0.662 ***	4.363 (1.729)	4.182 (1.814)	−0.135
Num relatives	**2.834** (1.130)	**2.691** (1.161)	−0.143 ***	2.906 (1.136)	2.833 (1.128)	−0.039
Obs	3013	3083		831	2741	
Proportion	49.43%	50.57%		27.58%	90.97%	

Notes: Bold values indicate that the mean difference is statistically significant at the 5 percent level or better. ***, **, * showing significant at 1%, 5%, and 10% probability level, respectively; standard errors are in parenthesis.

In the existing literature, several variables are used to measure social capital and to serve as such an instrument. For example, the variable called "difference of historical regional kinship" has been used to instrument for the endogenous relationship between kinship networks and rural enterprises in the process of market liberalization. Other instrumental variables correlated with measures of social capital were the village population, the village area, and the time that it takes to travel from the village to the nearest market town as well as measures of trust. Other measures include whether the farmer is a village party cadre, whether the village has a heterogeneous religion and community density, and whether the importance of political status affecting households' income has changed compared to the past.

To instrument the possibly endogenous friendship variable, we choose "the average transport fee last year". It includes local transport fee and fuel. Farm households need to visit each other, by car, bus, or other means of transportation, for maintaining and establishing the gift-giving. This instrumental variable is correlated with friendship but is unlikely to affect farmers' ability to get a formal or informal loan at the local village level. The coefficient of correlation between the friendship and transport fee in the previous year (2012) is 0.125 and significant at the 1% significance level. We tested for a weak instrument and found that the original assumption that the instrumental variable and the endogenous variable are not correlated can be rejected at the 10% level. Thus, we estimate the first-stage regression of friendship on all dependent variables and the instrument and the probability to obtain a formal loan is regressed on the predicted friendship variable and all other controls in the second stage.

Once we establish if and how *friendship* and *kinship* affect the households' ability to get formal and informal loans, we evaluate how the social capital affects the size of the formal and informal loans that

farm households are able to obtain. The data shows that, of the 6096 rural households, 50.57% have no credit and 49.43% have credit, with 44.97% of the households with credit having informal loans, 13.63% having formal loans, and 559 households having both formal and informal loans. Compared to farmers elsewhere, a much larger proportion of farm households in China carry loans, especially informal loans. Yet, even for these borrowers, only farmers who *believe* that they can get a (formal) loan apply for a loan. To address this sample selection issue, we estimate a Heckman selection model that accounts for farmers' self-selection to apply for a loan in the first stage and evaluate what farmers' characteristics and social capital measures affect the size of the loan they were able to get.

Since we are interested in the impact of social capital on formal and informal loans, we specify separate models for the two loan types. To identify our model, in the selection equations, we use the variable "level of market liberalization" and assume that it affects a farmer's ability to get a loan but not the amount of loan given, which typically is affected more by the specific purpose of the loan and the available real or reputational collateral. The correlation coefficient between the identifier and the two dependent variables shows that this variable has a significant impact on whether the farm household has formal and informal loans and we argue that is has no direct effect on the loan amount, which satisfies the basic principle of identified variable selection.

The first stage Heckman selection equations for each sub-group of formal and informal loans are:

$$\text{Prob}(Formal\ Borrowing = 1) = \phi(\alpha_0 + \alpha_1 friendship + \alpha_2 kinship + +\alpha_3 controls + \varepsilon_1) \quad (3)$$

$$\text{Prob}(Informal\ Borrowing = 1) = \phi(\beta_0 + \beta_1 friendship + \beta_2 kinship + \beta_3 controls + \varepsilon_2) \quad (4)$$

The dependent variables in model (3) and (4) are the probability of a farm household obtaining a formal loan and the probability of farm household getting an informal loan. The explanatory variables in model (3) and (4) are *friendship*, *kinship*, and the control variables include the characteristics of a farm household's head and family described before, α_1, α_2, β_1, β_2 are coefficients of social capital measures, and ε_1, ε_2 are random disturbance terms. The first stage estimates are used to compute the inverse mills ratio:

$$\lambda = \frac{\phi(\cdot)}{\varphi(\cdot)} \quad (5)$$

where $\phi(\cdot)$ and $\varphi(\cdot)$ are standard normal density function and cumulative function. The second step equations are

$$\ln qfl = \gamma_0 + \gamma_1 friendship + \gamma_2 kinship + \gamma_3 control + \gamma_4 InverseMillsratios_1 + \varepsilon_1 \quad (6)$$

$$\ln qpl = \sigma_0 + \sigma_1 friendship + \sigma_2 kinship + \sigma_3 control + \sigma_4 InverseMillsratios_2 + \varepsilon_2 \quad (7)$$

where the left side of the equation is the logarithm of the amount of formal and informal loans, respectively, the right side contains the independent variables from the first stage.

A final robustness check if performed using kinship strength to resolve the possible endogeneity of the impact of the strength of the kinship variable on the ability to get an informal loan. Specifically, since kins "who have participated in a family sacrifice or tomb-sweeping last year" could have affected a relative's ability to get a loan, there is a need to instrument that variable. We consider the strength of kinship variable only as a robustness check because it has data available for a little more than 50% of the sample.

4. Results

Table 2 presents summary statistics of each variable, and Table 3 presents a variables' comparison results between groups.

The number of households with a formal loan is 831, accounting for only 27.58% of the household with loans (3013). The number of households with informal loans is 2741 or (90.97% of the households with loans). The proportion of households with formal and informal loans does not sum to one

because 559 households have loans from both formal and informal sources. Table 3 presents the means of households classified by their use of any credit; by the use of formal and informal credit with statistically significant mean differences presented in bold. The mean difference tests show statistically significant differences in friendship between farm households with and without credit, as well as between farm households with formal and informal loans. Households with credit have higher *friendship* value than those without credit and households with formal loans have higher *friendship* value than those with informal loans. Thus, friendship measures seem to be an important type of social capital associated with getting formal and, to a lesser extent, informal loans.

In terms of kinship, there is no difference across formal and informal loans but there are statistically significant differences between farm households with and without loans. The value of kinship strength and scale in households with credit are greater than in households without credit, suggesting that kinship is important for borrowing.

In terms of other variables, a higher proportion of households with credit (0.86) have a male head of household than a household without credit (0.84) and that proportion is higher in households with formal loans (0.89) relative to those with informal loans (0.86). The heads of households with credit are younger than those of households without loans (51.9 vs. 58 years), and heads of households with formal loans are also younger than those with informal loans (50 vs. 52 years). It seems that younger households are getting more loans either because they are more likely to apply for it or because they are preferred by creditors.

In terms of educational attainment, the heads of households with credit are better educated than those without and those with formal loans are better educated than those with informal loans in all higher education categories. These results suggest that heads of households with a low level of educational attainment have either a lower demand for external loans for productive use or they can otherwise meet their credit needs by informal borrowing. Alternatively, the results possibly suggest that formal institutions prefer borrowers with higher levels of education.

Complementary to this result is the finding that the proportion of employment of the households with loans is higher than that of the households without loans and that the employment of households with formal credit is higher than that of households with informal credit. The family size variable also follows the same pattern and is greater for households with credit and for those that have formal credit. There is no statistically significant difference in party membership between households with and without credit, but households with formal credit are more than two times more likely to be party members. Family size and number of relatives are higher in households with credit than without credit.

Table 4 presents results from the estimation of (1) and (2), where we test how both *kinship* and *friendship* simultaneously affect whether a farm household has formal (column 1) or informal loans (column 2). The regression results show that both social capital measures affect the probability of getting credit but in different directions. Specifically, a one unit increase in the *friendship* variable is associated with a 3.9% higher probability that the household obtains a formal loan and is significant at the 10% significance level. Similarly, a one unit increase in the *kinship* value increases the probability of a household getting formal loans by 2.8%. One more family member increases the probability of a household getting formal loans by 6.2% (significant at the 1% level). The relation between age and farm households' borrowing behavior is inverse-U shaped. The gender of the head of the household or educational attainment do not affect the household's ability to get formal loans. However, households with a working head have a 14.2% higher probability of getting formal loans (significant at the 5% level).

Table 4. Regression Results of Social Capital's Effect on Farm Household's Getting Loans.

	Formal Loan (1)	Informal Loan (2)	Informal Loan (Robustness Check) (3)
Friendship	0.039 *	−0.036 *	−0.035 **
	(0.022)	(0.022)	(0.028)
Kinship Size	0.028 **	0.027 ***	0.015
	(0.011)	(0.009)	(0.012)
Kinship Strength			0.061
			(0.048)
Num relatives	0.007	0.001	0.018
	(0.019)	(0.015)	(0.019)
Num family	0.062 ***	0.071 ***	0.073 ***
	(0.011)	(0.009)	(0.011)
Male	0.048	−0.025	−0.018
	(0.067)	(0.050)	(0.069)
Age	0.022 *	0.043 ***	0.030 **
	(0.013)	(0.010)	(0.014)
Age2	−0.0004 ***	−0.001 ***	−0.0005 ***
	(0.0001)	(0.0001)	(0.0001)
No edu	−0.066	0.029	0.413
	(0.426)	(0.329)	(0.423)
Primary	0.064	0.034	0.412
	(0.422)	(0.327)	(0.420)
Junior	0.190	0.015	0.349
	(0.422)	(0.327)	(0.420)
Senior	0.276	0.001	0.428
	(0.425)	(0.330)	0.423
Work	0.142 **	0.007	0.039
	(0.067)	(0.048)	(0.063)
Constant	−1.884 ***	−0.998 **	−1.224 **
	(0.527)	(0.413)	(0.533)
Pseudo R2	0.0524	0.0528	0.0634
Observations	6090	6090	3811

Notes: ***, **, * showing significant at 1%, 5%, and 10% probability level, respectively; standard errors are in parenthesis.

We interpret these results in the following way. Formal loans are granted if the borrower's projects/use of credit meet certain requirements, typically measured through "hard information" that includes formal risk evaluation. Since we do not have information about the projects for which households applied for a formal loan, we end up with a relatively small R2. However, the social capital of the applicant helps borrowers to learn more about availability of formal loans, while the financial institution can use that social capital information to better evaluate and monitor borrowers, which decreases information asymmetry and lowers screening and monitoring costs [12,13]. Thus, both kinship and friendship social capital help farm a household obtain a formal loan.

Model (2) in Table 4 contains the results on the probability of obtaining informal credit. The results show that kinship and friendship affect the probability of getting informal loans but in the opposite direction. For example, a one unit increase in the *friendship* variable is associated with 3.6% lower probability of obtaining an informal loan (significant at the 10% level), while a one unit increase in the *kinship size* value is associated with a 2.7% increase in probability. The impact of the number of family member is also positive and significant with one additional member associated with 7.1% higher probability of household getting informal loans. Age also has an inverted u-shaped relation

to the probability of getting credit. Considering that the value of the informal loan is so small, two explanations are possible. First, access to more *kinship size* capital helps farmers to ask for and obtain small amounts of informal loans from their kin. At the same time, the more households spend on gift-giving (higher friendship capital) may simply indicate that they need less small informal loans (have more financial resources). Alternatively, households may spend money on gifts and, in turn, receive even larger reciprocal gifts that help them meet their needs.

Model (3) in Table 4 is the robustness check on the probability of getting informal loans using both kinship capital variables but a smaller sample size. There are 3816 observations of kinship strength, out of the whole sample of 6096. In this regression, the kinship variables are not statistically significant but friendship remains negative and statistically significant. An one unit increase in *friendship* value is again associated with a 3.5% decrease in the probability of getting an informal loan, which is the same as before.

Like anywhere in the world, but especially in rural areas of many developing countries, in rural China not everybody who wants a loan can obtain one. To improve their access to loans, many applicants try to use alternative methods to secure loans. For example, ceremonies matter in China, and ceremonies may include gifts to a banker to improve an applicants' chance of getting a loan. Giving gifts to build social capital for the gift giver improves connectedness to the local community and repayment capacity and signals information about cash flow and repayment capacity that a banker or a loan officer can use to make a screening decision. Since a potential borrower may give presents to a banker/loan officer to improve their chances of getting credit, there may be a reverse causality if the expenditure on gifts is used as a proxy for friendship social capital. Therefore, there is a need for an instrument that measures *friendship social capital*. Maintenance of social relations between households requires frequent visits, such as visiting each others' homes at festivals. We choose the regional transportation fee as the friendship's instrumental variable. While this fee does not have a direct effect on the probability of getting a loan, it is correlated with the value of gifts exchanged because more frequent visits are likely to result in more gifts.

Table 5 shows the results from this IV Probit estimation of the probability to get formal and informal loans. The first part of the table (columns 1–2) refers to results from instrumenting the friendship social capital, while the second part of the table (columns 3–5) contains the results from a subsample where the kinship strength is instrumented. The instrument for friendship in the first stage is "the transport fee last year" and it is statistically significant. In the second stage, the increase in friendship social capital is statistically significant and positive, consistent with the simple estimate but of higher magnitude (92.3%). This regression, however, does not confirm the previous result that the kinship social capital, measured by the number of siblings, affects the probability of getting a formal loan. This suggests that friendship social capital affects the probability of getting a formal loan, controlling for endogeneity of the previous measure.

Kinship strength, which involved sacrifice or joint sweeping of a temple, is another variable of interest that may have reverse causality related to the ability to get an informal loan from kin. It is instrumented with the "historical regional difference of kinship". Columns (4–5) show the results of that IV Probit regression. The coefficient of correlation between kinship and the historical regional difference of kinship is 0.107 and significant at 1% significance level. The results show that friendship social capital is statistically significant but negative while kinship strength is positive as expected.

Our third objective is to evaluate whether social capital variables affect the amount of credit that the farm households are obtaining using a Heckman two-step specification. The results of the estimations of equations (3) and (6) are presented in Table 6. In this specification we use the identifying variable "market liberalization level". A higher level of market liberalization is negatively associated with the probability of a farm household having a formal loan, which may be explained by rent-seeking behavior in the financial markets. In the second stage, the inverse mills ratio is significant, suggesting that a Heckman specification is appropriate.

Table 5. IV Probit Estimation of the Impact of Social Capital on Farm Household's Getting Formal and Informal Loans.

	Formal Loans		**Informal**	**Loans**	
	Pr (Formal Loans)	**First-Stage**	**Pr (Informal Loans)**	**First Stage**	**First Stage**
		Friendship		**Friendship**	**Kinship Strength**
Friendship	0.923 *** (0.203)		−0.0797 * (0.091)		
Kinship Size	0.016 (0.011)	0.004 (0.006)	0.0160 ** (0.0121)	0.0125 ** (0.00605)	0.00313 (0.00403)
Kinship Strength			0.320 ** (0.079)		
Male	0.060 (0.054)	−0.024 (0.029)	−0.0395 (0.0701)	−0.0121 (0.0388)	0.0692 *** (0.0243)
Age	−0.021 (0.014)	0.0001 (0.006)	0.0308 ** (0.0141)	−0.00118 (0.00602)	0.000511 (0.00429)
Age2	−0.0003 (0002)	−0.00005 (0.00005)	−0.000483 *** (0.000130)	-2.82×10^{-5} (5.50×10^{-5})	-2.15×10^{-5} (3.88×10^{-5})
No edu	0.195 (0.253)	−0.258 ** (0.127)	0.408 (0.511)	−0.146 (0.126)	−0.0133 (0.139)
Primary	0.243 (0.242)	−0.22 1* (0.126)	0.401 (0.508)	−0.145 (0.123)	0.00584 (0.138)
Junior	0.277 (0.240)	−0.165 (0.126)	0.328 (0.506)	−0.104 (0.124)	0.0552 (0.138)
Senior	0.172 (0.257)	−0.014 (0.141)	0.393 (0.508)	−0.0110 (0.131)	0.121 (0.139)
Work	0.111 ** (0.061)	0.009 (0.028)	0.0386 (0.0638)	−0.0347 (0.0424)	0.0185 (0.0215)
Num relatives			0.0158 (0.0208)	0.0248 ** (0.0111)	0.0142 ** (0.00650)
Num family			0.0719 *** (0.0131)	0.0255 *** (0.00513)	0.00126 (0.00395)
Transport fee		1.595 *** (0.006)		2.573 *** (0.643)	0.190 (0.146)
Rdkinship				−0.0858 *** (0.0246)	0.112 *** (0.0146)
Constant	−1.850 ** (0.443)	0.623 *** (0.181)	−1.361 ** (0.660)	0.493 ** (0.193)	0.469 *** (0.176)
Wald chi2 (1/2)	8.13	_			
Prob > chi2	0.0043	_			
Observations	6050	6050	3791	3791	3791

Notes: ***, **, * showing significant at 1%, 5%, and 10% probability level, respectively; Robust standard errors are in parenthesis.

The results of Equations (4) and (7) are in shown Table 7. Market liberalization is again inversely related to having informal loans; i.e., higher level of market liberalization is associated with lower the probability of farm households getting informal loans. In the second stage, the inverse mills ratio is also significant.

Table 6. The Heckman two-step results of kinship and friendship effects on households' access to formal loans.

	Have Formal Loans	**Formal Loan Amount**
Market liberalization level	−0.077 ***	
	(0.010)	
Friendship	0.052 **	0.312 ***
	(0.022)	(0.072)
Kinship Size	0.021 *	0.016
	(0.011)	(0.034)
Num family	0.056 ***	0.172 ***
	(0.011)	(0.041)
Male	0.035	−0.024
	(0.069)	(0.204)
Age	0.028 **	0.032
	(0.014)	(0.039)
Age2	−0.0004 ***	−0.001
	(0.0001)	(0.0004)
No edu	−0.162	0.256
	(0.418)	(1.226)
Primary	0.045	0.556
	(0.413)	(1.214)
Junior	0.143	0.939
	(0.412)	(1.216)
Senior	0.207	0.982
	(0.415)	(1.225)
Work	0.138 **	0.182
	(0.069)	(0.227)
Part Member	0.264 ***	0.922 ***
	(0.063)	(0.198)
Constant	−1.284	−3.687 **
	(0.527)	(1.885)
Wald chi2 (11)	62.22	
Prob > chi2	0.0000	
Mills	1.791 ***	
	(0.456)	
Rho	0.821	
Sigma	2.182	
Observations	6091	

Notes: ***, **, * showing significant at 1%, 5%, and 10% probability level, respectively; standard errors are in parenthesis.

The results show that the social capital variables—*friendship* and *kinship*—are positively associated with the probability of having a formal loan, as indicated by values on their coefficients that are very similar to the previous regressions. These results confirm that households with a higher level of friendship and kinship social capital (both siblings and family members) have a higher probability of getting a formal loan. The results from the second-stage regression show that higher levels of such capital are also associated with a larger size of formal loans with statistically significant coefficients with magnitudes of 0.31 and 0.17 in the case of a friendship measurement, while the basic measure of kinship does not affect the size of the formal loan. Friendship and family size have a significant

positive effect on the volume of a farm household's formal loans. Kinship has a significant positive effect on the amount of informal loans, and higher levels of this capital are also associated with larger informal loans with statistically significant coefficient of 0.31 (See Table 7).

Table 7. Heckman two-step results of kinship's effect on households' access to informal loans and informal loans amount: robustness check.

	Heckman Two-Step		Robustness Check	
	Whether to Have Informal Loans	**The Informal Loan Amount**	**Whether to Have Informal Loans**	**The Informal Loan Amount**
Market liberalization level	−0.028 *** (0.008)		−0.057 *** (0.013)	
Friendship	0.010 (0.021)	0.281 (0.281)	0.023 (0.030)	0.509 * 0.301
Kinship Size	0.029 *** (0.009)	0.313 ** 0.154	0.018 (0.016)	0.102 (0.428)
Kinship Strength			0.127 ** (0.052)	0.837 (0.553)
Num family	0.043 *** (0.010)	0.453 ** (0.193)	0.050 *** (0.012)	0.428 ** (0.168)
Male	0.040 (0.054)	0.577 (0.677)	0.031 (0.074)	0.549 (0.710)
Age	0.052 *** (0.011)	0.487 ** (0.234)	0.047 *** (0.015)	0.227 (0.180)
Age2	−0.001 *** (0.0001)	−0.006 *** (0.003)	−0.001 *** (0.000)	−0.003 * (0.002)
Noedu	−0.444 (337)	−6.426 (4.071)	0.086 (0.467)	−0.065 (4.545)
Primary	−0.308 (0.334)	−4.810 (3.915)	0.156 (0.463)	1.145 (4.522)
Junior	−0.324 (0.334)	−4.666 (3.921)	0.091 (0.463)	0.206 (4.498)
Senior	−0.290 (0.337)	−5.209 (3.932)	0.245 (0.466)	0.560 (4.578)
Work	−0.013 (0.053)	−0.913 ** (0.643)	−0.018 ** (0.070)	−1.390 * (0.669)
Party member	−0.056 * (0.057)	0.021 (0.711)	−0.139 * (0.074)	−0.245 * (0.762)
Constant	−1.131 ** (0.436)	−13.533 (10.104)	−1.377 (0.594)	−9.780 ** (8.818)
Wald chi2 (11)	12.16		19.68	
Prob > chi2	0.0352		0.0499	
Mills	11.692 ** (0.012)		8.026 *** (0.007)	
Rho	1.000		0.957	
Sigma	11.692		8.626	
Observations	6091		3816	

Notes: ***, **, * showing significant at 1%, 5%, and 10% probability level, respectively; standard errors are in parenthesis.

While the measure of kinship social capital, the number of siblings, is significant, the kinship strength may also affect the ability of a household to get an informal loan (See above and Table 5). Therefore, as a final robustness check, we evaluate how the strength of kinship capital affects access to

informal loans. Our measure for kinship strength is a variable that shows if the family participated in the family sacrifice or tomb sweeping activities last year, following Tsai [50] who uses a similar variable "Whether there is a shrine in the village." This variable is available for about 3800 observations out of the 6096. We estimate a subsample Heckman model for informal loans as we expect that only informal loans are affected by the availability of kinship social capital, controlling for friendship social capital, and all the other control variables. The results are presented in Table 7, columns 3 and 4. The results show that, while the kinship strength variable is positively associated with the probability of a household getting an informal loan, it does not affect the size of the loan. When it comes to informal loans in rural China, it is possible that factors other than kinship strength as proxied by our variable play a role and future research may be able to identify the type of social capital that matters.

5. Conclusions

Social capital is a popular concept in the social sciences and is increasingly used in developmental economic research, especially on rural China [54]. China is a country where relationships are valuable and important. Based on the micro-data from the Chinese Household Finance Survey for 2013 (CHFS2013), we analyze the impact of different components of social capital on a farm household's formal and informal borrowing.

The results of our analysis demonstrate that two components of social capital, namely *kinship* and *friendship*, which we use as the best available measures of relevant social capital, play important roles in the ability of farm households to get loans. In rural China, kinship is similar to bonding social capital as it relates to the relationships and associations within a community. However, the variables that we use to measure it, number of relatives for scale and observance of important cultural traditions for strength, are different from the traditional measures for bonding social capital. The friendship measure, related to bridging social capital, is measured by variables mostly related to participation in the gift exchange and donation traditions that have increasingly replaced old kinship ties with the further liberalization of labor movement in rural China. As the indigenous social structure changes, kinship becomes weaker and the *friendship* social capital involving deliberate efforts to cultivate relationships among kin but especially among non-kin, becomes stronger and more important.

Our data shows higher levels of social capital in rural households with formal or informal credit. Households with formal loans have a significantly higher social capital than those with informal loans. The estimation of Probit models with and without endogeneity correction to evaluate whether different types of social capital (*friendship* and *kinship*) affect a farm household's ability to obtain loans shows that friendship has a positive effect on whether farm households obtain formal loans and also has a strong substitution effect on informal borrowing. We find that kinship is positively associated with the probability of getting informal loans. Estimates of the Heckman sample selection models show that friendship has a significant positive effect on the amount of a farm household's formal loans but no impact on the informal loan size, while kinship has a significant positive effect on the amount of informal loans. In light of these findings, we believe that, while it is likely that other factors such as the availability of collateral and repayment capacity affect farmers' ability to get formal loans, the value of social capital should not be ignored. Our findings that newer social capital helps farmers secure formal loans while traditional social capital remains useful only in informal lending should be included in future research on what factors help farmers obtain loans.

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