Impacts of Financial Literacy on Loan Demand of Financially Excluded Households in China

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Government leaders around the world are designing national strategies to improve financial inclusion for populations traditionally excluded from the financial markets. Financial literacy is a key tool being used to bring economically vulnerable populations into the financial mainstream. We use data from the *2013 Chinese Household Finance Survey (CHFS)* to investigate the impacts of various dimensions of financial literacy on the demand for bank and non-bank loans among rural, illiterate, and migrant populations in China. The findings show that those groups most vulnerable may be less likely to be positively impacted by financial literacy, especially when it comes to access to formal bank loans. Moreover, other factors such as those related to social networks and infrastructure may matter more than financial literacy. The findings suggest that barriers to access likely need to be overcome before financial literacy can have a chance at being effective. Interestingly, results varied across measures of financial literacy and financial inclusion. Researchers are encouraged to re-examine previous definitions and measures of financial literacy and inclusion and to develop a better understanding of the relationship between the two dimensions. This work has important implications for government leaders and international organizations designing national strategies to improve financial inclusion via financial literacy, especially for populations that have traditionally been excluded.

Introduction

A growing number of countries have established or are in the process of setting national agendas and strategies that aim to reduce economic and financial disparities, via financial inclusion, for those groups that have traditionally been excluded from the formal financial sector. The need to enhance accessibility of formal financial services to underserved populations is now of top priority across countries and regions (e.g., G20 Global Partnership for Financial Inclusion, 2016, 2017; Basel Committee on Banking Supervision, 2015; G20 Financial Inclusion Experts Group ATISG Report, 2010; Mehrotra & Yetman, 2015; United Nations, 2015; World Bank, 2014). In fact, a number of developing countries are engaged in efforts to expand credit opportunities in rural areas to small farmers and in urban areas to holders of micro and small enterprises (e.g., Lyons & Contreras, 2017). Government leaders argue that inaccessibility of formal financial services, especially microfinance loans, has a dampening effect on economic growth, which results in financial instability at the household and national levels (e.g., Čihák et al., 2015; Čihák, Mare, & Melecký, 2016; Dabla-Norris, Ji, Townsend, & Unsal, 2015; Demirgüç-Kunt & Levine, 2009; Hannig & Jansen, 2010; International Monetary Fund, 2015; Lyons, Grable, & Zeng, 2017; Park & Mercado, 2015; Sahay et al., 2015; United Nations, 2015). China, in particular, has increased its efforts to expand financial inclusion to three specific groups: (1) rural, (2) illiterate, and (3) migrant populations (e.g., Cai, Giles, O'Keefe, & Wang, 2012; Fungacova & Weill, 2015; Li, Gan, & Hu, 2011; Li, Wang, Wang, & Tan, 2010; Lu & Xia, 2016; Peng, Zhao, & Wang, 2014; Sun & Huang, 2010). The People's Bank of China (China's central bank), state-owned banks, and rural credit union cooperatives have led these efforts (e.g., Asian Development Bank Institute, 2014; Duwal & Sun, 2013; Kumar, Narain, & Rubbani, 2015; Park & Marcado, 2015; Sparreboom & Duflos, 2012).

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Central to efforts designed to expand financial inclusion have been discussions among policy makers about how the concept should be defined and what should be the scope of inclusion. Traditional global measures of financial inclusion have focused on three dimensions: (1) access, (2) quality, and (3) usage of formal financial services (e.g., Allen, Demirgüç -Kunt, Klapper, & Peria, 2016; Ayyagari, Demirgüç-Kunt, & Maksimovic, 2010; Demirgüç -Kunt & Klapper, 2013; Demirgüç-Kunt, Klapper, Singer, & Oudheusden, 2014; Lyons, Grable, & Zeng, 2017; World Bank, n.d.). Yet, central banks and financial institutions operating around the world have raised concerns that financial inclusion is being too narrowly defined, especially given major differences across developing economies, including China. The international community is beginning to acknowledge the importance of other dimensions. Three dimensions that have received the most attention: (1) an educational dimension, (2) a social dimension, and (3) an infrastructure and technological dimension (e.g., Asian Development Bank, 2016, 2017; Klapper & Singer, 2014; Lyons, Grable, & Zeng, 2017; Lyons, Grable, & Joo, 2017; United Nations, 2015; Villasenor, West, & Lewis, 2016; World Bank, 2014).

Figure 1 illustrates how the six elements of inclusion work together to influence a household's level of financial inclusion. The educational dimension primarily refers to financial literacy but might also include training and skills development. Almost all national agendas on financial inclusion now include some component of financial literacy. The argument is that groups traditionally unserved and underserved by formal financial services need to be taught how to access and use these services and protect themselves from abusive practices within the financial industry. However, it is difficult to empirically make the case that financial education, by itself, changes a household's financial behavior or outcomes (e.g., Lyons, Chang, & Scherpf, 2006; Lyons & Scherpf, 2004). Other forces are needed to create the appropriate environment for financial knowledge to be practiced and applied. Moreover, it is difficult for households to apply this knowledge if they have limited social support systems in place (e.g., Lyons, Grable, & Joo, 2017). There also appear to be pre-existing barriers due to poor infrastructure and limited technologies (e.g., Lyons, Grable, & Teng, 2017). The social element therefore refers to a household's social, peer, familial, and community networks that provide a type of social insurance or social capital to households that may be deciding whether to participate in the formal financial markets. Infrastructure and technology factors refer to the challenges of having the necessary infrastructure (e.g., smart phones, points of service (POSs), banking agents, cell towers, internet access) for financial inclusion to even take place (Lyons, Grable, & Teng, 2017; Villanesor, West, & Lewis, 2016). For financial inclusion to reach a point of creating behavioral change, international organizations now argue that, along with access, usage, and quality, elements of these other dimensions need to be included within the scope of national financial inclusion agendas and strategies (e.g., International Monetary Fund, 2015; Lyons, Grable, & Teng, 2017; Sahay et al., 2015; World Bank, 2014).

Figure. 1. Six elements of financial inclusion

This paper focuses on the effects of financial literacy on financial inclusion while also controlling for social and infrastructural dimensions rarely accounted for in previous models. We use household-level data from the *2013 Chinese Household Finance Survey (CHFS)* to investigate the impacts of various dimensions of financial literacy on the demand for bank and non-bank loans among rural, illiterate, and migrant populations in China. This study, however, shows that those groups most vulnerable may be less likely to be positively impacted by financial literacy, especially when it comes to access to formal bank loans. Moreover, other dimensions such as those related to social networks and infrastructure may matter more than financial literacy. The findings suggest that some populations may first need to overcome barriers to access before financial literacy can have a chance at being effective. This work has important implications for government leaders and international organizations that are using financial literacy as a means to improve financial inclusion. Many countries now have financial literacy programs and initiatives built into their national agendas. These programs can be time and resource intensive, especially for countries in the developing world. The international community wants to better understand if, and to what extent, financial literacy might be a viable mechanism for improving financial inclusion, especially for populations traditionally excluded from the financial markets.

The remainder of this paper is structured as follows. The next section presents an overview of the literature and the key contributions of this research. The third section describes the data and metrics used to define financial inclusion and financial literacy. The fourth section includes the descriptive statistics and offers initial insight into the relationship between financial literacy and inclusion. The empirical framework is then presented, followed by the regression results. The final section summarizes key findings and highlights implications for the global financial inclusion community.

Literature Review

To date, very little, if any, research has investigated the impacts that financial literacy and other social and infrastructural dimensions have on the demand for formal and informal financial services in developing countries such as China, especially for groups traditionally excluded from the financial

markets (e.g., Ayyagari, Demirguc-Kunt, & Maksimovic, 2010; Li, Wang, Wang, & Tan, 2010; Sparreboom & Duflos, 2012; Sun & Huang, 2010). Most of the research focuses on the impacts of financial literacy on household asset allocations and portfolio diversification. Further, existing research tends to be based on data from the U.S. and Europe (e.g., Gaudecker, 2015; Grohmann, Klühs, & Menkhoff, 2017). A few studies, though, have considered the impacts of financial literacy on Chinese household's investment decisions (e.g., Chu, Wang, Xiao, & Zhang, 2017; Xia, Wang, & Li, 2014; Yin, Song, & Wu, 2014; Yin, Song, & Peng, 2015; Zeng, He, Wu, & Yin, 2015). The next version of this paper will include a more thorough review of the literature and highlight key contributions of this study to the body of existing research.

Data and Measures

Data for this study were obtained from the *2013 Chinese Household Finance Survey* (CHFS). The CHFS is a nationally representative survey of Chinese households administered by the Survey and Research Center for China Household Finance at Southwestern University of Finance and Economics (SWUFE) in Chengdu, China.[1] The first wave of the survey was administered in 2011. The survey collected data from 8,438 households and 29,500 individuals in 80 counties and 320 communities across 25 provinces. See Gan et al. (2014) for a comprehensive overview of the original data wave. The second wave of the survey was carried out in 2013. This survey expanded the 2011 sample to enhance representativeness at the provincial level. The second wave included 28,413 households from 262 counties and 1,084 communities across 29 provinces. For the purposes of this study, we used the 2013 wave of data.[2]

The 2013 survey questionnaire was designed to include a much larger and more enriched set of questions. Detailed information was collected on Chinese households' asset and debt holdings, income and expenditures, social insurance and welfare, and a wide range of individual and household-level demographics. The survey also collected information on respondents' subjective attitudes and knowledge of finances and relationship preferences, including a subset of questions related to financial literacy.

We constructed a working sample of 24,047 respondents using key information from the CHFS on financial literacy, bank and non-bank loans, social and familial networks, and community infrastructure. Observations not included in the sample were dropped due to missing information for these and other key control variables.

Defining "financial exclusion" and measuring "financial inclusion"

As previously mentioned, this study focused on three key target populations: rural, illiterate, and migrant households. These populations have been identified in China as being particularly at risk for financial exclusion. Rural households can be identified in the CHFS either by their place of residence or the *"hukou"* (户口), which is a record in the government household registration system that determines where citizens may be allowed to live. We defined rural households according to each respondent's place of residence at the time of the survey. Illiterate households were defined as those where the respondent never attended school or only attended primary school. Because of the recent rapid urbanization in China, migrants are commonly identified using the *hukou* (e.g., Lyons, Grable, & Teng, 20107). If the respondent had a rural hukou but was currently residing in a city/county that was in an urban area that did not match their rural hukou, then we classified them as a migrant.[3]

We defined financial *inclusion* using information from the CHFS on households' access to and usage of bank and non-bank loans for purposes related to: (1) home, (2) business, (3) agriculture, and/or (4) education. With regards to formal bank loans, respondents were asked if they had a bank loan, and if so, for what purpose, from which bank, how much, and what were the terms and conditions. Respondents were also asked if they had a non-bank loan and the source of the loan (i.e., parents, children, siblings, other relatives, friends/colleagues, and non-government financial institutions). If they had a non-bank loan, they were again asked more detailed questions about the loan. If respondents reported having a home, business, agriculture, and/or educational loan they were defined as being financially included.[4]

Measuring financial literacy

Among researchers and policy makers, there is considerable debate about the best way to measure financial literacy (e.g., Calve, Campbell, & Sodini, 2009; Hung, Parker, & Yoong, 2009; Lyons & Neelakantan, 2008). Traditional measures have focused on testing financial knowledge using a specific battery of questions related to various economic and financial concepts. Other techniques focus on measuring participation in a "financial literacy" experience (e.g., a course, curriculum, or seminar) where knowledge is being imparted in a structured environment over a period of time. Still, other approaches examine the role that information search and social networks play in acquiring financial knowledge and experience. Within the CHFS, we had information to capture all three aspects of financial literacy.

We examined the three dimensions using the following information. First, respondents were asked the subsequent three questions, which tested their knowledge about interest rates, inflation, and investment risk:

1) Given a 4% interest rate, how much would you have after 5 years if you have 100 RMB at first?
2) With an interest rate of 5% and an inflation rate of 3%, after saving money in the bank for 1 year, can you buy more or less than last year?
3) Do you think stocks have greater risks than equity funds?

These questions were mirrored after those frequently used in the literature on financial literacy related to savings and investments (e.g., Lusardi, Michaud, & Mitchell, 2017; Lusardi & Mitchell, 2014; Van Rooij, Lusardi, & Alessie, 2011; Yin, Song, & Wu, 2014). Answers to the questions were used to create a composite score for financial knowledge similar to what has been done in other studies.

With regards to each respondent's financial literacy experience, respondents were asked: "Have you ever taken an economic or financial course before?" Answers were recorded dichotomously. In terms of information search, respondents were asked: "To what degree do you pay attention to economic and financial information?" Responses were based on a five-point Likert-type scale, ranging from 1 = "pay extreme attention to" and 5 = "pay no attention to." Other researchers have used similar types of questions to inquire about households' sources of information and where household members go to find financial information (e.g., Lyons, Chang, & Scherpf, 2006; Lyons & Scherpf, 2004). However, few studies have asked households about their informational search habits in terms of "how often" they pay attention to the information (e.g., Lyons, Grable, & Zeng, 2017).

Social and infrastructural dimensions

Besides financial literacy, the CHFS also includes data on other dimensions of financial inclusion. This includes information related to a household's social infrastructure. It is known that social infrastructure can have an impact on financial decisions in several ways, especially as they relate to the usage of bank and nonbank loans. There is growing evidence in the behavioral economics and finance literature that social networks (i.e., familial, peer, and community networks) can influence financial behavior via the knowledge and experience the network members impart (e.g., Amuedo-Dorantes & Mundra, 2007; Lakey, 2013; Li, 2006a, 2006b; Liang & Yuan, 2013; Lyons, Grable, & Teng, 2017; Thaler & Sunstein, 2008). For example, networks may "nudge" a group member to make a financial decision based on what they and others in the network have done in the past. For example, did they go to a local bank to apply for a loan? Did they have a good experience? Do they trust the bank? Additionally, the strength of a network can serve as a type of financial or social insurance. On the one hand, if a person has a stronger local network, they might be more willing to take out a loan because they know they have others to rely on if something should happen and they are unable to repay the loan. On the other hand, if they have a strong network, they may be more likely to rely on their informal network to meet their borrowing needs rather than a formal financial institution.

We used the following information to account for this social dimension. In the CHFS, respondents were asked: "How important to you is family?" Responses were based on a five-point Likert-type scale, ranging from 1 = "very important" and 5 = "very unimportant." Information was also collected on respondents' local familial network and how many blood relatives were living in their city or village. Responses ranged from zero to more than six. The survey also asked respondents about the strength of

the relationships in their overall network (i.e., their *guanxi* 关系). In the survey, respondents were asked to report the amount of money (i.e., "guanxi income") they had received from people other than family members with whom they were living.[5] They may have received this money for festivals, weddings, funerals, education, medical services, living expenses, or other reasons.

Previous research has also considered the role that financial infrastructure plays in shaping an individual's ability to access and use financial services and products (e.g., number of bank branches, distance to bank branch, number of ATMs, points of service, etc.). Recently, researchers have begun to recognize the growing importance of other types of infrastructure, including physical, technological, and informational (Lyons, Grable, & Zeng, 2017). The CHFS includes community-level data that can be used to construct a general measure of the overall quality of a community/village's infrastructure along five dimensions: (1) the cleanliness of the roads, (2) condition of the building structures, (3) level of crowding, (4) level of environmental friendliness, and (5) economic conditions. Community/village leaders were asked to rank each dimension on a scale from 1 to 10; higher scores indicated better conditions. We used this information to create an infrastructure index by summing the scores across the five dimensions. Scores ranged from 5 to 50 and followed a normal distribution.[6]

To account for industry constraints on the supply side such as quality and actual availability of financial services, an additional measure that controlled for a respondent's access to bank loans was included in the study. Respondents who reported that they had applied for a bank loan but were denied or needed a bank loan but had not yet applied were classified as having "limited access to bank loans." In lieu of the recent digital finance movement (Klapper & Singer, 2014; Manyika, Singer, White, & Berry, 2016; Shrader & Duflos, 2014; Villasenor, West, & Lewis, 2016), another measure was included to account for technology access and usage. In this case, the item was whether a respondent reported using a mobile/cellular phone. Responses were coded dichotomously.

Descriptive Statistics

Table 1 shows the descriptive statistics for those groups classified as financially excluded: rural, illiterate, and migrant households. In terms of the entire sample, 39.9% were found to be living in rural areas, 35.1% were illiterate, and 5.7% were migrants. Further, of those living in rural areas, over half were illiterate (55.8%) compared to only 21.4% of those living in urban areas. In terms of literacy, almost two-thirds of illiterate respondents were living in rural areas (63.3%) compared to only 27.1% of those who were literate. About 4.0% of illiterate respondents and 6.8% of literate respondents were migrants. When looking at the population of migrants only, 22.4% were identified as being illiterate.

In terms of financial inclusion, 11.7% of households had some type of bank loan for purposes related to home, business, agriculture, or education. Among those who reported having a bank loan, most reported that the loan was used to fund the purchase of a home (61.3%). Interestingly, home loans were the most common type of loan held by migrants (83.1%) and illiterate populations (40.7%) who reported having a formal bank loan. Those living in rural areas with bank loans also tended to use them to purchase a home; however, they were more likely to use them for agricultural purposes (35.6% compared to 44.7%, respectively). With regards to the informal sector, 26.2% of households reported having some type of non- bank loan. Of those with non-bank loans, 67.9% indicated they had home loans. In fact, it was the most common type of loan held by households regardless of the group. However, rural and illiterate respondents with non-bank loans were more likely to report having an agricultural loan whereas migrants with non-bank loans were more likely to report having a business loan. This finding was also true for bank loans as well.

Table 1 also provides information on the key dimensions of financial literacy. The findings are reasonable and as what one might expect, given the makeup of the sample. In general, few respondents reported having previously taken a financial course (only 7.3%). Urban and literate populations reported the highest percentages (10.8% for both categories). Knowledge about interest rates, inflation, and investment risk was also highest among urban and literate populations. Those living in rural areas, and those categorized as illiterate, exhibited the lowest knowledge scores. Interestingly, scores for migrants

were higher than scores for non-migrants. This result may be the result of needing to know about the relative financial opportunities and threats in the economy before making the decision to migrate from rural to more urbanized areas in China where the household may not be able to access certain resources because of their *hukou*. Overall, respondents were somewhat blasé about paying attention to financial information. Most indicated paying little or no attention to financial information, with rural and illiterate populations paying less attention than urban and literate populations. The one exception was among migrants who were more likely than non-migrants to pay a bit more attention to financial information.

Regardless of their status, the majority of respondents indicated that family was important in their life. More than one-third of respondents reported having a local family network greater than six persons. As one might expect, migrants were less likely to report having a large family network locally. Guanxi income was highest among those living in urban areas and lowest among those residing in rural areas. Across classifications, there was very little difference in the reported levels of infrastructure and the proportion of respondents who reported having access to mobile technology. In terms of perceived access to the formal financial markets, about 14.6% of the sample on average believed that they had limited access to formal bank loans; 21% and 19% of those living in rural areas and those who were classified as illiterate reported having limited bank loan access, respectively.

As one might expect, large differences between those living in rural and urban areas, and those who were illiterate and not illiterate, were noted in respect to income and wealth. Rural and illiterate respondents held less wealth and earned less income. Across the sample, respondents exhibited below-average to no financial risk tolerance. Given their status, it was not surprising that migrants reported holding slightly higher risk tolerance.

Demographically, those living in urban centers were better educated and in better health. Those living in rural areas tended to be male, married, less educated, and in relatively poorer health. The situation among illiterate respondents was more pronounced. They were less well physically. Migrants tended to be the healthiest, although this population also had the smallest family size. Rural households were slightly more likely to report having children and larger family sizes, including more elders living in the household. While few respondents were self-employed, migrants were noticeably more likely to report being self-employed.

Table 1 Financial literacy and descriptive profile of financially excluded households in China.

VARIABLES (percentages)	(1) All (N=24,047)	(2) Rural (n=7,501)	(3) Urban (n=16,546)	(4) Illiterate (n=7,481)	(5) Literate (n=16,566)	(6) Migrant (n=1,342)	(7) Non-migrant (n=22,705)
Financially excluded populations							
Rural	39.9	100.0	0.0	63.3	27.1	0.0	42.3
Illiterate	35.1	55.8	21.4	100.0	0.0	22.4	35.9
Migrant	5.7	0.0	9.4	3.6	6.8	100.0	0.0
Financial inclusion							
Has bank loan	11.7	10.8	12.3	7.6	13.9	12.1	11.6
Bank loan: home	61.3	35.6	77.9	40.7	67.9	83.1	60.0
Bank loan: business	12.5	9.5	14.4	11.3	12.8	14.7	12.3
Bank loan: agriculture	20.0	44.7	4.0	36.1	14.8	1.0	21.1
Bank loan: education	14.0	22.4	8.6	20.9	11.8	6.7	14.4
Has non-bank loan	26.2	34.1	20.9	29.5	24.4	25.4	26.2
Non-bank loan: home	67.9	62.6	73.6	66.8	68.6	70.9	67.7
Non-bank loan: business	11.3	6.4	16.7	6.9	14.2	26.5	10.5
Non-bank loan: agriculture	21.6	35.4	6.6	28.4	17.1	3.2	22.6
Non-bank loan: education	19.9	23.0	16.6	21.5	18.9	12.8	20.3
Financial literacy dimensions							
Financial course	7.3	1.9	10.8	0.8	10.8	7.3	7.3
Financial knowledge	64.9	43.4	79.2	34.1	81.6	75.9	64.3
Interest rates	22.1	16.5	25.8	12.2	27.4	25.9	21.8
Inflation	15.7	15.3	15.9	12.9	17.2	15.3	15.7
Investment risk	27.5	11.7	38.1	9.2	37.5	35.3	27.1
Fin info: Pay extreme attention	4.2	4.0	4.4	2.6	5.1	3.0	4.3
Fin info: Pay a lot of attention	7.9	7.2	8.3	4.9	9.5	5.2	8.0
Fin info: Pay general attention	24.4	19.0	28.0	14.6	29.7	25.4	24.3
Fin info: Pay a little attention	26.5	23.7	28.5	21.2	29.5	36.3	26.0
Fin info: Pay no attention	37.0	46.1	30.9	56.8	26.2	30.0	37.4
Other financial inclusion dimensions							
Family very important	65.5	61.2	68.3	58.7	69.1	70.8	65.1
Local family network >6	39.1	36.6	40.8	35.6	41.0	16.9	40.4
Guanxi income (RMB)	2,214.0	1,473.5	2,704.8	1,579.9	2,557.7	2,218.9	2,213.7
Infrastructure index (#)	27.3	26.7	27.7	26.0	28.0	26.0	27.4
Limited access to bank loans	14.6	21.1	10.2	18.7	12.3	11.1	14.8
Access to mobile technology	89.2	86.9	90.8	81.4	93.5	95.0	88.9
Household income and wealth							
Wealth (RMB)	696,670.5	269,121.9	980,040.3	304,297.1	909,324.1	556,223.2	705,117.2
Income (RMB)	60,823.8	36,342.9	77,049.3	35,244.6	74,687.0	57,235.6	61,039.6
Homeowner	63.6	63.2	63.9	62.3	64.4	58.6	63.9
Risk: High risk, high return	6.3	6.7	6.1	5.2	6.9	7.5	6.2
Risk: Slightly above-average risk, slightly above-average return	4.8	2.8	6.1	2.1	6.2	8.7	4.5
Risk: Average risk, average return	20.4	16.9	22.7	12.6	24.7	30.0	19.8
Risk: Slightly below-average risk, slightly below-average return	15.3	13.7	16.3	11.6	17.3	17.0	15.2
Risk: Unwilling to take any risk	53.2	59.9	48.8	68.5	45.0	36.7	54.2
Individual demographics							
Age (#)	50.7	53.2	49.0	57.2	47.2	36.0	51.6
Educ: No school	9.6	16.0	5.4	27.4	0.0	4.0	10.0
Educ: Primary school	25.5	39.8	16.1	72.6	0.0	18.4	26.0
Educ: Junior high	32.0	33.5	31.0	0.0	49.3	42.0	31.4
Educ: High school	12.9	7.7	16.3	0.0	19.9	13.4	12.9
Educ: Some college	12.4	2.6	18.9	0.0	19.2	15.6	12.2
Educ: College	7.5	0.3	12.3	0.0	11.6	6.5	7.6
Female	41.9	33.3	47.6	45.5	40.0	46.1	41.7
Married	84.6	88.6	82.0	82.8	85.6	74.6	85.2
Poor health	28.0	39.9	20.2	43.7	19.6	10.5	29.1

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Table 1
Financial literacy and descriptive profile of financially excluded households in China (continued).

VARIABLES (percentages)	(1) All (N=24,047)	(2) Rural (n=7,501)	(3) Urban (n=16,546)	(4) Illiterate (n=7,481)	(5) Literate (n=16,566)	(6) Migrant (n=1,342)	(7) Non-migrant (n=22,705)
Has private insurance	17.3	10.8	21.6	8.2	22.2	20.2	17.1
Family size (#)	2.1	2.3	1.9	2.1	2.1	1.8	2.1
Has children	42.6	46.7	39.9	41.9	43.0	53.0	42.0
Has elders	29.1	33.2	26.4	40.1	23.1	5.4	30.5
Number employed (#)	1.9	2.4	1.5	2.0	1.8	1.9	1.9
Self-employed	8.9	4.3	12.0	4.4	11.4	27.5	7.8
Retired	14.6	2.5	22.6	9.9	17.1	0.7	15.4
Regions							
Region1: East	27.4	25.6	28.7	28.4	26.9	40.1	26.7
Region2: North	13.0	10.9	14.4	9.7	14.8	10.8	13.2
Region3: Central	14.0	15.2	13.2	13.4	14.3	13.5	14.0
Region4: South	9.5	8.3	10.2	7.7	10.4	8.3	9.5
Region5: Southwest	15.5	18.0	13.9	20.7	12.7	17.1	15.4
Region6: Northwest	9.9	11.6	8.8	11.6	9.0	7.0	10.1
Region7: Northeast	10.6	10.4	10.8	8.5	11.8	3.2	11.1

Note: All statistics have been weighted and are reported as percentages unless otherwise indicated. Dollar values are in RMB. As of August 14, 2017, 1 RMB = 0.15 USD.

Finally, the sample was geographically diverse. Slightly more than one in four lived in the eastern region of China; although among migrants, the percent was closer to 40%. Fewer respondents reported living in the south and northern regions of China. Outside of the eastern region, those who were classified as illiterate were more likely to live in the southwest region, which also happens to be a more rural area of
China.

Table 2a presents the characteristics of financially excluded households based on demand for *bank loans.* In general, those with bank loans were more financially literate than those who reported having no bank loans. They also had stronger social networks, lived in communities with better infrastructure and were more likely to have access to mobile technology. Across all of the categories, among those who reported having a bank loan, less than 20% had ever taken a financial course. This was highest among those categorized as literate (17.1%) and lowest among those categorized as illiterate (1.4%). The majority reported a moderate to high degree of financial knowledge, with the exceptions being those living in rural areas and the illiterate. Overall, those with a bank loan were more likely to report paying general or little to no attention to financial information. Even so, a surprising number noted paying no attention to financial information, with more than one of three rural respondents (36.2%) and approximately 45% of illiterate respondents paying no attention to financial information. Similar to what was reported earlier, the majority of respondents, across categories, reported that family was very important as a dimension of financial inclusion. Between 20% and 43% of those with a bank loan had a local family network of six or more people. Migrants reported having the fewest number of family members in the area. Gaunxi income was highest among those living in urban areas. The infrastructure index was relatively consistent across categories. As expected with this group, less than 12% reported having limited access to bank loans, whereas most had access to mobile technology (94.2%). Almost eighty-two percent of those with a bank loan were homeowners. This is not surprising because data showed that a larger portion of loans were used to purchase real estate. As was the case with the larger sample, those with the lowest wealth and income tended to live in rural areas and be classified as illiterate.

Table 2a

Financial literacy profile of financially excluded households based on demand for *bank loans.*

	Has Bank Loans						
	(1) All	(2) Rural	(3) Urban	(4) Illiterate	(5) Literate	(6) Migrant	(7) Non-migrant
VARIABLES (percentages)	N=3,270	n=1,029	n=2,241	n=683	n=2,587	n=178	n=3,092
Financial literacy dimensions							
Financial course	13.3	4.0	19.3	1.4	17.1	6.9	13.7
Financial knowledge	82.3	54.5	100.0	46.7	93.8	91.3	81.8
Fin info: Pay extreme attention	7.5	7.5	7.5	4.7	8.4	4.1	7.7
Fin info: Pay a lot of attention	11.9	11.5	12.1	9.3	12.7	6.7	12.2
Fin info: Pay general attention	29.3	24.5	32.4	21.0	32.0	25.7	29.5
Fin info: Pay a little attention	25.1	20.2	28.4	19.6	26.9	40.1	24.3
Fin info: Pay no attention	26.2	36.2	19.7	45.3	20.0	23.4	26.3
Other fin inclusion dimensions							
Family very important	72.4	68.3	75.0	66.8	74.2	78.0	72.0
Local family network >6	40.4	43.1	38.6	39.9	40.5	20.8	41.5
Guanxi income (RMB)	3,318.9	1,571.6	4,447.9	2,553.7	3,565.8	3,497.4	3,308.4
Infrastructure index (#)	28.6	27.2	29.5	26.6	29.3	27.9	28.7
Limited access to bank loans	11.1	16.5	7.6	14.5	10.0	5.3	11.5
Access to mobile technology	94.2	93.4	94.7	88.7	96.0	96.5	94.0
Household income and wealth							
Homeowner	81.9	76.0	85.7	78.2	83.1	83.2	81.8
Wealth (RMB)	1,119,580.2	398,331.9	1,585,640.9	442,542.6	1,338,072.8	1,091,134.2	1,12,429.3
Household income (RMB)	101,931.2	55,429.3	131,980.0	49,699.5	118,787.3	105,166.9	101,742.0
	Does Not Have Bank Loans						
	(1) All	(2) Rural	(3) Urban	(4) Illiterate	(5) Literate	(6) Migrant	(7) Non-migrant
	N=20,777	n=6,472	n=14,305	n=6,798	n=13,979	n=1,164	n=19,613
Financial literacy dimensions							
Financial course	6.4	1.6	9.5	0.7	9.7	7.4	6.3
Financial knowledge	62.3	41.7	76.0	32.9	79.4	73.6	61.6
Fin info: Pay extreme attention	3.7	3.5	3.9	2.3	4.5	2.9	3.8
Fin info: Pay a lot of attention	7.3	6.6	7.7	4.5	8.9	5.0	7.4
Fin info: Pay general attention	23.7	18.2	27.3	13.9	29.2	25.4	23.5
Fin info: Pay a little attention	26.8	24.2	28.5	21.3	29.9	35.8	26.2
Fin info: Pay no attention	38.6	47.6	32.6	57.9	27.5	30.9	39.0
Other fin inclusion dimensions							
Family very important	64.4	60.2	67.2	57.9	68.2	69.7	64.1
Local family network >6	38.9	35.6	41.1	35.1	41.1	16.3	40.3
Guanxi income (RMB)	2,047.6	1,459.0	2,439.2	1,482.6	2,376.1	2,032.1	2,048.5
Infrastructure index (#)	27.1	26.6	27.4	26.0	27.7	25.7	27.2
Limited access to bank loans	15.1	21.8	10.6	19.1	12.9	12.0	15.3
Access to mobile technology	88.5	85.9	90.2	80.7	93.0	94.8	88.1
Household income and wealth							
Homeowners	60.9	61.3	60.6	60.7	61.1	55.0	61.2
Wealth (RMB)	632,959.3	249,996.3	887,747.1	290,476.9	832,098.5	478,081.6	642,313.2
Household income (RMB)	54,631.0	33,517.7	68,677.9	33,799.5	66,743.7	50,233.6	54,896.6

Note: All statistics have been weighted and are reported as percentages unless otherwise indicated. Dollar values are in RMB. As of August 14, 2017, 1 RMB = 0.15 USD.

Table 2b provides data on financially excluded households based on demand for *non-bank loans.* For the sample as a whole, those without a non-bank loan were more likely than those with a non-bank loan to be financially literate. In addition, they were considerably less likely to report having limited access to formal bank loans and mobile technology. Compared to those in Table 2a who reported having a bank loan, those with a non-bank loan in Table 2b were less likely to have taken a financial course. Financial knowledge levels were also generally lower compared to those with bank loans. Across all categories, those who had a non-bank loan were about equally likely as those with a bank loan to report paying little or no attention to financial information. Comparing those with and without non-bank loans, the findings

related to the importance of family, the size of one's local family network, and the level of infrastructure in one's community were similar across categories. An exception was that migrant respondents with non-bank loans were more likely to have larger local family networks than migrants without non-bank loans. Compared to those in Table 2a with bank loans, those with non-bank loans in Table 2b were somewhat less likely to report that family was important, less likely to have a large local network of family members, more likely to live in a community with poorer infrastructure, and more likely to report limited access to formal bank loans and mobile technologies. Compared to those with bank loans, those with non-bank loans were

Table 2b
Financial literacy profile of financially excluded households based on demand for *non-bank loans*.

	Has Non-Bank Loans						
	(1) All	(2) Rural	(3) Urban	(4) Illiterate	(5) Literate	(6) Migrant	(7) Non-migrant
VARIABLES (percentages)	N=6,898	n=3,080	n=3,818	n=2,546	n=4,352	n=387	n=6,511
Financial literacy dimensions							
Financial course	5.2	1.9	8.8	0.8	8.1	6.4	5.2
Financial knowledge	58.8	46.3	72.4	35.7	73.9	74.7	57.9
Fin info: Pay extreme attention	4.2	4.4	4.0	3.1	4.9	3.9	4.2
Fin info: Pay a lot of attention	7.4	7.3	7.7	4.9	9.1	6.4	7.5
Fin info: Pay general attention	24.4	21.1	27.9	16.1	29.8	27.9	24.2
Fin info: Pay a little attention	26.1	23.7	28.6	21.9	28.8	28.6	25.9
Fin info: Pay no attention	37.9	43.6	31.8	54.0	27.4	33.2	38.2
Other fin inclusion dimensions							
Family very important	65.8	62.4	69.6	60.8	69.1	71.1	65.5
Local family network >6	39.6	38.4	40.8	36.0	41.9	20.7	40.6
Guanxi income (RMB)	2,060.9	1,409.9	2,767.6	1,760.4	2,257.8	2,117.0	2,278.0
Infrastructure index (#)	26.8	26.6	26.9	25.8	27.4	25.5	26.8
Limited access to bank loans	33.8	37.0	30.4	37.7	31.3	33.0	33.9
Access to mobile technology	91.8	90.7	93.0	87.7	94.4	94.7	91.6
Household income and wealth							
Homeowner	80.8	78.4	83.5	79.4	81.8	79.9	80.9
Wealth (RMB)	496,043.1	263,888.1	748,085.1	266,673.5	646,395.1	602,495.6	490,057.0
Household income (RMB)	48,497.7	33,083.0	65,232.8	32,826.4	58,770.2	48,287.7	48,509.5
	Does Not Have Non-Bank Loans						
	(1) All	(2) Rural	(3) Urban	(4) Illiterate	(5) Literate	(6) Migrant	(7) Non-migrant
	N=17,149	n=4,421	n=12,728	n=4,935	n=12,214	n=955	n=16,194
Financial literacy dimensions							
Financial course	8.1	1.9	11.4	0.7	11.8	7.6	8.2
Financial knowledge	67.5	41.6	81.3	33.4	84.5	76.3	66.9
Fin info: Pay extreme attention	4.2	3.8	4.5	2.3	5.2	2.7	4.3
Fin info: Pay a lot of attention	8.1	7.2	8.5	4.9	9.6	4.8	8.3
Fin info: Pay general attention	24.4	17.7	28.0	13.8	29.7	24.5	24.4
Fin info: Pay a little attention	26.8	23.7	28.4	20.8	29.7	39.2	26.0
Fin info: Pay no attention	36.6	47.6	30.6	58.1	25.8	28.8	37.0
Other fin inclusion dimensions							
Family very important	65.3	60.5	67.9	57.6	69.1	70.7	65.0
Local family network >6	38.9	35.4	40.8	35.3	40.7	15.5	40.4
Guanxi income (RMB)	2,276.8	1,512.5	2,685.8	1,492.0	2,669.1	2,257.1	2,278.0
Infrastructure index (#)	27.5	26.7	28.0	26.2	28.2	26.2	27.6
Limited access to bank loans	6.7	11.4	4.1	9.4	5.3	2.9	6.9
Access to mobile technology	88.2	84.5	90.2	78.4	93.1	95.2	87.8
Household income and wealth							
Homeowner	56.6	54.0	58.0	54.0	57.9	50.6	57.0
Wealth (RMB)	778,923.6	272,325.9	1,050,037.0	322,624.7	1,006,981.3	538,857.7	793,748.2
Household income (RMB)	65,877.3	38,338.5	80,615.1	36,422.6	80,598.8	60,593.7	66,203.6

Note: All statistics have been weighted and are reported as percentages unless otherwise indicated. Dollar values are in RMB. As of August 14, 2017, 1 RMB = 0.15 USD.

about equally likely to be homeowners (81.9% compared to 80.8%); however, they reported considerably lower levels of income and wealth across all categories. Similar to the data shown in Table 2a, those living in rural areas and those classified as illiterate reported the lowest levels of income and wealth.

Overall, the descriptive findings presented in this section suggest that a positive relationship is likely to exist between financial literacy and household demand for bank loans, while a negative relationship is likely to exist for non-bank loans. Further, the data indicate that household demand for bank loans is likely to vary according to the definition of financial literacy and a households' likelihood of financial inclusion. There is also statistical evidence to suggest that social and infrastructural dimensions likely matter as well. The next step is to determine if the empirical results, holding other factors constant, support the descriptive findings.

Methodology

Theoretical Framework

Standard economic theory posits that individuals maximize their expected utility and make savings and borrowing decisions based on their expected lifetime resources and preferences. The theory assumes individuals have unbounded rationality and are fully informed agents, able to predict future income and wealth and discount them appropriately. In reality, people do not have unbounded rationality; their capacity to process information is not unlimited. Instead, people adopt rules of thumb to create bounds in order to process available information given their existing capacity. As we know from behavioral economics, these rules of thumb can lead to systematic biases and "errors" in the decision-making process (e.g., Thaler & Sunstein, 2008). Further, other informational asymmetries can lead to additional mistakes, especially when the decisions are more complex. For populations that are economically vulnerable with more limited resources and less access to information, these mistakes are likely to be associated with greater costs and have more serious financial consequences. The field of financial literacy often argues that greater financial knowledge can reduce these costs and lead to greater financial capability–and thus, greater ability to process the information resulting in more informed and "optimal" choices.

Recent studies using more traditional economic modeling assume that financial information can be accumulated, but the decision of how much to invest in financial literacy is a choice that comes with costs and benefits (e.g., Jappelli & Padula, 2013; Lusardi & Mitchell, 2013; Lusardi, Michaud, & Mitchell, 2017). Specifically, these models make a key assumption that investing in financial literacy increases the net returns to savings, but requires money, time, and effort. The decision to invest in financial literacy can be expressed as $f(X)$, where $f(X)$ represents the value associated with the decision and X are the factors that affect the decision. Individuals will choose to accumulate financial literacy when $f(X) + \varepsilon > 0$ such that the benefits of accumulation are greater than the costs.

These studies test this assumption using household-level data and attempt to establish the optimal investment in financial literacy. The empirical findings typically support the hypothesis posited by the models, but the results are often based on the "average" individual. Few studies have considered the impacts of financial literacy across the distribution, paying particular attention to the lower tail. Yet, those individuals at the bottom of the economic distribution, especially those in developing countries such as China, often face greater barriers to entry in the financial markets. For these individuals, the costs to accumulating financial literacy are much higher than the benefits that could be obtained by the average individual. In these instances, persons in the lower tail, who still choose to accumulate financial knowledge, may not even be able to reap immediate benefits to the financial literacy until barriers to access are removed. In the case of this study, financial literacy may not lead to a greater likelihood of borrowing for economically vulnerable populations such as rural, illiterate and migrant households. However, we would expect it to lead to a higher probability of borrowing for less vulnerable populations (urban, literate, and non-migrant households). Because we are using cross-sectional data, we assume individuals are endowed with a certain level of financial literacy that they have already accumulated prior to the decision of whether to borrow. Thus, we are assuming our measures of financial literacy are exogenous, which is not unreasonable given that the measures of financial literacy were constructed based on responses related to "prior" financial knowledge and experiences.

Empirical Models

Probit models are estimated to empirically investigate the impacts of financial literacy on households' demand for both bank and non-bank loans. The relationship is assumed to be as follows:

$$L_{ijk}^* = \beta_0 + FinLiteracy_{ijk}\square\beta_1 + X_{ijk}\square\beta_2 + \varepsilon_{ijk}, \qquad (1)$$
$$where\ L_{jk}=1\ iff\ L_{jk}^* > 0\ and\ 0\ otherwise\ for\ i=\{1, …, I\},\ j=\{1, …, J\},\ and\ k=\{1, …, K\}.$$

In this model, L_{ijk} is the continuous, latent random variable that represents the actual amount of loans held by the ith household in the jth community for the kth bank or non-bank loan. L_{ijk}^* is unobservable. However, the discrete dependent variable, L_{ijk}, is observable such that it is equal to one if the ith respondent in the jth community has a kth bank or non-bank loan and zero otherwise. The error terms, ε_{ij}, are assumed to be distributed standard normally with mean zero and variance equal to one.

The factors that determine L_{ijk}^*, and thus L_{ijk}, are represented by the vector, $FinLiteracy_{ijk}$, that includes the variables that control for financial literacy along the three dimensions described in the data section. The vector, X_{ijk}, is also included in the model. This vector controls for the social and infrastructural dimensions of financial inclusion that could affect loan demand. Additional factors are included to control for the following individual and household-level characteristics: wealth, income, homeownership, risk tolerance, age, gender, marital status, health status and insurance coverage, family size, family structure (i.e., children and elders present in the home), employment status (i.e., number employed, self-employed, retired), and regional location.

Probit models are first estimated for all households controlling for the three vulnerable populations of interest: rural, illiterate, and migrant respondents. The models are then estimated separately for each of the target populations to determine how the impact of financial literacy on demand for bank and non-banks loans varies across the populations. Specifically, the models are estimated for: (1) rural and urban, (2) illiterate and literate, and (3) migrant and non-migrant households. As a robustness check, we test whether the financial literacy results are consistent depending on the type of loans held by the household. We estimate three models. The first model includes loans held by the household for purposes related to home, business, agriculture, and/or education. The second model includes home, business and agricultural loans. In China, the home represents the most important asset in the household's portfolio. Debt related to the home is also by far the most common type of debt held by Chinese households. For this reason, the final model includes home loans only to test whether home loans are driving the results.

<div align="center">

Results

</div>

Relationship between financial literacy and demand for bank loans

Table 3 presents the marginal effects and standard errors for the probit models that examine the impact of financial literacy on the *probability of having a bank loan*. The first column presents the results for all households controlling for the financially excluded target populations (rural, illiterate and migrant households). The remaining columns present the results for rural, illiterate and migrant households and their respective comparison groups.

With regards to the model for all households, the results show that taking a financial course and paying more attention to financial information significantly increased the probability of having a bank loan. Respondents who took a course were 3.0 percentage points more likely to have a bank loan compared to those who had not taken a course. Those who reported "paying extreme attention" or "paying a lot of attention" to financial information were 6.0 and 4.4 percentage more likely to have a bank loan compared to those who reported "paying no attention" to financial information. The knowledge-based measure of financial literacy was found to be insignificant. Recall, though, that this measure was based on questions that were testing numeracy and concepts related to interest, inflation, and investment risk and not cash flow or debt management, which could be more relevant when looking at borrowing behavior.

Table 3

Impact of financial literacy on *probability of having bank loans* for financially excluded households.

	Probit Models for Bank Loans						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	All	Rural	Urban	Illiterate	Literate	Migrant	Non-migrant
Financial literacy indicators							
Financial course	0.0302***	0.0506*	0.0228***	0.0507	0.0347***	-0.0091	0.0341***
	(0.0088)	(0.0297)	(0.0085)	(0.0377)	(0.0103)	(0.0322)	(0.0092)
Financial knowledge	0.0033	-0.0041	0.0049	0.0044	0.0024	0.0097	0.0026
	(0.0028)	(0.0052)	(0.0032)	(0.0047)	(0.0036)	(0.0113)	(0.0029)
Fin info: Pay extreme attention	0.0599***	0.0471**	0.0642***	0.0404*	0.0692***	0.0212	0.0602***
	(0.0140)	(0.0217)	(0.0172)	(0.0218)	(0.0183)	(0.0604)	(0.0142)
Fin info: Pay a lot of attention	0.0436***	0.0397**	0.0393***	0.0382**	0.0439***	0.0140	0.0438***
	(0.0114)	(0.0175)	(0.0141)	(0.0184)	(0.0143)	(0.0441)	(0.0116)
Fin info: Pay general attention	0.0162**	0.0211*	0.0130	0.0248**	0.0119	0.0083	0.0171***
	(0.0064)	(0.0109)	(0.0079)	(0.0099)	(0.0085)	(0.0283)	(0.0066)
Fin info: Pay a little attention	0.0027	-0.0150*	0.0104	-0.0043	0.0043	0.0176	0.0018
	(0.0063)	(0.0091)	(0.0082)	(0.0086)	(0.0085)	(0.0257)	(0.0064)
Other financial inclusion dimensions							
Family very important	0.0138***	0.0140*	0.0113**	0.0136**	0.0127**	0.0397**	0.0122***
	(0.0045)	(0.0073)	(0.0055)	(0.0060)	(0.0063)	(0.0160)	(0.0047)
Local family network >6	-0.0122***	0.0048	-0.0222***	-0.0014	-0.0196***	-0.0078	-0.0130***
	(0.0044)	(0.0075)	(0.0052)	(0.0064)	(0.0058)	(0.0211)	(0.0045)
Guanxi income (100,000 RMB)	0.0371***	0.0361	0.0342***	0.0501***	0.0331*	0.0739	0.0360***
	(0.0131)	(0.0557)	(0.0127)	(0.0176)	(0.0173)	(0.1013)	(0.0132)
Infrastructure index	0.0018***	0.0011*	0.0022***	0.0010**	0.0022***	0.0032***	0.0017***
	(0.0003)	(0.0006)	(0.0003)	(0.0005)	(0.0004)	(0.0011)	(0.0003)
Limited access to bank loans	-0.0559***	-0.0531***	-0.0547***	-0.0443***	-0.0606***	-0.0856***	-0.0543***
	(0.0044)	(0.0070)	(0.0054)	(0.0052)	(0.0066)	(0.0134)	(0.0046)
Access to mobile technology	0.0028	0.0222**	-0.0148	-0.0069	0.0160	0.0041	0.0021
	(0.0099)	(0.0110)	(0.0156)	(0.0131)	(0.0116)	(0.0345)	(0.0102)
Household income and wealth							
Wealth (100,000 RMB)	0.0003**	0.0019***	0.0002	0.0011***	0.0002	0.0014**	0.0003**
	(0.0001)	(0.0006)	(0.0001)	(0.0003)	(0.0001)	(0.0007)	(0.0001)
HH income (100,000 RMB)	0.0045***	0.0063	0.0037***	0.0019	0.0068***	0.0053	0.0044***
	(0.0012)	(0.0051)	(0.0013)	(0.0012)	(0.0018)	(0.0050)	(0.0012)
Homeowner	0.0895***	0.0600***	0.1047***	0.0463***	0.1136***	0.1199***	0.0871***
	(0.0043)	(0.0077)	(0.0050)	(0.0062)	(0.0057)	(0.0192)	(0.0044)
Risk: High risk, high return	0.0302***	0.0564***	0.0090	0.0359**	0.0273**	0.0444	0.0307***
	(0.0102)	(0.0178)	(0.0109)	(0.0157)	(0.0132)	(0.0412)	(0.0105)
Risk: Slightly above-average risk, slightly above-average return	0.0186*	0.0405*	0.0121	0.0098	0.0250*	-0.0089	0.0230**
	(0.0105)	(0.0239)	(0.0114)	(0.0194)	(0.0135)	(0.0334)	(0.0112)
Risk: Average risk, average return	0.0270***	0.0173	0.0294***	0.0191*	0.0331***	0.0399	0.0268***
	(0.0065)	(0.0107)	(0.0079)	(0.0103)	(0.0084)	(0.0257)	(0.0067)
Risk: Slightly below-average risk, slightly below-average return	0.0165**	0.0063	0.0209**	0.0018	0.0243**	0.0653	0.0140**
	(0.0071)	(0.0113)	(0.0088)	(0.0093)	(0.0096)	(0.0429)	(0.0069)
Individual demographics							
Age	-0.0023***	-0.0021***	-0.0023***	-0.0019***	-0.0025***	0.0003	-0.0025***
	(0.0002)	(0.0004)	(0.0003)	(0.0003)	(0.0003)	(0.0010)	(0.0002)
Female	-0.0056	-0.0089	-0.0037	-0.0022	-0.0076	0.0336*	-0.0080*
	(0.0045)	(0.0078)	(0.0053)	(0.0063)	(0.0061)	(0.0183)	(0.0046)
Married	0.0297***	0.0059	0.0373***	0.0055	0.0405***	0.0268	0.0281***
	(0.0061)	(0.0132)	(0.0065)	(0.0091)	(0.0083)	(0.0263)	(0.0063)
Poor health	0.0207***	0.0249***	0.0196**	0.0092	0.0328***	0.0622	0.0196***
	(0.0059)	(0.0082)	(0.0086)	(0.0061)	(0.0093)	(0.0502)	(0.0058)
Has private insurance	0.0201***	0.0009	0.0249***	0.0092	0.0233***	0.0434	0.0180***
	(0.0059)	(0.0110)	(0.0067)	(0.0105)	(0.0073)	(0.0274)	(0.0059)

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Table 3
Impact of financial literacy on *probability of having bank loans* for financially excluded households (continued).

VARIABLES	Probit Models for Bank Loans						
	(1) All	(2) Rural	(3) Urban	(4) Illiterate	(5) Literate	(6) Migrant	(7) Non-migrant
Family size	0.0010	0.0047	-0.0024	0.0024	-0.0006	0.0147*	0.0000
	(0.0021)	(0.0030)	(0.0028)	(0.0025)	(0.0031)	(0.0084)	(0.0022)
Has children	-0.0013	-0.0158*	0.0082	-0.0031	-0.0001	-0.0195	-0.0004
	(0.0054)	(0.0089)	(0.0066)	(0.0072)	(0.0075)	(0.0239)	(0.0055)
Has elders	-0.0267***	-0.0185**	-0.0363***	-0.0130*	-0.0362***	0.0054	-0.0267***
	(0.0054)	(0.0083)	(0.0065)	(0.0071)	(0.0075)	(0.0397)	(0.0055)
Number employed	0.0193***	0.0191***	0.0192***	0.0140***	0.0226***	-0.0010	0.0201***
	(0.0024)	(0.0031)	(0.0035)	(0.0031)	(0.0034)	(0.0092)	(0.0024)
Self-employed	0.0530***	0.0701***	0.0469***	0.0650***	0.0551***	0.0536**	0.0511***
	(0.0094)	(0.0226)	(0.0100)	(0.0207)	(0.0113)	(0.0235)	(0.0099)
Retired	-0.0249***	-0.0393*	-0.0178*	-0.0104	-0.0349***	.	-0.0214***
	(0.0079)	(0.0213)	(0.0093)	(0.0117)	(0.0108)	.	(0.0081)
Regions	-0.0249***	-0.0393*	-0.0178*	-0.0104	-0.0349***		
Region1: East	-0.0453***	-0.0914***	0.0053	-0.0615***	-0.0299***	-0.0068	-0.0448***
	(0.0070)	(0.0092)	(0.0098)	(0.0078)	(0.0101)	(0.0416)	(0.0071)
Region2: North	-0.0314***	-0.0731***	0.0188*	-0.0479***	-0.0146	0.0366	-0.0332***
	(0.0070)	(0.0082)	(0.0107)	(0.0065)	(0.0106)	(0.0543)	(0.0070)
Region3: Central	-0.0478***	-0.0941***	0.0070	-0.0619***	-0.0295***	0.0268	-0.0501***
	(0.0071)	(0.0079)	(0.0121)	(0.0062)	(0.0114)	(0.0505)	(0.0072)
Region4: South	-0.0422***	-0.0807***	0.0070	-0.0510***	-0.0291***	-0.0295	-0.0418***
	(0.0071)	(0.0075)	(0.0118)	(0.0062)	(0.0111)	(0.0394)	(0.0073)
Region5: Southwest	0.0121	-0.0359***	0.0691***	-0.0263***	0.0435***	0.0222	0.0134
	(0.0090)	(0.0109)	(0.0139)	(0.0087)	(0.0136)	(0.0483)	(0.0092)
Region6: Northwest	0.0042	-0.0092	0.0170	-0.0181*	0.0157	0.0141	0.0050
	(0.0094)	(0.0132)	(0.0123)	(0.0096)	(0.0136)	(0.0524)	(0.0096)
Financially excluded populations							
Rural	0.0156***	.	.	0.0180**	0.0138*	.	0.0153**
	(0.0059)	.	.	(0.0083)	(0.0080)	.	(0.0059)
Illiterate	-0.0169***	-0.0198**	-0.0144*	.	.	-0.0112	-0.0171***
	(0.0058)	(0.0085)	(0.0081)	.	.	(0.0237)	(0.0060)
Migrant	-0.0317***	.	-0.0371***	-0.0110	-0.0426***	.	.
	(0.0082)	.	(0.0077)	(0.0139)	(0.0105)	.	.
Observations	24,047	7,501	16,546	7,481	16,566	1,333	22,705
Pseudo R2	0.132	0.124	0.161	0.143	0.125	0.156	0.135

Note: All probits have been weighted. Marginal effects are reported for each model. Robust standard errors in parentheses. Omitted categories include: Fin info: Pay no attention; Risk: Unwilling to take any risk; Region7: Northeast. All dollar values are in 100,000 RMB. *** $p<0.01$,
** $p<0.05$, * $p<0.1$

Table 3 also shows that social and infrastructural factors significantly affected households' demand for bank loans. Respondents who reported that family was "very important" were more likely to have a bank loan, as were those who reported higher levels of guanxi income. Those who reported a local family network of more than six were less likely to have a bank loan. With regards to infrastructure, respondents living in communities/villages with better physical infrastructure were significantly more likely to have a bank loan. Not surprisingly, those who reported more limited access to bank loans were less likely to have a loan. In terms of technology, having access to a mobile phone did not significantly affect loan demand.

Other socioeconomic factors that significantly increased a respondent's probability of having a bank loan included the following: higher levels of income and wealth, owing a home, being more risk tolerant, being married, having poor health, having any type of private insurance, and being self-

employed. Those who were older, had elders present in the home, and were retired were less likely. The effect of gender was found to be negative but insignificant.

The control variables for all three target populations were statistically significant. Illiterate and migrant respondents were 1.7 and 3.2 percentage points less likely to have a bank loan, while rural respondents were 1.6 percentage points more likely. The results were particularly interesting when the models were estimated separately for rural, illiterate, and migrant households and then compared to urban, literate and non-migrant households. In particular, those groups traditionally excluded (rural, illiterate, and migrant households) were significantly less likely to be impacted by financial literacy when it comes to demand for formal bank loans. The findings for urban, literate, and non-migrant households were highly significant and similar to those found for all households. Thus, the financial literacy results for all households appear to be driven by those populations more likely to be financially included rather than excluded.

The social and infrastructural factors also tended to be less significant for the financially excluded groups. However, for all groups, the importance of family and the overall infrastructure of the community/village increased the household's likelihood of having a loan while having more limited access to bank loans decreased the probability. Given recent efforts in China to reach rural populations using mobile banking, it is interesting to note that having a mobile phone increased the probability of having a bank loan for rural households by 2.2 percentage points compared to those living in urban areas.

Relationship between financial literacy and demand for non-bank loans
Table 4 presents the marginal effects and standard errors for the probit models that examine the impact of financial literacy on the *probability of having a non-bank loan*. With regards to all households, the results suggest that financial literacy may lead to a decrease in non-bank loans. Specifically, those who had taken a financial course were 3.3 percentage points less likely to have a non-bank loan. Similarly, those with higher levels of financial knowledge were also less likely by 1.6 percentage points. The effects were found to be significant for those groups more likely to be financially included urban, literate, and non-migrant populations). The effects were largest and most significant for non-migrant households – 3.5 and 1.7 percentage points, respectively. Regardless of how financial literacy was defined, it had little, if any, impact on the probability of non-bank loans for those groups more likely to be financially excluded (rural, illiterate, and migrant populations).

In terms of the social and infrastructural factors, Table 4 shows that familial and social networks are likely to have little impact on the probability of having a non-bank loan, regardless of household type and likelihood of financial inclusion. Those living in communities/villages with better infrastructure were significantly less likely to have a non-bank loan. These results, though, were driven by the urban, literate, and non-migrant populations. For rural, illiterate, and migrant households, infrastructure did not seem to significantly matter nor did many of the other key factors. However, having limited access to formal bank loans increased the likelihood by 35.4 percentage points for all households. The marginal effect was particularly large for migrant populations – 57.6 percentage points. Homeownership also had a large and significant effect on household demand for non-bank loans. Homeowners were 20.0 percentage points more likely than non-homeowners to have a non-bank loan. In this case, the marginal effect was largest for rural households (22.7 percentage points).

Robustness checks
The results presented in Tables 3 and 4 assume a fairly inclusive definition for loan demand, such that bank and non-bank loans can be for purposes related to home, business, agriculture, and/or education. The financial literacy results, however, might vary depending on the type of loans held by the household. As a robustness check, we estimated three models using three different definitions for loan demand and compared the results. The first model included loans held by the household for purposes related to home, business, agriculture, and/or education. The second model excluded education loans and included home, business and/or agricultural loans. The final model included home loans only since it was previously mentioned that home loans could be driving the results.

Table 4
Impact of financial literacy on *probability of having non-bank loans* for financially excluded households.

	Probit Models for Non-Bank Loans						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	All	Rural	Urban	Illiterate	Literate	Migrant	Non-migrant
Financial literacy indicators							
Financial course	-0.0330***	0.0072	-0.0232*	0.0283	-0.0241*	-0.0006	-0.0348***
	(0.0128)	(0.0481)	(0.0119)	(0.0798)	(0.0128)	(0.0548)	(0.0131)
Financial knowledge	-0.0163***	-0.0097	-0.0161***	-0.0181*	-0.0127**	-0.0001	-0.0174***
	(0.0051)	(0.0095)	(0.0055)	(0.0100)	(0.0057)	(0.0175)	(0.0053)
Fin info: Pay extreme attention	0.0149	0.0321	-0.0017	0.0586	-0.0036	0.0072	0.0132
	(0.0186)	(0.0351)	(0.0196)	(0.0417)	(0.0203)	(0.0840)	(0.0190)
Fin info: Pay a lot of attention	0.0051	-0.0093	0.0112	-0.0254	0.0105	0.0200	0.0031
	(0.0150)	(0.0273)	(0.0167)	(0.0308)	(0.0169)	(0.0873)	(0.0148)
Fin info: Pay general attention	0.0224**	0.0342*	0.0178	0.0289	0.0199*	-0.0106	0.0231**
	(0.0100)	(0.0186)	(0.0111)	(0.0193)	(0.0118)	(0.0413)	(0.0102)
Fin info: Pay a little attention	0.0010	-0.0108	0.0078	0.0082	-0.0021	-0.0757**	0.0069
	(0.0094)	(0.0164)	(0.0107)	(0.0172)	(0.0112)	(0.0355)	(0.0097)
Other financial inclusion dimensions							
Family very important	0.0081	-0.0012	0.0135	0.0132	0.0062	0.0381	0.0070
	(0.0074)	(0.0133)	(0.0082)	(0.0129)	(0.0090)	(0.0321)	(0.0075)
Local family network >6	-0.0031	-0.0031	-0.0043	0.0003	-0.0046	0.0720*	-0.0062
	(0.0072)	(0.0134)	(0.0077)	(0.0134)	(0.0084)	(0.0403)	(0.0072)
Guanxi income (100,000 RMB)	0.0175	-0.0015	0.0212	0.1072**	-0.0101	-0.1133	0.0215
	(0.0293)	(0.1159)	(0.0246)	(0.0521)	(0.0317)	(0.1546)	(0.0290)
Infrastructure index	-0.0014***	-0.0002	-0.0016***	-0.0013	-0.0011*	0.0032	-0.0016***
	(0.0005)	(0.0010)	(0.0005)	(0.0009)	(0.0006)	(0.0020)	(0.0005)
Limited access to bank loans	0.3542***	0.3072***	0.4077***	0.3314***	0.3675***	0.5755***	0.3454***
	(0.0111)	(0.0156)	(0.0153)	(0.0170)	(0.0149)	(0.0434)	(0.0115)
Access to mobile technology	0.0283**	0.0323	0.0229	0.0310	0.0155	0.0192	0.0271**
	(0.0127)	(0.0202)	(0.0152)	(0.0194)	(0.0167)	(0.0525)	(0.0130)
Household income and wealth							
Wealth (100,000 RMB)	-0.0014**	-0.0029**	-0.0010**	-0.0029***	-0.0012**	-0.0019	-0.0014**
	(0.0006)	(0.0013)	(0.0005)	(0.0010)	(0.0005)	(0.0012)	(0.0006)
HH income (100,000 RMB)	-0.0036	-0.0109	-0.0017	-0.0039	-0.0027	0.0000	-0.0039
	(0.0025)	(0.0102)	(0.0022)	(0.0068)	(0.0026)	(0.0039)	(0.0032)
Homeowner	0.1997***	0.2267***	0.1718***	0.2221***	0.1882***	0.1960***	0.1996***
	(0.0071)	(0.0135)	(0.0077)	(0.0127)	(0.0083)	(0.0299)	(0.0072)
Risk: High risk, high return	0.0127	0.0789***	-0.0346**	0.0099	0.0141	0.0315	0.0099
	(0.0156)	(0.0273)	(0.0168)	(0.0281)	(0.0186)	(0.0721)	(0.0154)
Risk: Slightly above-average risk, slightly above-average return	0.0117	0.0556	-0.0069	0.1106**	0.0001	0.0332	0.0097
	(0.0186)	(0.0436)	(0.0181)	(0.0558)	(0.0185)	(0.0724)	(0.0188)
Risk: Average risk, average return	-0.0125	0.0072	-0.0267***	0.0059	-0.0146	-0.0848**	-0.0059
	(0.0096)	(0.0184)	(0.0100)	(0.0197)	(0.0111)	(0.0342)	(0.0100)
Risk: Slightly below-average risk, slightly below-average return	-0.0057	0.0452**	-0.0347***	0.0207	-0.0158	-0.0890**	0.0008
	(0.0101)	(0.0195)	(0.0103)	(0.0198)	(0.0116)	(0.0370)	(0.0105)
Individual demographics							
Age	-0.0028***	-0.0049***	-0.0017***	-0.0059***	-0.0017***	0.0022	-0.0031***
	(0.0004)	(0.0006)	(0.0004)	(0.0006)	(0.0005)	(0.0018)	(0.0004)
Female	0.0122*	0.0172	0.0092	0.0295**	0.0044	0.0223	0.0116
	(0.0074)	(0.0143)	(0.0078)	(0.0132)	(0.0088)	(0.0308)	(0.0076)
Married	0.0475***	0.0183	0.0485***	0.0100	0.0527***	0.0486	0.0435***
	(0.0098)	(0.0214)	(0.0101)	(0.0183)	(0.0120)	(0.0398)	(0.0102)
Poor health	0.0646***	0.0944***	0.0424***	0.0700***	0.0656***	0.0722	0.0657***
	(0.0088)	(0.0139)	(0.0107)	(0.0134)	(0.0115)	(0.0595)	(0.0088)
Has private insurance	-0.0195**	-0.0243	-0.0138	-0.0052	-0.0193**	-0.0567*	-0.0177*
	(0.0089)	(0.0197)	(0.0089)	(0.0216)	(0.0096)	(0.0312)	(0.0092)

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Table 4
Impact of financial literacy on *probability of having non-bank loans* for financially
excluded households (continued).

VARIABLES	Probit Models for Non-Bank Loans						
	(1) All	(2) Rural	(3) Urban	(4) Illiterate	(5) Literate	(6) Migrant	(7) Non-migrant
Family size	0.0164***	0.0187***	0.0104***	0.0086	0.0188***	0.0163	0.0158***
	(0.0033)	(0.0054)	(0.0039)	(0.0055)	(0.0041)	(0.0131)	(0.0034)
Has children	-0.0116	-0.0131	-0.0109	0.0039	-0.0197*	-0.0453	-0.0098
	(0.0087)	(0.0163)	(0.0093)	(0.0164)	(0.0102)	(0.0366)	(0.0089)
Has elders	-0.0373***	-0.0231	-0.0463***	0.0012	-0.0532***	-0.0696	-0.0349***
	(0.0088)	(0.0153)	(0.0098)	(0.0157)	(0.0104)	(0.0519)	(0.0089)
Number employed	0.0187***	0.0203***	0.0204***	0.0235***	0.0165***	0.0151	0.0191***
	(0.0036)	(0.0055)	(0.0047)	(0.0059)	(0.0045)	(0.0176)	(0.0037)
Self-employed	0.0560***	0.0645*	0.0414***	0.0765**	0.0502***	0.0741**	0.0516***
	(0.0135)	(0.0353)	(0.0131)	(0.0320)	(0.0146)	(0.0370)	(0.0143)
Retired	-0.0598***	-0.0796*	-0.0536***	-0.0685***	-0.0652***	-0.2180***	-0.0542***
	(0.0112)	(0.0446)	(0.0110)	(0.0221)	(0.0130)	(0.0326)	(0.0114)
Regions							
Region1: East	-0.0463***	-0.0716***	-0.0242*	-0.0668***	-0.0355**	-0.0726	-0.0454***
	(0.0126)	(0.0234)	(0.0135)	(0.0244)	(0.0143)	(0.0635)	(0.0128)
Region2: North	-0.0214	-0.0522**	-0.0010	-0.0695***	-0.0008	-0.0302	-0.0215
	(0.0131)	(0.0252)	(0.0141)	(0.0251)	(0.0150)	(0.0643)	(0.0134)
Region3: Central	-0.0039	-0.0574**	0.0318*	-0.0411	0.0152	-0.0148	-0.0044
	(0.0142)	(0.0255)	(0.0164)	(0.0268)	(0.0167)	(0.0671)	(0.0146)
Region4: South	-0.0033	-0.0547**	0.0319*	-0.0385	0.0112	-0.1224**	0.0021
	(0.0150)	(0.0265)	(0.0176)	(0.0285)	(0.0175)	(0.0520)	(0.0155)
Region5: Southwest	-0.0425***	-0.0813***	-0.0213	-0.0896***	-0.0176	-0.1199**	-0.0391***
	(0.0128)	(0.0235)	(0.0142)	(0.0235)	(0.0154)	(0.0530)	(0.0131)
Region6: Northwest	0.0129	-0.0455*	0.0504***	-0.0515*	0.0479**	0.0167	0.0126
	(0.0153)	(0.0273)	(0.0172)	(0.0271)	(0.0187)	(0.0773)	(0.0156)
Financially excluded populations							
Rural	0.0716***	.	.	0.0108	0.0992***	.	0.0745***
	(0.0095)	.	.	(0.0159)	(0.0122)	.	(0.0095)
Illiterate	0.0134	-0.0241*	0.0462***	.	.	0.0628	0.0105
	(0.0092)	(0.0144)	(0.0121)	.	.	(0.0510)	(0.0092)
Migrant	-0.0022	.	0.0023	-0.0033	-0.0025	.	.
	(0.0179)	.	(0.0160)	(0.0386)	(0.0194)	.	.
Observations	24,047	7,501	16,546	7,481	16,566	1,342	22,705
Pseudo R2	0.171	0.141	0.177	0.175	0.174	0.237	0.171

Note: All probits have been weighted. Marginal effects are reported for each model. Robust standard errors in parentheses.
Omitted categories include: Fin info: Pay no attention; Risk: Unwilling to take any risk; Region7: Northeast. All dollar values
are in 100,000 RMB. *** p<0.01,
** p<0.05, * p<0.1

Table 5 presents the findings for the key financial literacy, social, and infrastructure dimensions of financial inclusion. The results for the other individual and household-level variables were controlled for in the models and are available upon request. Several findings are worth noting. First, the results for the key financial literacy variables tended to be consistent regardless of the definition of loan demand. Taking a financial course and paying more attention to financial information increased the probability of have a bank loan, whereas taking a course and having lower levels of financial knowledge tended to decrease the probability of having a non-bank loan. The effects were larger and more significant for the broader measures of loan demand. Interestingly, for bank loans, the knowledge-based measure of financial literacy was significant in Models 2 and 3 which placed more weight on home loans, but insignificant in Model 1 which included all types of loans. The largest effect was found for Model 3, which showed that being more financially knowledgeable increased the probability of having a home loan in the formal financial markets. Being more financially knowledgeable significantly decreased the probability of a non-

bank loan for all three models. However, in this case, the largest effect was found for the most comprehensive measure of loan demand, and the smallest effect was found for the measure that included home loans only. Paying more attention to financial information significantly increased the probability of having a bank loan but had little impact on demand for non-bank loans.

Table 5

Robustness checks for the impact of financial literacy on demand for *bank and non-bank loans* according to types of loans held by the household

VARIABLES	Bank Loans			Non-bank Loans		
	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)
Financial literacy indicators						
Financial course	0.0302***	0.0274***	0.0294***	-0.0330***	-0.0237**	0.0043
	(0.0088)	(0.0080)	(0.0069)	(0.0128)	(0.0120)	(0.0116)
Financial knowledge	0.0033	0.0043*	0.0064***	-0.0163***	-0.0100**	-0.0073*
	(0.0028)	(0.0025)	(0.0021)	(0.0051)	(0.0048)	(0.0039)
Fin info: Pay extreme attention	0.0599***	0.0618***	0.0285***	0.0149	0.0061	-0.0026
	(0.0140)	(0.0135)	(0.0100)	(0.0186)	(0.0173)	(0.0151)
Fin info: Pay a lot of attention	0.0436***	0.0381***	0.0146*	0.0051	-0.0002	-0.0159
	(0.0114)	(0.0106)	(0.0076)	(0.0150)	(0.0142)	(0.0115)
Fin info: Pay general attention	0.0162**	0.0161***	0.0045	0.0224**	0.0189**	0.0029
	(0.0064)	(0.0058)	(0.0047)	(0.0100)	(0.0094)	(0.0081)
Fin info: Pay a little attention	0.0027	0.0019	-0.0023	0.0010	-0.0003	-0.0045
	(0.0063)	(0.0054)	(0.0044)	(0.0094)	(0.0086)	(0.0073)
Other financial inclusion dimensions						
Family very important	0.0138***	0.0120***	0.0004	0.0081	0.0006	-0.0100*
	(0.0045)	(0.0040)	(0.0034)	(0.0074)	(0.0070)	(0.0060)
Local family network >6	-0.0122***	-0.0093**	-0.0110***	-0.0031	-0.0061	-0.0019
	(0.0044)	(0.0039)	(0.0032)	(0.0072)	(0.0067)	(0.0058)
Guanxi income (100,000 RMB)	0.0371***	0.0314***	0.0299***	0.0175	0.0209	0.0335
	(0.0131)	(0.0116)	(0.0091)	(0.0293)	(0.0269)	(0.0230)
Infrastructure index	0.0018***	0.0017***	0.0019***	-0.0014***	-0.0010**	-0.0001
	(0.0003)	(0.0003)	(0.0002)	(0.0005)	(0.0005)	(0.0004)
Limited access to bank loans	-0.0559***	-0.0565***	-0.0350***	0.3542***	0.3512***	0.2970***
	(0.0044)	(0.0037)	(0.0035)	(0.0111)	(0.0111)	(0.0105)
Access to mobile technology	0.0028	0.0065	-0.0001	0.0283**	0.0265**	0.0360***
	(0.0099)	(0.0076)	(0.0072)	(0.0127)	(0.0112)	(0.0097)
Financially excluded populations						
Rural	0.0156***	0.0114**	-0.0286***	0.0716***	0.0669***	0.0075
	(0.0059)	(0.0049)	(0.0037)	(0.0095)	(0.0086)	(0.0072)
Illiterate	-0.0169***	-0.0130**	-0.0183***	0.0134	0.0156*	0.0047
	(0.0058)	(0.0051)	(0.0041)	(0.0092)	(0.0085)	(0.0073)
Migrant	-0.0317***	-0.0243***	-0.0151**	-0.0022	0.0101	0.0072
	(0.0082)	(0.0074)	(0.0060)	(0.0179)	(0.0179)	(0.0143)
Other control variables included	YES	YES	YES	YES	YES	YES
Observations	24,047	24,047	24,047	24,047	24,047	24,047
Pseudo R2	0.154	0.132	0.123	0.171	0.191	0.098

Note: All probits have been weighted. Marginal effects are reported for each model. Robust standard errors are in parentheses. Model 1 includes home, business, agriculture, and educational loans; Model 2 includes home, business, and agricultural loans; and Model 3 includes home loans only. The individual and household-level control variables were included in each regression. The omitted categories were consistent with the previous estimations All dollar values are in 100,000 RMB. *** p<0.01, ** p<0.05, *p<0.1

With regards to other dimensions of financial inclusion, we found that the social and infrastructural effects also tended to be consistent across the different measures of loan demand. The effects were again stronger for bank loans than non-bank loans. Better infrastructure still significantly increased demand for bank loans and decreased demand for non-bank loans. Two findings, though, were

particularly interestingly. First, having access to mobile technology significantly increased the probability of a non-bank loan regardless of how non-bank loans were defined; the effect was particularly strong for Model 3 which only included home loans. Second, for bank loans, those living in rural areas were significantly more likely to have a loan according to Models 1 and 2. However, when only home loans were taken into account, the effect was negative, suggesting that rural respondents may be facing more borrowing constraints when it comes to home loans in the formal financial markets.

As an additional robustness check, tobit models were estimated to investigate how financial literacy influences the amount of bank and non-bank loans held by the household. However, limited analysis could only be conducted due to missing values, non-response rates, and small sample sizes. For this reason, the results are not presented in the paper, but are available upon request. In general, the financial literacy variables tended to be insignificant in the tobit models. Overall, these findings suggested that financial literacy mattered more in terms of the decision to take out a loan than the decision of how much to borrow.

Discussion and conclusions

This study used data from the *2013 China Household Finance Survey (CHFS)* to investigate the impacts of financial literacy on demand for both formal and informal loans for households traditionally excluded from the financial markets. Overall, the findings suggest that on average a positive relationship is likely to exist between financial literacy and household demand for bank loans, while a negative relationship is likely to exist for non-bank loans. Further, there is evidence that the impacts of financial literacy and how it is defined can have different effects depending on how financial inclusion is also defined. For example, in this paper, we considered various definitions of loan demand. While the direction of the effect of financial literacy tended to be the same regardless of the definition, the magnitude and significance varied. This finding is a reminder to researchers that how financial education is "defined" does matter such that the context in which we incorporate financial education into existing financial inclusion efforts can affect the outcomes that are achieved. Researchers are encouraged to consider more carefully how they are defining financial literacy and inclusion and develop a better understanding of the relationship between the two dimensions.

At the onset of this paper, it was noted that financial literacy is a key tool being used to bring economically vulnerable populations into the financial mainstream so as to foster greater financial inclusion. However, this study found that those groups most vulnerable (rural, illiterate, and migrant households) were less likely to be positively impacted by financial literacy, especially when it came to access to formal bank loans. Does this mean financial literacy doesn't work? Maybe, but maybe not. Recall that a positive and significant relationship was found for less vulnerable populations (urban, literate, and non-migrant households). Thus, these findings may suggest that barriers to access may first need to be overcome before financial literacy can be effective. Moreover, while financial literacy was found to be an important dimension of financial inclusion, other dimensions such as those related to social networks and infrastructure mattered as well. These other factors tended to have a more significant effect on demand for bank loans, especially for the less vulnerable groups. These findings, in particular, have important implications for government leaders and international organizations that are using financial literacy as a tool to improve financial inclusion for populations traditionally excluded from the financial markets.

Many countries now have financial literacy programs and initiatives built into their national agendas. In fact, considerable time and resources are being devoted to increase the financial capability of vulnerable populations in developing countries such as China. Based on this reasearch, countries may want to re-examine their existing strategies and how finanical literacy can be used more effectively. In particiluar, they might first want to address the barriers certain populations are facing in terms of access to basic financial services and products. They then could consider more strategically the role of finanical literacy within this context.

The concept of financial literacy—the notion of understanding how to manage and invest money—has traditionally been the foundation of building financial stability as the household level. This helps explain the significant investment in resources designed to increase knowledge through the development

and dissemination of information through courses, curriculums, and seminars. It was once thought that what most people lacked was a core understanding of the tools and techniques necessary to manage household resources effectively and efficiently. A working hypothesis was that once knowledge was obtained, assuming the person in the class was engaged in the coursework, a significant change in behavior would be noted.

Many financial literacy programs and initiatives worldwide have been designed assuming this fundamental hypothesis. However, researchers have had a difficult time "proving" that financial literacy works; the results have not lived up to expectations. The findings from this study provide valuable insight into the possible reason coursework and other knowledge accumulation strategies sometimes fail to meet expectations in changing behaviors and/or improving household outcomes (e.g., Lyons, Chang, & Scherpf, 2006; Lyons & Scherpf, 2004). Specifically, this study shows that financial literacy is simply one element that shapes consumer behavior. Among the numerous factors evaluated in this study, financial literacy was really only meaningful for less vulnerable populations in the context of traditional lending. In this sense, coursework, teaching curriculums, and seminars seem to be somewhat effective in helping those who already have access to the mainstream financial markets to understand the characteristics associated with bank loans.

However, traditional financial literacy efforts were found to be less effective for the most vulnerable populations and for those who were engaged in making non-traditional (i.e., non-bank) borrowing decisions. It is these individuals, and the households in which these people live, that may need the greatest help when avoiding frauds, rip-offs, and unethical lending practices. Stated another way, consumers living in large urban areas in China, for example, have alternatives when borrowing money. With the appropriate information in hand, urban consumers may be well equipped to make better borrowing decisions. However, the lending options for consumers living in rural areas may be limited. Given that most financial literacy programs focus on topics such as interest rates, inflation, and the risks and returns associated with investing, it is not surprising that the effectiveness of financial literacy programs among rural, illiterate, and migrant consumers is less effective.

As noted, the concept of financial inclusion does appear to include (1) an educational dimension, (2) a social element, and (3) infrastructure and technology factors. Future research may want to consider moving beyond traditional measures of access, usage, and quality to construct a broader measure of financial inclusion that takes into consideration the above mentioned dimensions as well as others. All of these factors are needed to ensure that consumers are prepared to interact in the complex financial marketplace. Of particular importance, as shown in this study, is the role of familial networks (Amuedo-Dorantes & Mundra, 2007). The financial help seeking and information search literature shows that other family members are the primary sources of help when people make financial decisions (e.g., Grable & Joo, 2001; Grable & Joo, 2002). The problem is that unless other family members within the network possess the knowledge and skills necessary for the decisions being faced, the help seeker may not obtain appropriate information. This creates a circular pattern where inappropriate financial behavior becomes the norm. Financial literacy efforts typically fail because the topics being taught rarely address the issues faced by rural consumers. Additionally, the information being taught may conflict with familial networks norms.

Finally, the findings from this study hint at several policy takeaways. First, financial literacy programs should be designed for different audiences. Urban consumers may require different information that those living in rural areas. Second—and this is particularly important when an audience is made of rural participants—the information provided should correspond with the norms and cultural expectations held within the area. When information is contradictory, alternatives should be given. For example, rather than show how alternative lenders are typically more expensive and predatory, which is true, it seems important for educators to offer alternatives when, say, bank lending is not accessible. Third, findings from this study clearly show that the infrastructure in which consumers are making decisions matters. Those without a foundation of technology, access to services, and inadequate buildings, roads, and sanitation may be preoccupied with meeting daily needs at the expense of making informed consumer decisions. In summary, as shown in Figure 1, it does appear that efforts designed to standardize financial inclusion should move beyond the current definition of access, usage, quality to create a broader measure that

includes an educational dimension, a social element, and infrastructure and technology factors. Future research will examine other dimensions as well which were not investigated in this paper.

Notes

[1] The CHFS was modeled after the US Survey of Consumer Finances (SCF) sponsored by the US Board of Governors of the Federal Reserve System, as well as other similar US household surveys, such as the Health and Retirement Survey (Bricker, Bucks, Kennickell, Mach, & Moore, 2011; Bricker, Kennickell, Moore, & Sabelhaus, 2012).

[2] The Survey and Research Center for China Household Finance regularly updates the CHFS data. The following four CHFS data files were used to construct the dataset: (1) chfs2013_hh_20161215.dta (household-level data); (2) chfs2013_ind_20161215.dta (individual-level data); (3) chfs2013_community_20161215.dta (community-level data); and (4) chfs2013_master_20161215.dta (master-level data). Missing values for financial information were imputed by the Center using available raw data. A review of the imputation methods indicated that some financial information may have been underreported. Even so, the values appeared to provide reasonable estimates of the financial earnings and wealth holdings of Chinese households. We used the imputed values related to household net worth and income.

[3] However, if the respondent had an urban hukou but was residing in a rural area, they were classified as a non-migrant.

[4] Actually, we will test the robustness of our results using three different definitions of financial inclusion. For more details, see the methodology section of the paper.

[5] Note that because we included "guanxi income" in the models, this income was subtracted from total household income, which is also included in the models.

[6] Factor analysis using the principal component method was used to test the five dimensions of the infrastructure index. The factor loadings were quite strong, indicating that the five items were measuring a single underlying latent variable, which we termed infrastructure. The results from the Cronbach's alpha test for reliability were particularly strong (α = 0.87).

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