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Formal and Informal Finance: Underlying Channels and Welfare Effects

Abstract: By taking advantage of China's dramatic institutional shifts over time and large variations across communities concerning democracy and social interaction, I analyze the disparity in availability of formal and informal finance by their different mechanisms, including local governance and family network. I find that households' financial access to both formal and informal finance has a significant impact on family welfare improvement. However, in regions with higher access to formal finance, the influence of informal finance declines. The influence of formal finance is limited to urban non-agricultural households, and informal finance is particularly important for rural areas and agricultural hukou households. This implies that a substitute and complementary relationship between formal and informal finance exists. The results shed light on China's financial reform.

Keywords: Household Welfare Effects; Formal and Informal Financing; Local Governance; Family Network

JEL: D14, G20, O17, R22

1. Introduction

This paper compares the welfare effects of households' ability to access formal and informal finance in China, a developing country. A comparison of whether access to formal and informal finance enhances the welfare of households is especially important to the debate on the role of formal and informal finance in improving welfare and reducing poverty. Unfortunately, most previous papers focus only on either formal or informal finance on the macro level or on the economics of the firms. The few existing studies barely investigate the relative effectiveness of formal and informal finance for households concurrently. For example, Honohan (2004), Beck, Demirguc-Kunt, and Levine (2007), Comola and Prina (2013), Gloede and Rungruxsirivorn (2013), and Bruhn and Love (2014) study access to formal finance, while Morse (2011) examines the effects of payday lenders, a primary channel of informal finance. This paper seeks to fill this gap by adding new evidence on the impact of access to formal/informal finance on household welfare. My research provides insight on whether regulators should allow informal finance to play a larger role in developing regions.

The paper takes a further step, by identifying important alternative channels through which formal or informal finance may help to improve welfare or alleviate financial constraints from the perspective of households. Such quantitative estimates offer concrete suggestions on how policymakers can spur access to both formal and informal finance.[1] Few studies quantitatively examine the mechanisms that underlie access to formal and informal finance due to data/sample constraints. By taking advantage of China's unique political history, economic reforms, and societal evolution, I identify effective local-level mechanisms ("local governance" and "family network") for accessing formal and informal finance. The paper demonstrates that local governance is an important channel for formal finance, while family network is an important channel for informal finance.

Formal finance, such as commercial banks and credit unions, has been documented as playing a key role in enhancing economic growth. Accordingly, regulators from many developing countries

[1] The effective channels that alleviate imperfect information and imperfect enforcement differ from economic development and law systems. Underlying mechanisms provide a better framework to analyze the effects of formal and informal finance for households (Hoff and Stiglitz, 1990).

promote formal finance and discourage informal finance. It has been widely documented by macro data that access to finance focuses on saving accounts. Access to finance can alleviate poverty at the country level (Honohan, 2004; Beck, Demirguc-Kunt and Levine, 2007). However, studies of the welfare impacts of financial institutions on the micro level are limited. Gloede and Rungruxsirivorn (2013) study the relationship between financial development and economic welfare using a micro-household survey for Thailand. They show that the development of micro-financial institutions in local communities is correlated with higher investment and better possibilities of smoothing consumption. Comola and Prina (2013) expand on formal financial access by adopting an exogenous intervention to evaluate access to savings accounts in Nepal. Bruhn and Love (2014) investigate the impact of access to finance on poverty by exploiting the opening of Banco Azteca (a bank branch) that serves low-income clients in Mexico. They find positive effects between access to finance and entrepreneurial activity, employment, and income, in particular for low-income individuals and those located in areas with lower preexisting bank penetration.

Despite the growing demand for informal access to finance, many governments, including those of the U.S. and emerging countries, are working toward regulating or prohibiting informal finance, including loans from family, friends, or private lending.[2] Morse (2011) indicates that in the U.S., 15% of households borrow from payday lenders each year, even though the annual rates of fees charged in payday lending could be upwards of 400%. By using natural disasters as an exogenous shock, he shows that payday lenders, a primary source of distress financing, have a mitigating effect on individual financial distress. Informal finance is very popular in many countries, especially in emerging markets, yet its effect on the welfare of poor families is constantly debated. Informal finance could be welfare destroying not only because the fees charged could be extremely high, but also because households may overconsume. Though the previous papers tried to alleviate the concern of an identification issue, the welfare implication is challenging due to the lack of both formal and informal access and time series data on income/wealth at the household-level.

[2] They mainly rely on information advantages or an altruistic relationship, similar to constructive informal financing in Allen, Qian and Xie (2013).

I fill this gap by examining the household welfare effects of informal/formal finance using comprehensive individual survey data engendered by a massive transformation in a developing country, which allows for differences in cultural features and local governances. Economic growth, law systems, and enforcement implementation are the determinants in which formal or informal finance can support economic development (Allen, Qian, and Zhang, 2011). Through the unique Chinese features—a variety of local governance structures and an "acquaintances society" across communities—I propose that local-level governance mechanisms, proxied by local electoral participation, is an effective mechanism for household welfare improvement for formal finance, while the acquaintances society, proxied by ancestral temple, is an effective channel for informal finance.

Variation in legal rules and regulations and social network influence formal and informal finance in information processing capability and contract enforcement respectively, which are critical in determining the relative efficiency of formal and informal finance. Law provides an effective protection for corporate shareholders and creditors and enhances the quality of their contract enforcement (La Porta, López-De-Silanes, Shleifer, and Vishny, 1998). Formal finance has an effective system of monitoring borrowers, and loan contacts can be structured in a way that is allied with the incentive of the lenders to be engaged (Rajan, 1992).

An efficient and effective legal system provides superior investor protection and improves the ability of financial institutions to enforce contracts (La Porta, López-De-Silanes, Shleifer, and Vishny, 1998, 2000, 2002). It also provides better disclosure of accounting systems (La Porta, López-De-Silanes, and Shleifer, 2006).Therefore, an effective and efficient legal system is the foundation of formal finance. The paper hypothesizes that better local governance provides a good democratic environment for the enforcement/engagement of formal finance and may enhance the effectiveness of formal finance on households' welfare, while the impact on informal finance is the opposite.

China's local community committee election provides a natural experiment to investigate the effectiveness of law enforcement/engagement on formal and informal finance. In China, local

governments are actively involved in the management of local enterprises and can directly influence the effectiveness of public goods provision. China is transitioning from a socialist system to a market-based system, and there has been a massive transformation of village governance from officials appointed by the higher levels of government to a village election system (Martínez-Bravo et. al., 2013). Tomm (2010) argues that elections in China hold the promise of genuine democracy in local governance. In the context of extensive decentralization during the past decades, Zhang, Fan, Zhang, and Huang (2004) link elections with economic performance by arguing that the elected village leaders have been more responsive to the needs of villagers. Utilizing such dramatic institutional shifts over time and large variations across villages, this paper quantitatively assesses the particular impact of elections, proxied by the latest local community committee election, on formal/informal finance. I argue that households living in communities with higher election pressures have a higher propensity to borrow through formal finance, indicating strong local governance enhances the use of formal financing.

Historical tradition and local family ancestral relationships help to build up social trust, which is the foundation of the operational principle for informal finance (Franks, Mayer, and Wagner, 2006; Franks, Mayer, and Rossi, 2009). Informal finance relies on social networks such as local relationships in discovering rich and dynamic information to evaluate and monitor the borrowers (Peterson and Rajan, 1994; Biais and Gollier, 1997; Garmaise and Moskowitz, 2003; Hellman, Lindsey, and Puri, 2008). Therefore, individuals who live in the same social network have more trust in each other, and thus are more likely to monitor borrowers' behaviors afterwards (Allen, Qian, and Xie, 2013).

Local family relationships act as a typical social network in Chinese society as family networks are essential elements in society, and families celebrate a variety of household social events, including weddings, funerals, childbirth, and so on. The phenomenon is similar in Thailand, Vietnam, and Korea. Chen (2014) uses the tradition of keeping written records of gifts received as a means for social network analysis, and he finds that gift giving for coming-of-age celebrations, weddings, and funeral expenditures, is positively related to informal insurance. The deep tradition of the family ancestral temple in China offers researchers great potential for collecting valuable datasets for use in

a family network analysis that well identify the social network at both the individual level and the community-link level.[3] I argue that households living in a community with an ancestral temple have a higher propensity to borrow through informal mechanisms, indicating that a strong family network reduces reliance on formal financing.

In contrast to the previous papers on firm effects, I discuss the welfare effects of formal and informal finance on individual households. The impact of formal and informal finance on firm value has attracted much research recently, yet the results are still debatable. The traditional view is that informal finance is an inefficient and alternative channel and serves the market that most of the banks are not willing to target. In the informal market, interest rates charged to households are very high and not easily monitored. For example, Cull, Xu, and Zhu (2009), and Ayyagari, Demirgüç-Kunt, and Maksimovic (2010, 2011) document that formal finance is more important to household welfare effects than informal finance. Though the informal finance market is very popular, only formal finance is crucial for sales growth and innovation. However, recent papers show that informal finance is beneficial to households. For example, Fisman and Love (2003) find that in underdeveloped markets or industries that rely on trade credits, informal finance can enhance economic growth. Allen, Chakrabarti, De, Qian, and Qian (2012), Allen, Qian, and Xie (2013) document that informal finance supports the growth of small business. This paper uses Chinese household data to analyze the underlying mechanisms and the welfare effects of households' access to finance. Additionally, I evaluate the complement and substitute effects on formal and informal finance. These confounding results might be subject to endogeneity bias and/or sample selection issues in studying different household income-levels, different economic development stages, or different local cultural backgrounds of a sample country.[4]

Endogeneity is the main concern in investigating financing choice and household welfare.

[3] Family networks are strong ties in ancestral society. Ancestral trust is a good characteristic for addressing Chinese society revolution (Fei, 1992).

[4] There is little comprehensive research on the comparison of countries with different stages of economic development in this area; papers either focus on a selective sample in well-developed countries or in developing ones, but not both.

Households may not access finance due to involuntary or self-selection issues, which means that they do not need or do not have the ability to borrow. Ayyagari, Demirgüç-Kunt, and Maksimovic (2010) use financing from the previous year to explain the current year's change in sales growth to control for sample selection and endogeneity from financial development and economic growth. Allen, Chakrabarti, De, Qian, and Qian (2012), and Allen, Qian, and Xie (2013) adopt the Heckman approach to alleviate the concern of endogeneity. In 2012, they used a number of financial institution branches as instruments. They argue that the expansion of banks, proxied by the number of financial institution branches, is positively related to the accessing of finance for firms, yet unrelated to firms' sales growth. However, the numbers of financial institution branches are not randomized as they are probably highly correlated with economic growth. In 2013, they also included an additional exdogenity variable, that of regional common-spoken language, to infer that in some areas with a major common language, the number of financial institutions is more likely to grow.

Following the empirical procedures of Allen, Qian, and Xie (2013), this paper employs Heckman's approach by creating alternative instrumental variables—local governance (measured by the latest local community committee election), and family network (proxied by ancestral temple). I also control for demographic factors, regional financial development, and county-specific fixed effects. In addition, I also adopt a propensity matching score method to match each treatment household that accesses specific financing to a control household based on the likelihood that the specific financing is used. Then, I regress household net wealth growth on the different financing choices in the corresponding matched sample. By utilizing Heckman's Selection Model and Propensity Matching Score method, the main findings are as follows:

First, I find households living in a community with better local governance are more likely to access formal finance, while those who live in a community with a stronger family network tend to use more informal finance, and vice versa. In addition, community committee elections and family network not only capture the variation of Chinese society and democratic evolution over time, but also alleviate endogenity concerns in assessing the welfare effects of formal and informal finance.

Second, both access to formal and informal finance are positively associated with an increase in

household wealth. Formal financing is consistently and positively associated with household net wealth growth both as the choice variable and as the control variable. Informal financing is also positively associated with household net wealth growth as the choice variable. The coefficient of informal financing as the control variable is positive but insignificant.

Third, in areas with high formal finance access, households with more formal (informal) access，have positive (little) effect on wealth increase. In contrast, for households who live in areas with high informal finance access, both formal and informal access to finance have positive effects on the wealth of individuals who can make use of these two channels. The financial development of both the formal and informal channels is highly associated with supporting households, but informal financing becomes less effective in support of households when formal financing is more developed.

Fourth, for households in rural areas, informal finance is a strong support in enhancing their welfare; in particular, households within an agricultural hukou rely heavily on informal finance to increase their wealth. The hukou system, in which citizens are classified as agricultural or non-agricultural hukou and are assigned to either a “rural” or “urban” location, has been charged as being the main source of income inequality. I show that the welfare effects of formal financing are limited to the group of *Non-agricultural Hukou in Urban Area*. The findings emphasize the importance of informal finance in supporting households in rural areas and in urban areas with agricultural hukou.

The rest of the paper is organized as follows. Section 2 introduces the data. Section 3 discusses methodologies, especially the endogeneity problem. Section 4 presents the empirical results and robustness checks and also discusses rural-urban structure and the hukou system. Section 5 concludes the paper.

2. Data

China is transitioning from a socialist economic system to a market-based system, providing a rich variation in legal rules and regulations, local governance structure, and an evolution in local communities. As mentioned by Allen, Qian, and Qian (2005), “China is an important counterexample to the findings in the law, institutions, finance, and growth literature.” It is one of the

fastest growing economies in the world, yet its legal and financial systems are relatively undeveloped. Family network are essential elements in society and usually play a major role in the social network of Chinese communities. Utilizing such dramatic institutional shifts in the election system over time and large variations across communities in the deep tradition of family ancestral temples, this paper quantitatively assesses the particular impact of formal/informal finance.

The paper uses data from the 2010 and 2012 Chinese Family Panel Studies (CFPS). The CFPS is a nationwide, comprehensive panel survey project launched in 2010 by the Institute of Social Science Survey at Peking University. The study covers approximately 16,000 households across 25 mainland provinces in China (excluding Inner Mongolia, Xinjiang, Tibet, Hainan, Ningxia, and Qinghai), representing about 95% of the Chinese population. It studies family well-being and its dynamics in contemporary China. The CFPS surveys detailed information including gender, age, education, occupation at the individual level, wealth, income, family structure, social interaction at the household level, local financial development (% Informal Access), average voting rates in the latest community committee election (Voting Rate), and ancestral temple in the community level (village for rural areas, residence for urban areas).

Table 1 describes a statistical summary of the surveyed sample—11,000 Chinese households—including households, communities, and counties. I summarize the statistics of family size, net income, housing status, access to formal and informal finance at the household level, and the head of household's education level, gender, age, and occupation in year 2000 in Panel A. I also describe the voting rate and ancestral temple at the community level and the financial access rate at the county level in Panel B and Panel C, respectively.

[Insert Table 1 here]

As Panel A of Table 1 shows, the mean of household size is 3.85, indicating that there are 3.85 family members in a household on average. The education level of the household head shows 23% have a primary education, 44% have a secondary education, and 6% have a tertiary education. The rest of the 27% of household heads are illiterate or semi-illiterate. This education distribution represents that most households in China are less educated. Seventy-five percent of household heads

are male, which is consistent with a typical Chinese family in that males have more power than females or that males are the major source of economic support. The mean of household net income is 31,965, larger than the median of 21,788, indicating that household income is still very low and there is a severe income inequality issue in China. Eighty-seven percent of households own at least a house no matter where they live. The average age of the households is 50.40, while 30% of households are engaged in agriculture, 18% are salaried employees, and 8% are self-employed.

In our sample, 9% of the households accessed formal finance, while 25% of households accessed informal finance. The rate of households that accessed informal finance is far higher than the rate of households that accessed formal finance, indicating that in China, either households have a strong demand for access to finance, or, government policy represses access to informal finance. The mean of formal financing is 4, 274, while the mean of informal financing is 5,156. However, their medians are both 0, implying that a typical household does not necessarily access finance. Considering only the households that have debt, the means of formal financing and informal financing are 49,061 and 22,244, while the medians are 20,000, and 10,000, respectively. The level of formal financing is much greater than that of informal financing.

Panel B describes local governance and social network of 600 communities. The average voting rate of the latest community committee election is 78%, indicating households heavily participate in the community committee election. Ancestral temples exist in 11% of communities, which shows close social ties in 11% of the communities.

Panel C presents the local financial development of 161 counties. The average access rate of formal finance at the county level is 9%, while the average rate of informal finance at the county level is 24%. The medians are 6% and 24%, respectively. The data show that informal finance is more popular than formal finance in China.

3. Methodology

Endogeneity is the main concern in investigating financing choice and household welfare. Households that do not access financing may not do so due to the involuntary or self-selection issue, which means that they do not need or do not have the ability to borrow. Financial development is

highly correlated with economic growth: economic growth will speed up an expansion of financial institutions, and thus, the expansion of financial institutions increases the opportunities for households to access financing. This is a typical endogenity issue in the literature of finance development and economic growth (Burgess and Pande, 2005). Therefore, this paper tries to control for local financial development and district variations. I also use the Heckman Selection Model to introduce instrumental variables (IV), to address the endogeneity issue.

3.1 Probit/Tobit Model

This paper adopts a Probit/Tobit model to study alternative choices of formal and informal financial access for households, by controlling for local financial development and district fixed effects to alleviate the concern of the relationship between financial development and economic growth. In the Probit model, the dependent variable is a dummy variable that equals 1 if a household accessed the corresponding financing (formal versus informal) in year 2010 and 0 otherwise. The independent variables are demographic factors ($Demo_{idt}$), including Household Size, Education Level, Male, Age, Occupations, Homeownership, and Household Net Income. The dependent variable in the Tobit model is the natural log of value of the corresponding type of financing. As such, there are four regressions for four dependent variables in total: two financing sources by two models. The equation is as follows:

$$\Pr(\text{Financing}_{idt} = 1) = \alpha + \beta \text{Demo}_{idt} + \mu_{idt} \quad (1)$$

Equation (1) analyzes the relationship between the actual accessing of formal/informal finance and household demographic factors. However, it is likely that the decision to take advantage of financial access is due to high growth in the economy and financial institutions, and therefore, households had easier access to formal finance than informal finance. To alleviate the self-selection effects for households accessing finance, this study controls by adding districted dummies (μ_{idt}). This paper uses maximum likelihood to estimate the parameters. Pr(.) is the probability. I predict that these demographic factors are related to the financing decisions for households and are uncorrelated with any change in wealth for households, controlled by districted fixed effects.

$$\Pr(\text{Financing}_{idt} = 1) = \alpha + \beta \text{Demo}_{idt} + \gamma \text{County}_{dt} + \mu_{idt} \quad (2)$$

In addition, this paper also includes local financial development (% Informal Access), Voting Rate, Ancestral Temple, and districted fixed dummies to mitigate endogeity issues. I propose that Voting Rate and Ancestral Temple are underlying local-level mechanisms, respectively, for local governance and family network for households in accessing formal and informal finance. Meanwhile % Informal Access is used to control for local financial development; I expect that an increase in local formal/informal finance access is helpful for households in accessing financing. The equations that include Voting Rate, Ancestral Temple, and local financial development are listed as follows.

$$\Pr(\text{Financing}_{idt} = 1) = \alpha + \beta \text{Demo}_{idt} + \gamma \text{VotingRate}_{dt} + \delta \text{AncestralTemple}_{dt} + \theta \text{AccessRate}_{dt} + \vartheta \text{County}_{dt} + \mu_{idt} \quad (3)$$

3.2 Heckman Selection Model

To investigate the welfare effects of informal/formal finance on households, this paper adopts the Heckman approach to address the endogeneity issue. Following the two stage least squares (2SLS) procedures of ADM (2010) and Allen, Qian, and Xie (2013), this paper explores leading-lagging variables to address the endogeneity issue. Specifically, I use the financing in year 2010 to explain the net wealth change from the end of year 2010 to the end of year 2012. Since the net wealth change could be positive or negative, I adopt the Inverse Hyperbolic Sine Transformation, $\sinh^{-1}(w) = \log\left(w + \sqrt{w^2 + 1}\right)$, which as a symmetric function is linear around the origin and approximates the logarithm in its right tail (Johnson,1949; Burbidge, Magee, and Robb, 1988).

In the first stage of the Heckman Selection Model, I employ a Probit model to predict the accessing of the formal (informal) financing source based on the choice models in equation (3). The dependent variable is a dummy variable that equals 1 if a household accessed the corresponding financing in year 2010 and 0 otherwise.

To estimate the selection model using instrumental variables, the paper uses instruments that are correlated with access to finance at the household level, yet uncorrelated with changes in household

wealth. I use the voting rate of the latest community committee election, ancestral temple existing in the community, and the county level access rate of informal (formal) financing as the instruments in the first stage, in that these three instrumental variables are correlated with accessing finance for households, yet uncorrelated with household wealth change. This paper also controls for demographic factors. In the second stage of the Heckman approach, I regress the net wealth growth from 2010 to 2012 on financing choices in 2010 while controlling for the predicted likelihood of the corresponding financing with Heckman's lambda, demographic factors, and county-specific fixed effects. The Heckman selection model is shown in equations (4) and (5). I estimate the Heckman model as follows.

$$\Pr(Financing_{idt} = 1) = \alpha + \beta Demo_{idt} + \gamma VoteRate_{dt} + \delta AncestralTemple_{dt} + \theta AccessRate_{dt} + \mu_{idt}$$

$$\Delta \text{Wealth}_{\text{idt}} = \alpha + \beta \log \text{Financing}_{\text{idt}} + \gamma \, \text{Demo}_{\text{idt}} + \delta \text{County}_{\text{dt}} + \mu_{\text{idt}} \quad (4)$$

3.3 Substitutes or Complements

This paper is also interested in the effect of substitutes or complements on the roles of formal and informal finance on the performance of households who access alternative finance. I regress the change in household net wealth on the access rate of a particular financing choice (formal/informal finance), its interaction with the dummy variable of the other alternative channel, and demographic factors. If the coefficient of the of the interaction is positive, this indicates that there is a complement effect between formal and informal finance, while if the coefficient of the interaction is negative, it implies that there is a substitute effect between formal and informal finance.

$$\Delta Wealth_{idt} = \alpha + \beta AccessRate_{dt} + \gamma AccessRate * DummyFinancing_{idt} + \delta Demo_{idt} + \theta County_{dt} + \mu_{idt} \quad (5)$$

4. Empirical Results

This paper conducts the following empirical tests. First, I estimate Probit and Tobit models to explore the determinants of formal and informal financing choices with demographic factors. Second, the welfare effects of accessing formal and informal finance for households are then investigated.

Third, I further study the substitutes or complements of formal and informal financing's welfare effects. Finally, robustness checks are conducted using the Heckman instrumental analysis and propensity matching scores.

4.1 Choice of formal and informal financing

I present the results of the Probit and Tobit model in Table 2, Panel A, and Panel B, respectively. Equations (1), (2), (5), and (6) are controlled only for demographic factors; (3), (4), (7), and (8) are additionally controlled for county-specific fixed effects. As Panel A of Table 2 shows, the likelihood of accessing formal and informal financing are both positively associated with household size, with marginal effects of 4.47% and 8.65%, respectively. The marginal effects of the financing amount are 62.8% and 89.8%, respectively. As financial burdens increase with household size, financing needs increase with household size. The coefficients of household size are significantly positive at the 1% level in all the equations. The coefficients of household net income are positively significant in the formal financing equations, but negatively significant in the informal financing equations, all at the 1% level. This indicates that higher net income households have better access to formal financing and are less likely to borrow from informal financing, while lower net income households rely more on informal channels. The coefficients of home ownership are mainly insignificant, which may be due to the extremely high home ownership rate in China (around 87%).

[Insert Table 2 here]

The coefficient of gender (Male) is positively significant in the formal financing equations. A male household head is more likely to borrow through formal channels, possibly because of the higher economic status of males in Chinese society. The coefficient of age (age squared) is positively (negatively) significant in all the equations, illustrating an inverted U-shaped relationship. At first the propensity to borrow increases with the age of household head, due to an increase in financial burdens and relatively low income for young households. As financial burdens decline and income increases over time, the propensity to borrow starts to decrease at a declining rate and then increases with age at some point. The coefficients of primary, secondary, and tertiary education are all negatively significant in the formal and informal financing equations, except for the coefficient of

tertiary education in the formal model, indicating that household heads with higher education have better access to formal financing and are less likely to resort to informal financing. The likelihood of accessing informal financing decreases with the level of education. Household heads working in agriculture or who are self-employed are more likely to borrow, while salaried heads are less likely to have a demand for a loan. Table 2 shows that demographics are important in explaining the choice of formal and informal financing. As local governance, family network, and local financial development are crucial to financial access, I additionally control for local governance (proxied by the voting rate in the latest community committee election), and family network (proxied by ancestral temple), and local financial development (measured by the percentage of households in the county that accessed formal or informal financing) in Table 3. The results of the Probit model and the Tobit model are shown in Panel A and Panel B, respectively.

[Insert Table 3 here]

The results show that ancestral temple is positively related to informal financing and negatively related to formal financing, while voting rate is negatively related to informal financing and positively related to formal financing. This result indicates that the probability of accessing formal (informal) finance increases (decreases) by 22.8% (12.6%) with a 1% increase in voting rate. This represents that higher participation in local community committee elections may offer better local governance and, therefore increase the access to formal financing. The impact of voting rate on informal finance is the opposite, implying that a weak local governance may encourage the development of informal finance.

I also find that stronger family connection is associated with informal financing. Specifically, the probability of accessing formal (informal) finance decreases (increases) by 38.5% (14.1%) where there is an ancestral temple in a community. Communities with ancestral temples are more likely to be an ancestral society, in which households can more easily borrow from relatives and friends. These effects are similarly significant after controlling for district fixed effects at the county level.

The results also show that a higher fraction of households accessing informal financing at the county level predicts households' higher probability of accessing formal financing, but a higher

fraction of households accessing formal financing at the county level predicts that household's reduced probability of accessing informal financing. Specifically, the likelihood of accessing informal finance decreases by 14.7%, with a 1% increase in availability of formal financing at the county level. The likelihood of accessing formal finance increases by 66.7%, with a 1% increase in availability of informal financing at the county level.

4.2 Financing and Household Welfare Effects

The results of the Heckman (1979) selection model are presented in Table 4. The first two columns of Panel A show the results of the first and second stages of formal financing, and the second two columns show the results of informal financing in the full sample.

[Insert Table 4 here]

As Table 4 shows, formal financing is consistently and positively associated with household net wealth growth as the control variable both in equations (2) and (4). The magnitude is around 45%, significant at the 10% level. Informal financing is also positively associated with household net wealth growth as the choice variable. The magnitude is around 59% and significant at the 1% level. The coefficient of informal financing as the control variable is positive but insignificant. The results show that both formal and informal financing have positive welfare effects for households.

Similar to the results of Table 3, formal financing is prevalent in regions where access to informal finance is extensive, while the use of informal financing decreases with the high availability of formal financing. Meanwhile, formal financing is positively related to voting rate and negatively related to ancestral temple, while informal financing is the opposite. These findings indicate the importance of local financial development, local governance, and family network to financial access. Additionally, local governance and family network are good instrumental variables as they are not relevant to household personal wealth change, and these two variables are shown to be associated with formal/informal access.

To alleviate the concern of an involuntary issue (households do not access finance because they cannot) and the self-selection issue (households do not access finance because they do not need it), I

also conduct an alternative subsample in which households access at least one specific financing source. As shown in Table 4 Panel B, the main results still hold, although the coefficient of % of formal access becomes significant and voting rate becomes insignificant in column (7). Additionally, I also conduct an alternative dependent variable, positive growth dummy, which equals 1 if net income growth is positive, as an alternative measure of net income change. The results are basically similar.

4.3 Substitutes or Complements of Formal and Informal Financing's Welfare Effects

The relation of the prevalence of access to formal financing and the usage of informal financing could be either positive or negative in terms of local financial development, as shown in section 4.1. I further analyze the substitute and complementary roles of formal and informing financing in supporting households in this section. I regress household net wealth growth on the access rate of a particular financing choice, its interaction with the dummy variable of the other channel and demographic factors. The results are presented in Table 5.

[Insert Table 5 here]

As Table 5 shows, the regional development of formal and informal financing are both positively associated with household net wealth growth, all significant at the 1% or 5% level. The coefficients of the interaction of the formal financing dummy variable and the informal financing rate are 3.232 and 2.938, positively significant at the 5% level, while the coefficients of the interaction of the informal financing dummy variable and the formal financing rate are -0.224 and -0.417, negative but not significant.

I also use the subsample in which households at least access one channel to alleviate the involuntary and self-selection issues. The results show that the coefficients of the interaction of the informal financing dummy variable and the formal financing rate are negatively significant at the 10% level, indicating that using informal finance in areas where formal finance is developed is negatively associated with household wealth growth.

The findings of substitutes or complements on welfare effects deliver two main messages. First,

the financial development of both formal and informal channels is highly associated with improving household wealth. Second, informal financing becomes less effective in support of households when formal financing is more developed. Therefore, the relation of formal and informal financing in support of households changes from complements to substitutes with the development of a formal system. Our results are consistent with previous studies that analyze the impact of access to formal finance (Comola and Prina, 2013; Bruhn and Love, 2014), and those for informal finance (Morse, 2011). However, when I investigate the substitute and complementary roles of formal and informal financing in supporting households conditional on access to the alternative channel, the finding suggests that informal finance will be replaced by formal finance access if households are in a community with more developed formal financial institutions.

4.4 Robustness Check

I employ an alternative test, the Propensity Score Matching Method (Rosenbaum and Rubin 1983), to alleviate the involuntary or self-selection issue. The propensity score, calculated by a Probit model, is the probability of a household's obtaining specific financing given a vector of household characteristics. Table 6 presents the results.

[Insert Table 6 here]

In the propensity score matching approach, I match each of the treatment households that accessed specific financing with a control household based on the likelihood that the specific financing would be used. In the first stage, I predict the likelihood of the specific financing choice usage controlling for its county-level access rate, dummy of the other financing source, and demographic factors shown in Table 2. The dummy dependent variable equals 1 if the household accesses the corresponding financings source and 0 otherwise. The treatment samples are households that access specific financing. The control samples are drawn from households that do not access that specific financing source. For each treatment household, the control household is chosen by matching the same likelihood (if not the same, the closest with less than a 2% deviation) based on the first stage model’s prediction. In the second stage, I regress household net wealth growth on the different financing choices in the corresponding matched sample.

Panel A of Table 6 shows the difference in the mean of wealth growth and household financing variables between the treatment and control samples and the t-test results. When the treatment sample and control sample are correctly matched, the distribution of household characteristics should not be statistically different between the treatment and control samples, and the dependent variable should be positively significant. Panel B reports the regression results of net wealth growth on dummy financing variables within the matched sample controlling for demographic factors. Consistent with the results of Heckman's approach presented in Table 4, both formal and informal financing in the propensity score matching approach are positively associated with household net wealth growth, with the magnitude being around 98% and 51% and significant at the 10% level.

I also employ the propensity score matching method as an alternative test for the substitute or complementary role of formal and informal financing in support of family financial needs. The results are presented in Table 7.

[Insert Table 7 here]

As Table 7 shows, conditional on access to informal finance, formal financing is positively associated with household wealth increases, significant at the 5% level. Conditional on access to formal finance, the coefficient of informal financing is insignificant. The results are consistent with Table 5.

Findings from the Propensity Matching Score Method are mainly consistent with previous results based on the Heckman Selection Model. Both formal and informal financing are beneficial to household welfare. Formal financing is effective in supporting households when informal finance is more developed, but informal financing becomes less effective in supporting households when formal financing is more developed.

4.5 Rural-Urban Structure and the Hukou System

The most influential planned institutional arrangements of Chinese society is a rural-urban dual system, which is naturally divided between the different productivities of the countryside and cities. The other influential institutional arrangement is the hukou system. In this system, each household

must register with the government: citizens are classified as agricultural or non-agricultural and are assigned to a location. As hukou status does not change when people migrate, larger numbers of people living in urban areas hold agricultural hukou. Their identities differ from their job status. The type of government benefits and services residents receive is based on their type and location of registration.

Does the dual system have any influence on household welfare effects of formal and informal finance? Does formal financing or informal access to finance improve the welfare effects in rural areas or agricultural hukou households? Is formal financing still effective in support of urban area households with agricultural hukou? To answer these questions, I divide the sample households into four parts: *Non-agricultural Hukou in Urban Area*, *Agricultural Hukou in Urban Area*, *Non-agricultural Hukou in Rural Area*, and *Agricultural Hukou in Rural Area*. Their fractions of the whole sample are 25.45%, 19.31%, 3.58%, and 51.87%, respectively. I then investigate the welfare effects of formal and informal financing based on the Heckman Selection Model as performed in Table 5. I present the key coefficients of the second stages in Table 8, omitting the results of the first stages and all control variables.

[Insert Table 8 here]

As Table 8 shows, the welfare effects of formal financing are limited to the *Non-agricultural Hukou in Urban Area* group. The welfare effects of informal finance are both effective in *Agricultural Hukou in Urban Area* and *Agricultural Hukou in Rural Area* group. The findings emphasize the importance of informal finance in support of households in rural areas and in urban areas with agricultural hukou.

5. Conclusions

Empirical research has not been able to ascertain whether formal or informal finance is warranted using micro-level data. Informal finance is traditionally treated as a low efficiency financial channel for individuals and firms, as it is the substitute for formal finance when formal financial institutions give up their stake. Alternatively, informal finance is still very popular in many countries, indicating that formal finance fails to meet the demand from some borrowers. Traditional empirical research

documents that only formal finance can enhance sales growth and innovation for business, though the scale of informal finance is not neglected. In contrast, recent studies indicate that informal finance can have positive welfare effects on households and alleviate financial constraints for the poor. A clarification of the roles of formal and informal finance is thus valuable for regulators in enhancing financial development.

In China, many households have a demand for financing. Informal finance, in particular, loans from relatives and friends, is the major source of informal financing in the society. This study constructs instrumental variables, including voting rate and family temple at the community level, to address the endogeneity issue. I find that for households, a community with better local governance is related to formal finance access, while a community with a family temple infers a strong family network, which is helpful in accessing informal finance. The finding indicates that local governance and family connections are important channels for formal and informal finance, respectively.

By utilizing the Heckman Two Stage method and the Propensity Matching Score method, this paper shows that the financial development of both formal and informal channels is highly associated with supporting households. In areas with high informal access, households with formal finance access have a positive impact on wealth increases. On the contrary, in areas with highly developed formal financial access, informal financing becomes less effective in supporting households. Therefore, the relation of formal and informal financing in support of households is changing from complementary to substitution with the enhancement of formal financial development.

There are two unique planning features in the Chinese society: the dual rural-urban system, which divides the different productivities of the countryside and cities, and the hukou registration system, in which citizens are classified as agricultural or non-agricultural according to their birth location. This paper also studies household welfare effects of formal and informal finance under these two competing institutional systems. The results show that the positive effects of formal financing are limited to the *Non-agricultural Hukou in Urban Area* group. In contrast, the welfare effects of informal finance are effective in both the *Agricultural Hukou in Urban Area* and *Agricultural Hukou in Rural Area* groups. The findings emphasize the importance of informal

finance in supporting households in rural areas and in urban areas with agricultural hukou.

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Tables

Table 1 Summary Statistics

Table 1 describes the surveyed sample households, communities and counties. For about 11,000 Chinese households covered in the survey, I summarize their size, net income, housing, formal and informal access, and the head's education level, gender, age, and occupation in year 2000, shown in Panel A. I also describe voting rate and ancestral temple at the community level and financial access rate at the county level as shown in Panel B and Panel C.

Variable	Obs.	Mean	Median	Min	Max
Panel A Household Level					
Demographic Variable					
Household size	11,020	3.85	4	1	26
Education: Primary	11,011	0.23	0	0	1
Education: Secondary	11,011	0.44	0	0	1
Education: Tertiary	11,011	0.06	0	0	1
Male	11,020	0.75	1	0	1
Household net income	10,422	31,965	21,788	5	2,042,000
Own house	11,019	0.87	1	0	1
Age	11,020	50.40	49	16	97
Occupation: Agriculture	11,009	0.30	0	0	1
Occupation: Salaried	11,009	0.18	0	0	1
Occupation: Self-employed	11,009	0.08	0	0	1
Financial Access					
Dummy (Formal)	11,007	0.09	0	0	1
Dummy (Informal)	11,013	0.25	0	0	1
Value (Formal)	11,007	4,274	0	0	1,500,000
Non Zero Sample	959	49,061	20,000	2	1,500,000
Value (Informal)	11,013	5,516	0	0	650,000
Non Zero Sample	2,731	22,244	10,000	0	650,000
Panel B Community Level					
Governance/Network					
Voting Rate	616	0.78	0.80	0.01	1
Ancestral Temple	635	0.11	0	0	1
Panel C County Level					
Financial Access Rate					
% Formal	161	0.09	0.06	0	0.50
% Informal	161	0.24	0.24	0	0.55

Table 2 Demographics and Formal/Informal Financing

Table 2 explains the use of formal and informal financing with demographic variables. The results of the Probit model and Tobit model are presented in Panel A and Panel B, respectively. Equations (3), (4), (7), and (8) are controlled for county-specific fixed effects. The dependent variable in the Probit model is a dummy variable that equals 1 when a household has access to the corresponding type of financing, otherwise 0. The dependent variable in the Tobit model is the natural log value of the corresponding type of financing. Household size is the number of family members in a household. Household net income is measured by the log of household net income. Own House equals 1 if the household owns a house. Male equals 1 if the household head is a male. Age and Age-Squared are the household head's age and its square divided by100. Three dummy variables are used to capture the impact of education level and occupation, respectively. Standard errors are in parentheses below the coefficients. ***, **, and * denote 1%, 5%, and 10% level of significance, respectively.

VARIABLES	Panel A Probit Model				Panel B Tobit Model			
	Formal	Informal	Formal	Informal	Formal	Informal	Formal	Informal
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Household Size	0.0487***	0.112***	0.0447***	0.0865***	0.796***	1.202***	0.628***	0.898***
	(0.0116)	(0.00870)	(0.0144)	(0.00997)	(0.198)	(0.0969)	(0.212)	(0.105)
Household Net Income	0.0891***	-0.151***	0.164***	-0.110***	1.609***	-1.541***	2.501***	-1.026***
	(0.0204)	(0.0145)	(0.0247)	(0.0163)	(0.345)	(0.162)	(0.363)	(0.173)
Own House	0.0973	0.00802	0.0381	-0.0362	1.736*	0.182	0.609	-0.304
	(0.0591)	(0.0428)	(0.0690)	(0.0469)	(1.001)	(0.474)	(1.010)	(0.495)
Male	0.203***	0.0436	0.109**	0.0207	3.416***	0.523	1.641**	0.281
	(0.0461)	(0.0333)	(0.0526)	(0.0363)	(0.783)	(0.368)	(0.770)	(0.383)
Age	0.0332***	0.0423***	0.0316**	0.0413***	0.577***	0.516***	0.467**	0.470***
	(0.0123)	(0.00857)	(0.0137)	(0.00900)	(0.208)	(0.0952)	(0.199)	(0.0952)
Age-squared/100	-0.0571***	-0.0630***	-0.0506***	-0.0613***	-0.985***	-0.749***	-0.750***	-0.685***
	(0.0128)	(0.00852)	(0.0141)	(0.00894)	(0.217)	(0.0950)	(0.206)	(0.0949)
Education: Primary	-0.0896*	-0.0754*	-0.0261	-0.0917**	-1.501*	-0.723*	-0.431	-0.885**
	(0.0532)	(0.0394)	(0.0599)	(0.0416)	(0.899)	(0.434)	(0.874)	(0.438)
Education: Secondary	-0.0836*	-0.144***	0.0446	-0.115***	-1.344	-1.476***	0.705	-1.143***
	(0.0485)	(0.0365)	(0.0561)	(0.0397)	(0.819)	(0.403)	(0.819)	(0.419)
Education: Tertiary	0.224**	-0.262***	0.303***	-0.249***	4.016***	-2.552***	4.775***	-2.395***
	(0.0893)	(0.0754)	(0.102)	(0.0812)	(1.510)	(0.837)	(1.494)	(0.861)
Occupation: Agriculture	0.238***	0.0489	0.127**	0.0580	3.951***	0.568	1.857**	0.686*
	(0.0439)	(0.0336)	(0.0555)	(0.0396)	(0.749)	(0.370)	(0.810)	(0.417)
Occupation: Salaried	-0.277***	-0.101**	-0.110	-0.0747	-4.785***	-1.218**	-1.711*	-0.784
	(0.0606)	(0.0435)	(0.0697)	(0.0472)	(1.034)	(0.484)	(1.025)	(0.501)
Occupation: Self-employed	0.0824	0.0371	0.228***	0.0440	1.360	0.640	3.343***	0.732
	(0.0683)	(0.0549)	(0.0783)	(0.0588)	(1.151)	(0.604)	(1.146)	(0.618)
Constant	-2.888***	-0.0534	-4.532***	-0.0284	-50.43***	-2.862	-67.86***	-2.049
	(0.341)	(0.239)	(0.586)	(0.303)	(5.923)	(2.647)	(8.688)	(3.198)
Observations	10,400	10,400	9,523	10,274	10,395	10,400	10,395	10,400
Pseudo R-squared	0.0654	0.0633	0.1725	0.1010	0.0342	0.0266	0.101	0.0452
District Fixed Effects	No	No	County	County	No	No	County	County

Table 3 Access Rate, Voting Rate and Ancestral Temple

Table 3 presents the key explanatory variables in this paper. The results of the Probit model and the Tobit model are presented in Panel A and Panel B, respectively. Equations (3), (4), (7), and (8) are controlled for county-specific fixed effects. % Formal/Informal Financing is calculated by the percentage of households in the county (in the survey sample) that have access to the corresponding type of financing, representing financial development. Voting Rate is the voting rate of the latest community committee election, representing local governance. Ancestral Temple takes the value of 1 if a community has an ancestral temple and 0 otherwise. The dependent variables and other independent variables are as defined in Table 2. Standard errors are in parentheses below the coefficients. ***, **, and * denote 1%, 5%, and 10% level of significance, respectively.

VARIABLES	Panel A Probit Model				Panel B Tobit Model			
	Formal	Informal	Formal	Informal	Formal	Informal	Formal	Informal
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
% Informal Access	0.667***		-4.519		11.54***		-68.00	
	(0.195)		(3.517)		(3.301)		(51.25)	
% Formal Access		-0.147		-4.180**		-1.087		-44.30**
		(0.155)		(2.003)		(1.694)		(20.99)
Ancestral Temple	-0.385***	0.141***	-0.183*	0.0840	-6.392***	1.431***	-2.575*	1.028
	(0.0688)	(0.0447)	(0.0976)	(0.0672)	(1.167)	(0.486)	(1.429)	(0.701)
Voting Rate	0.228**	-0.126*	0.234**	-0.134*	3.886**	-1.511**	3.582**	-1.616*
	(0.0925)	(0.0659)	(0.117)	(0.0809)	(1.564)	(0.724)	(1.729)	(0.847)
Demographic	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-3.436***	-0.0295	-3.249***	0.0572	-59.62***	-2.548	-48.87***	-1.003
	(0.372)	(0.250)	(0.906)	(0.336)	(6.467)	(2.744)	(13.30)	(3.506)
Observations	10,001	10,001	9,102	9,878	9,996	10,001	9,996	10,001
Pseudo R-squared	0.0730	0.0650	0.1725	0.1025	0.0383	0.0273	0.102	0.0460
District Fixed Effects	No	No	County	County	No	No	County	County

Table 4 Financing and Household Welfare: Heckman Selection Model

Table 4 presents the results of Heckman's approach on financing and household wealth growth. The first step explains the determinants of usage of formal (informal) financing, where the dependent variable is a dummy variable that equals 1 if a household had access to formal (informal) financing in year 2010 and 0 otherwise. The second stage examines formal (informal) financing and growth nexus while controlling for the predicted likelihood of the corresponding financing with Heckman's lambda, where the dependent variable is the Inverse Hyperbolic Sine Transformation $\sinh^{-1}(w) = \log\left(w + \sqrt{w^2 + 1}\right)$ of household net wealth growth from 2010 to 2012. The instruments in the first stage are the county level access rate of informal (formal) financing, voting rate of the latest community committee election, and ancestral temple existing in the community. The second stage is controlled for county-specific fixed effects. Both of the stages are controlled for the demographic factors shown in Table 2. Standard errors are in parentheses below the coefficients. ***, **, and * denote 1%, 5%, and 10% level of significance, respectively.

VARIABLES	Panel A Full Sample				Panel B Access Subsample			
	Dummy (Formal)	IHS (ΔWealth)	Dummy (Informal)	IHS (ΔWealth)	Dummy (Formal)	IHS (ΔWealth)	Dummy (Informal)	IHS (ΔWealth)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log (Formal Financing)		0.452*				0.456*		
		(0.274)				(0.274)		
Dummy (Informal Access)		1.206				1.230		
		(0.749)				(0.749)		
Log (Informal Financing)				0.588***				0.590***
				(0.133)				(0.134)
Dummy (Formal Access)				1.440**				1.520**
				(0.682)				(0.654)
% Informal Access	0.678***				-1.504***			
	(0.196)				(0.278)			
% Formal Access			-0.138				-3.728***	
			(0.155)				(0.247)	
Ancestral Temple	-0.380***		0.141***		-0.456***		0.410***	
	(0.0688)		(0.0447)		(0.0856)		(0.106)	
Voting Rate	0.241***		-0.129*		0.324**		-0.225	
	(0.0933)		(0.0660)		(0.127)		(0.146)	
lambda		0.637		1.881		-1.067		-10.12**
		(5.026)		(7.137)		(4.489)		(4.633)
Control (Demographics)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-3.421***	1.353	-0.0227	1.641	-2.634***	6.915	3.847***	-1.807
	(0.372)	(21.21)	(0.250)	(8.031)	(0.498)	(18.46)	(0.547)	(5.578)
Observations	9,991	9,991	9,991	9,991	3,064	3,064	3,064	3,064
District Fixed Effects	No	County	No	County	No	County	No	County

Table 5 Complementary or Substitute Role of Formal and Informal financing

Table 5 explains household net wealth growth with financing sources and demographic characteristics. Two new variables, % Informal Access*Dummy (Formal Access) and % Formal Access*Dummy (Informal Access), are included as the interaction of formal (informal) financing access rate in county level and informal (formal) dummy variable, respectively. Standard errors are in parentheses below the coefficients. ***, **, and * denote 1%, 5%, and 10% level of significance, respectively.

VARIABLES	IHS (ΔWealth)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
% Informal Access	2.982***	2.720**			31.48***	31.41***		
	(1.112)	(1.117)			(9.208)	(9.207)		
% Informal Access		3.232**				2.938**		
* Dummy (Formal Access)		(1.382)				(1.421)		
% Formal Access			2.903**	2.886**			3.647**	3.746**
			(1.224)	(1.326)			(1.656)	(1.732)
% Formal Access				-0.224				-0.417
* Dummy (Informal Access)				(1.908)				(1.901)
Control (Demographics)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-1.060	-0.996	-0.197	-0.164	-10.37***	-10.24***	-3.877*	-3.834*
	(1.864)	(1.863)	(1.805)	(1.807)	(3.316)	(3.316)	(2.306)	(2.308)
Observations	10,360	10,356	10,360	10,356	10,360	10,356	10,360	10,356
R-squared	0.021	0.022	0.021	0.021	0.074	0.074	0.032	0.033
Adj R-squared	0.020	0.020	0.020	0.020	0.058	0.058	0.029	0.028
District Fixed Effects	No	No	No	No	County	County	Province	Province

Table 6 Financing and Household Welfare: Propensity Score Matching Method

Table 6 presents the results of the propensity score matching method. Each of the treatment household's access to specific financing is compared to a matching control household. The control household meets two requirements: first it is a household that does not have access to that specific financings source, and second it has the same likelihood of the specific financing source usage (if not the same, the closest with less than 2% deviation) based on the first stage model's prediction controlling for county level access rate and demographic factors. Panel A shows the difference in mean of wealth growth and household financing variables between the treatment and controlling samples and the t-test results. Panel B reports the regression results of net wealth growth on dummy financing variables within the matched sample controlling for demographic factors. Standard errors are in parentheses below the coefficients. ***, **, and * denote 1%, 5%, and 10% level of significance, respectively.

Panel A Comparison of Household Demographic Information in the matched samples				
Matched Sample by the Likelihood of Access to:	Formal Financing		Informal Financing	
	Treatment Sample Mean – Controlling Sample Mean	t-stat of the Difference in Mean	Treatment Sample Mean – Controlling Sample Mean	t-stat of the Difference in Mean
Log (Wealth Growth)	1.0178**	1.97	0.5259*	1.72
Dummy (Formal Financing)			0.0023	0.25
Dummy (Informal Financing)	-0.0258	-1.12		
% Formal Financing	0.0060	0.92		
% Informal Financing			0.0022	0.81
Demographics	Yes	Yes	Yes	Yes
Combined Observations	1,780		5,116	

Panel B OLS Results within the Matched Sample		
VARIABLES	IHS (ΔWealth)	IHS (ΔWealth)
	(1)	(2)
Dummy (Formal Financing)	0.982*	
	(0.511)	
Dummy (Informal Financing)		0.512*
		(0.304)
Control (Demographics)	Yes	Yes
Constant	8.498**	4.298**
	(3.334)	(1.838)
Observations	1,780	5,116
R-squared	0.030	0.017
Adj R-squared	0.0227	0.0141

Table 7 Complementary or Substitute: Propensity Score Matching Method

Table 7 presents the results of the propensity score matching method on the complementary or substitute role of formal and informal financing. Each of the treatment household's access to specific financing is compared to a matching control household. The control household meets two requirements: first it is a household that does not access the specific financing source but accesses other financing sources, and second it has the same likelihood of the specific financing source usage (if not the same, the closest with less than 2% deviation) based on the first stage model's prediction controlling for county level access rate and demographic factors. Panel A shows the difference in the mean of wealth growth and household financing variables between the treatment and control samples and the t-test results. Panel B reports the regression results of net wealth growth on dummy financing variables within the matched sample controlling for demographic factors. Standard errors are in parentheses below the coefficients. ***, **, and * denote 1%, 5%, and 10% level of significance, respectively.

Panel A Complementary or Substitute in the matched samples				
Matched Sample by the Likelihood of Access to:	Formal Financing (Conditional on Informal Financing)		Informal Financing (Conditional on Formal Financing)	
	Treatment Sample Mean – Controlling Sample Mean	t-stat of the Difference in Mean	Treatment Sample Mean – Controlling Sample Mean	t-stat of the Difference in Mean
	(1)	(2)	(3)	(4)
Log (Wealth Growth)	2.2352***	2.60	1.0198	1.20
% Formal Financing	0.0068	0.65		
% Informal Financing			0.0024	0.35
Demographics	Yes	Yes	Yes	Yes
Combined Observations	646		644	

Panel B OLS Results within the Matched Sample		
VARIABLES	IHS (ΔWealth)	IHS (ΔWealth)
	(1)	(2)
Dummy (Formal Financing)	2.000**	Condition
	(0.850)	
Dummy (Informal Financing)	Condition	0.808
		(0.836)
Control (Demographics)	Yes	Yes
	12.03**	16.75***
Constant	(5.581)	(5.255)
Observations	646	644
R-squared	0.058	0.055
Adj R-squared	0.0369	0.0335

Table 8 Hukou System and Rural-Urban Structure: Heckman's Approach

I divide the sample households into four parts: *Non-agricultural Hukou in Urban Area*, *Agricultural Hukou in Urban Area*, *Non-agricultural Hukou in Rural Area*, and *Agricultural Hukou in Rural Area*. I investigate the welfare effects of formal and informal financing based on the Heckman Selection Model as done in Table 5. Table 8 presents the key coefficients of the second stages, omitting the results of the first stages and all control variables. Standard errors are in parentheses below the coefficients. ***, **, and * denote 1%, 5%, and 10% level of significance, respectively.

VARIABLES	IHS (ΔWealth)			
	Non-agricultural Hukou in Urban Area	Agricultural Hukou in Urban Area	Non-agricultural Hukou in Rural Area	Agricultural Hukou in Rural Area
Panel A Formal Financing				
Log(Formal Financing)	0.706*	0.904	-1.489	0.133
	(0.403)	(1.321)	(2.022)	(0.375)
Observations	2,490	1,869	361	5,260
Panel B Informal Financing				
Log(Informal Financing)	0.0733	1.129***	0.386	0.672***
	(2.011)	(0.307)	(0.514)	(0.170)
Observations	2,491	1,869	361	5,259
Control Variables	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
District Fixed Effects	County	County	County	County