Digital Financial Development, Diversification of Financial Services Participation and Entrepreneurial Choices for Residents

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Abstract

Along with the popularity of the mobile Internet and the development of digital technology, financial institutions have shown a digital development trend, and digital finance (Internet lending) has become a new channel for entrepreneurial financing. In view of this, based on CHFS 2019 data, this paper includes traditional finance and digital finance in the same analysis framework, and from two dimensions: single participation and compound participation, the study finds that: (1) Both single and compound participation forms can have a significant positive impact on residents' entrepreneurial choices, and relatively speaking, the compound participation form has a more significant promotion effect than the single participation form; (2) Among the single forms of participation, Internet lending has the lowest promotion effect and its role is still to be explored, while private lending has the highest promotion effect, which indicates that private lending is still the main financing channel for entrepreneurs; (3) Among the compound forms of participation, the compound financial participation mode without bank lending has the lowest promotion effect, which indicates that bank lending is extremely important to residents' entrepreneurial choices. Further, the heterogeneity analysis reveals that financial services participation has a more significant facilitating effect on entrepreneurial choices made by low-endowment households, both in terms of single participation and composite participation. In summary, this paper argues that the role of formal finance should be strengthened, the development of informal finance should be guided, and the inclusive role of digital finance should be further explored through the construction of digital infrastructure and the improvement of residents' financial literacy.

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1. Introduction

In 2022, China's Central Economic Work Conference pointed out that it would "coordinate the work of stabilizing growth, promoting reform, adjusting structure, benefiting people's livelihood and preventing risks, and further stabilize employment, finance, foreign trade, foreign investment, investment, and expectations". In recent years, through the optimization and upgrading of the industrial structure, China's economic growth has moved from a stage of high-speed development to a stage of high-quality development, but at the same time, it has also produced periodic pains such as a slowdown in economic growth, difficulties in business operations and increased pressure on employment. Coupled with the interaction of compounding factors such as sluggish global economic growth, rising international trade protectionism, and the impact of the new crown pneumonia epidemic, China is facing a severe employment situation and a difficult time for residents to increase their income, which in turn poses a major challenge to consolidating the achievements of poverty eradication and achieving common prosperity.

Employment is the foundation of people's livelihoods, and "stabilizing employment" should focus on consolidating the stock and expanding the increment. Given the interplay between quality economic development and epidemic prevention and control, promoting employment through entrepreneurship has become an important strategic option to alleviate the employment dilemma and a major strategic need for China's current economic and social development. Academics have long focused on entrepreneurship, and studies have found that entrepreneurship is a major driving force in the economic process itself, which is not only beneficial in driving innovation and long-term economic growth in a country (King and Levine, 1993; Samila and Sorenson, 2011; Prieger et al., 2016) but also contributes to solving employment problems in society as well as increasing the income of the population (Banerjee and Newman, 1993; De et al., 2008).

However, there is generally a minimum capital threshold for entrepreneurial activity, and when households have a certain level of own wealth, the financing constraint will restrict households lacking start-up capital from undertaking the entrepreneurial activity and is the most significant barrier to residents undertaking entrepreneurial activity (Yin et al., 2021). For a long time, traditional finance has been the main source of financing for entrepreneurship for residents, mainly consisting of formal and informal finance. In terms of formal finance, formal financial institutions are well organized and have formal processes, which are characterized by low risk. However, to avoid non-performing loans, formal financial institutions often have stringent application requirements and need to provide full guarantees, and there are certain threshold requirements for borrowers'

qualifications. The formal financial credit constraint is high due to the dualistic financial structure, incomplete financial markets and strict government regulation of finance in developing countries, including China, and the wealth-based limited liability credit system further exacerbates the credit constraint problem for low-income groups (Li et al., 2020). As far as informal finance is concerned, loans from friends and relatives and private loans are the main forms of informal finance, which can reduce the cost of information search and have the advantage of quick financing. There is a moral hazard in borrowing beyond a certain limit. In summary, both traditional finances have its strengths and weaknesses, with formal finance characterized by low risk but low accessibility, and informal finance characterized by high accessibility but low loan amounts.

In recent years, along with the rapid popularity of mobile internet and the continuous development of digital technology, financial institutions have shown the development trend of technology and digitalization, and digital finance such as "borrowing money", "Jingdong White Strip", Wezhong Bank and Xinwang Bank have developed rapidly, opening up new financing channels for entrepreneurs - internet loans. The study found that through changes in financial infrastructure, financial service platforms, channel portfolios, scenarios, and other areas, digital finance (especially digital inclusive finance) has solved the challenges that have long plagued traditional finance in areas such as service efficiency, mobile channel penetration, customer screening, and customer service, risk assessment and control, differentiated pricing systems, and back-office operations (Xie et al., 2018), and to a certain extent compensated for the shortcomings of traditional financial lending channels, balancing inclusiveness and loan amount limits. However, the participation and use of digital finance will face a "knowledge threshold", i.e., residents need to have a certain level of digital literacy (Cheng et al., 2019).

As mentioned above, there are advantages and disadvantages to formal, informal, and digital financial channels of finance. With the increasing availability of financial loans, people are choosing more flexible ways to finance their businesses. However, studies have focused on the impact of a single financial lending channel on credit availability and entrepreneurship, neglecting the complex causal relationship between the combined effect of different financial lending channels and entrepreneurial activity (Misangyi et al., 2017). In light of this, the fundamental question to be addressed in this paper is: how does the diversification of financial services participation in the context of the digitization of financial institutions affect residents' entrepreneurial activity?

2. Literature review

2.1 Traditional lending channels and entrepreneurial activity

Research on the impact of traditional financial lending channels, such as formal and informal finance, on entrepreneurial activity, has focused on three main areas: (1) the role of formal finance in alleviating credit constraints on household entrepreneurship. Most studies have shown that credit constraints have a significant

impact on household entrepreneurship (Evans and Jovanovic, 1989; Hurst and Lusardi, 2004) and that the development of financial markets can effectively alleviate the financing constraints faced when starting a business, significantly facilitating entrepreneurial activity and new business entry (Shao, 2014); in areas where residents have relatively easier access to bank loans, local new business entry rates, and growth rates are higher. However, in rural and underdeveloped areas, due to the lack of their own collateral and credit cannot be effectively proven, families are still subject to greater credit constraints when starting a business and face severe "financial exclusion" phenomenon. (Guiso et al., 2004; Zhang and Zhang, 2013). (2) The complementary role of informal finance to formal finance. Due to the severe 'financial exclusion' of formal finance, residents who are willing to start their businesses generally lack objective information that can be easily observed, transmitted, and verified, such as collateral assets and financial statements, to meet the requirements of formal financial institutions such as banks; Banks also lack incentives and motivation to provide credit and other financial services to these particular clients, thus making informal finance an effective alternative and complement to formal finance (Stein, 2002; Allen, 2000). Because of its endogenous nature, informal finance significantly contributes to household entrepreneurial decisions and opportunistic entrepreneurship formation, and further promotes household entrepreneurship by alleviating credit constraints, playing an important role in household entrepreneurship (Li and Zhang., 2016). Some scholars argue that formal finance has greater advantages than informal finance. For example, Han et al. found that the withdrawal of formal financial institutions from rural China was a significant deterrent to entrepreneurship through the transmission of the wealth effect and had a greater impact on the availability of informal credit. Using CFPS data (Han et al. 2013), Liu and Qian found empirically that there is a substitution effect between formal and informal finance (Liu and Qian, 2018), although informal finance has a greater impact on farmers' entrepreneurial decisions. Some scholars also argue that informal finance has greater advantages, such as Li and Zhang based on the perspective of endogenous finance, who argue that the endogenous and localized characteristics of informal finance are better matched with the riskiness of farmers' entrepreneurship and can alleviate formal credit constraints to meet the financing needs of entrepreneurial farmers, not only facilitating farmers' entrepreneurial decisions but also improving their entrepreneurial effectiveness. From the perspective of regional differences, Liu et al. find that the marginal effect of informal finance on farmers' entrepreneurial decisions is greater nationally and that formal finance cannot form effective support for farmers' entrepreneurship in the central and western regions by region (Liu et al., 2017).

2.2   Emerging lending channels and entrepreneurial activity

Digital finance, an emerging financial service model, opens up a third and completely different financing channel in addition to formal and informal finance. Looking at the development characteristics of traditional and digital finance, traditional finance mainly emphasizes the depth of financial services, such as enhancing financial deepening or financial competition, while digital finance mainly emphasizes the breadth of financial services, aiming to promote inclusive economic and social development from a financial perspective (Li et al., 2020). Some scholars argue that financial services should adequately meet the financial needs of all regions and classes, as groups in different regions and classes have equally strong needs for financial services, and unequal access to financial markets has become an important obstacle to economic development, greatly reducing the generation of entrepreneurial activities (Claessens et al., 2007). The emergence of digital finance provides an opportunity to solve this problem, and its "low cost, wide coverage, and sustainability" characteristics are in stark contrast to traditional finance, which can complement the shortcomings of traditional financial services through scenarios, data, and innovative financial products, and improve the accessibility of financial services for disadvantaged groups (Huang et al., 2018). Under the rapid development of e-commerce and communication technology, digital finance has stronger geographical penetration, low-cost advantage, and universality compared with traditional finance, providing more conditions and opportunities for residents to start their businesses (Li, 2015).

Scholars' studies generally agree that there is a positive promotion effect of digital finance on resident entrepreneurship (Jiao et al. 2015; He et al. 2019; Tao et al. 2021), and digital finance permeates resident entrepreneurial activities in a variety of participatory ways. In terms of residents' financing needs, the application of digital financial services helps alleviate financing constraints, enhances the availability of financial services, effectively reduces the financing costs of residents' entrepreneurship, and alleviates the problem of residents' entrepreneurial credit constraints, thus leading to residents' entrepreneurship (Xie et al., 2018). From the perspective of service scope and information access, it is argued that digital finance has broadened the information sources of financial suppliers with the help of big data technology, enabling them to obtain information with more diverse dimensions and comprehensive coverage (Dong et al. 2021), while one of the characteristics of digital finance is to provide residents with inclusive financial services, extensively expand the coverage of financial services, and solve the problem of residents' entrepreneurial credit constraints by so that they have more abundant capital to expand their business (He et al. 2019; Zhang et al. 2022). In addition, Huang et al. (2019) point out that digital finance has disrupted traditional business transaction models, unlocked a large number of new business opportunities, improved resource allocation efficiency, broken down barriers to industry and information, reduced market transaction costs, and played an important role in promoting social equality and creating a favorable environment for entrepreneurship. In addition, some

scholars have also explored the issue from the perspective of human capital accumulation. Li argue that the core element of financial services on residents' entrepreneurship lies in the enhancement of their financial capabilities and that residents gain access to formal financial products and services, in the process improving many basic skills and qualities closely related to entrepreneurship, including the use of the medium of exchange, risk perception, risk management, etc., which in turn In the process, residents improve their basic skills and qualities related to entrepreneurship, including the use of the medium of exchange, risk perception, and risk management, thereby facilitating the formation and establishment of entrepreneurial intentions.

However, some scholars still find that the development of digital finance has not narrowed the 'digital divide' as expected, but has largely exacerbated and widened the existing urban-rural and intra-rural income gaps (Qiu et al., 2016). The reasons for this are threefold: firstly, the slower and more unstable internet connection in rural areas reduces the effectiveness of digital technology as a tool. Second, rural residents are more affected by age, education, and occupational factors, and thus may be marginalized or even squeezed out of the labor market. Thirdly, the wide heterogeneity of rural households in terms of human, social, and physical capital has been translated into digital finance, which also brings about a primary digital divide characterized by an "access gap" in digital infrastructure and a secondary digital divide characterized by a "usage gap" in digital technology. A secondary digital divide, characterized by an access gap in digital infrastructure, and a secondary digital divide, characterized by an access gap in digital technology, is giving rise to a tertiary digital divide, mainly characterized by a digital 'income gap' (Li and Ke, 2021). In addition, there is also a 'Matthew effect' in digital finance, where factors such as the level of Internet access, the skills that match digital technology adoption, and one's own level of education lead to different levels of 'Internet capital' among residents in the case of entrepreneurial households.

2.3   Literature Analysis

The existing studies have analyzed the impact of financial services participation on residents' entrepreneurial activities from two dimensions, namely traditional finance and digital finance, and have achieved many results, which have laid a solid foundation for this study. Both traditional and digital finance are effective channels for entrepreneurs to alleviate their credit constraints, however, existing studies have mainly focused on the alternative relationship between different financial services participation methods, ignoring the complementary relationship between different financial services participation methods. Given this, this paper proposes to analyze and discuss the impact of different modes of financial services participation on entrepreneurial activities from the perspective of single and composite participation, bringing traditional and digital finance under the same framework, which is somewhat innovative. Overall, this study not only reveals the complex causal relationship between different lending channels and entrepreneurship, but also

expands the theoretical boundaries of the relationship between credit constraints and entrepreneurship; it also provides scientific guidance for the optimization of the policy of "financial services for the development of the real economy", and achieves the national economic and social goals of preventing and controlling the new epidemic and stabilizing economic growth. The study also provides scientific guidance for optimizing the policy of "financial services for the development of the real economy", to achieve the national economic and social development goals of preventing and controlling the new epidemic and stabilizing economic growth.

3. Theoretical analysis and research hypothesis

Credit constraints are one of the most significant barriers that inhibit potential entrepreneurs from starting a business, and typically the traditional sources of financing for entrepreneurs include own funds, formal financial loans, informal financial loans, and government subsidies (Zhang and Zhao, 2015). There are significant differences between formal and informal financial loans in terms of the scale of financing, eligibility, risk control, and interest rates, and thus have significantly different requirements for lenders. Specifically, formal finance has the advantage of cost and scale, but its "threshold effect" is obvious; informal finance has the advantage of the information and high efficiency, but loans from friends and relatives tend to be mainly short-term loans, while private loans and microfinance companies usually have high-interest rates (Claessens and Perotti, 2007). Digital financial services can complement the shortcomings of traditional financial services through scenarios, data, and innovative financial products, and improve access to financial services for the disadvantaged. Digital financial services can complement the shortcomings of traditional financial services through scenarios, data and, innovative financial products, and improve the accessibility of financial services for disadvantaged groups (Huang and Huang, 2018).

In the face of credit constraints, entrepreneurs may choose to finance themselves through one lending channel or multiple lending channels. Different financial services participation methods have different degrees of credit constraint alleviation for residents and can also lead to variability in residents' entrepreneurial decisions. Therefore, this paper will first compare and analyze the impact of different financial services participation methods (single participation, i.e., lending through only a single channel; compound participation, i.e., lending through more than one channel) on residents' entrepreneurial activities by formulating hypothesis H_1 and alternative hypothesis H_{1a}:

H_1: The composite participation approach is more effective in promoting residents' entrepreneurial choices than the single participation approach.
H_{1a}: The single-participation approach is more effective in promoting residents' entrepreneurial choices than the single-participation approach.
In addition, to identify in more detail the impact of financial services participation on residents' entrepreneurial choices, a comparative analysis is made of the different

forms of single participation (i.e. the three forms of participation) and the different forms of composite participation (i.e. the different composite forms). Because of the strong 'financial exclusion' associated with traditional finance, people are often forced to choose informal finance when they have a need for finance. However, the emergence of digital finance has improved this situation, with its "low cost, wide coverage, and sustainability" characteristics contrasting with traditional finance. This paper proposes hypothesis H_2 and alternative hypothesis H_{2a}:

H_2: Compared to bank loans and private loans, internet loans are more effective in promoting entrepreneurial choices.

H_{2a}: Internet loans are not a substitute for bank loans and private loans in promoting entrepreneurial choices, and because of the financial exclusion of the traditional financial sector, private loans are still the most effective form of finance in promoting entrepreneurial choices.

Generally speaking, entrepreneurial finance can be obtained through both endogenous and exogenous financing (Wang and Liu, 2015). Endogenous financing mainly refers to the accumulation from the entrepreneur's personal and family; exogenous financing mainly refers to funding from sources other than the entrepreneur's personal and family, including both informal financial financing in the form of loans from relatives, friends, other farmers, and private financial organizations, and formal financial financing such as loans applied from formal financial institutions, as well as various government subsidies received from governments at all levels. It has also been argued that regional financing patterns can significantly influence entrepreneurial activity, with bank credit-led financing patterns inhibiting the growth of entrepreneurial 'numbers' and active equity financing facilitating the occurrence of entrepreneurial activity (Cai et al., 2017). Therefore, as residents' participation in financial services increases, their credit size and entrepreneurial capital will also increase, and so this paper proposes hypothesis H_3 and alternative hypothesis H_{3a}:

H_3: As residents' forms of financial participation increase (i.e. compound participation) can more effectively promote residents' entrepreneurial choices.

H_{3a}: Entrepreneurial choices of residents do not increase with increasing forms of financial participation.

4. Variable Selection and Empirical Analysis

4.1   Data sources, variable selection, and descriptive statistics

4.1.1   Data sources

The data used in this paper comes from the second round of the China Household Finance Survey (CHFS) conducted nationwide in 2019 by the China Ting Finance Survey and Research Centre, Southwest University of Finance and Economics. Using a three-stage stratified, proportional to population size (PPS) sampling method, the China Household Finance Survey aims to collect micro information on

Chinese household finance through scientific sampling, modern survey techniques, and survey management tools, to provide domestic and international researchers with high-quality microdata for studying Chinese household finance issues. The sample covers 29 provinces, 262 counties (districts and county-level cities), and 1,048 communities (villages) across China, and a total of over 28,000 households have been obtained with detailed information on assets and liabilities, income and expenditure, insurance and protection, household demographic characteristics and employment, etc. The project has adopted a number of measures to control sampling and non-sampling errors, and the data are representative and of high quality. At the same time, the 2019 China Household Finance Survey was designed to cover three types of financial participation regarding bank borrowing, internet borrowing, and private borrowing, which provides good data support for this paper to study the impact of financial services participation methods on household entrepreneurial behavior.

4.1.2   Variable selection and descriptive statistics

Explanatory variable: household entrepreneurship. To study the impact of financial services participation on entrepreneurial behavior, the explanatory variable chosen for this paper is whether the household is entrepreneurial. In this paper, household entrepreneurship is defined as a household that is "engaged in self-employment or entrepreneurship", including self-employment, renting, transport, online shop, micro-business, purchasing, and running a company, etc., excluding agricultural production and operation of farmers. The household entrepreneurship category is equal to 1 if the household is "engaged in self-employment or business" and 0 if the opposite is true. The reasons for starting a business are "to be my boss", "to earn more money", "more flexibility and freedom" and "social responsibility", which are defined as active entrepreneurship and vice versa.

Table 1 reports the basic profile of household entrepreneurship, with a total of 3,950 households in the sample choosing to start a business, of which 2,762 (69.92%) were active and 1,188 (30.08%) were passive. Table 1 also reports on the sectors in which households started their businesses. It can be seen that the wholesale and retail sector accounted for nearly half of the active businesses (43.45%), while other sectors came second with 21.36%, followed by accommodation and catering and residential services (12.27% and 11.01% respectively), while other sectors were in single digits. In terms of passive entrepreneurship, wholesale and retail trade also topped the list with 51.43%, followed by accommodation and catering with 14.48% and residential services with only 9.18%. In general, wholesale and retail trade occupies the largest share of both types of entrepreneurship, followed by accommodation and catering and residential services (omitting the other sectors of active entrepreneurship), suggesting that these three sectors absorb the majority of entrepreneurs in current household entrepreneurship.

Table 1: Basic information on home business start-ups

Entrepreneurship		
Type of entrepreneurship	**Active entrepreneurship**	**Passive entrepreneurship**
Number (%)	2762 (69.92%)	1188 (30.08%)
Mining	4 (0.14%)	0 (0.00%)
Manufacturing	177 (6.41%)	41 (3.45%)
Electricity, gas, and water production and supply	10 (0.36%)	2 (0.17%)
Construction	144 (5.21%)	39 (3.28%)
Transportation, storage, and postal services	160 (5.79%)	67 (5.64%)
Information transmission, computer services, and software	37 (1.34%)	8 (0.67%)
Wholesale and retail trade	1200 (43.45%)	611 (51.43%)
Accommodation and Food Services	339 (12.27%)	172 (14.48%)
Finance	10 (0.36%)	2 (0.17%)
Real estate	24 (0.87%)	4 (0.34%)
Rental and business services	52 (1.88%)	20 (1.68%)
Scientific research, technical services, and geological surveys	8 (0.29%)	1 (0.08%)
Water, Environment, and Public Facilities Management	8 (0.29%)	0 (0.00%)
Residential services and other services	304 (11.01%)	109 (9.18%)
Education	27 (0.98%)	6 (0.51%)
Health, social security, and social welfare	55 (1.99%)	13 (1.09%)
Culture, Sports, and Recreation	59 (2.14%)	23 (1.94%)
Public administration and social organizations	1 (0.04%)	0 (0.00%)
Agriculture, forestry, animal husbandry and fishing	82 (2.97%)	43 (3.62%)
Other industries	59 (21.36%)	20 (1.68%)

Explanatory variable: mode of financial services participation. The paper first defines three types of loans based on the source of loans to households engaged in business operations: bank loans (i.e. formal financial services participation), private loans (i.e. informal financial services participation), and internet loans (i.e. digital financial services participation). For bank loans, "outstanding bank/credit union loans due to production and business activities" is assigned a value of 1, otherwise 0; for private loans, "outstanding private loans due to production and business operations" is assigned a value of 1, otherwise 0; for internet loans, "outstanding loans due to production and business operations" is assigned a value of 1, otherwise 0; for internet loans, "outstanding loans due to production and business operations" is assigned a value of 1, otherwise 0. Second, based on the three forms of financial services participation, the paper further defines two forms of financial services

participation: single participation (only one loan channel is selected, i.e. one of the three forms of financial services participation (only one lending channel is selected, i.e. one of the three forms of financial services participation), if there is and only one of the three "bank loans, private loans, Internet loans", then it is defined as 1 if none of them are involved, then it is defined as 0; compound participation (more than one lending channel is selected, i.e. any two or three of the three forms of financial services participation), if there is more than one form of lending (more than one lending channel selected) is defined as 1, and 0 otherwise.

Control variables: As entrepreneurial activity is closely related to the human capital characteristics of entrepreneurs, this paper selects control variables for the individual characteristics of the household head according to the questionnaire setting, including gender, age, education level, and political affiliation. In addition to this, the paper controls for some of the variables that influence entrepreneurship in the household, including risk preference and social capital, where risk preference is judged by a preference for risk and reward, defined as 0 if the resident is unwilling to take any risk or can only accept low and average risk, and 1 if the opposite is true, and social capital is measured by the logarithm of holiday transfer income. The definitions of specific variables and descriptive statistics are shown in Table 2.

As can be seen from Table 2, among the variables related to entrepreneurship, only 11.4% of the sample households started their own business, while only 8% were active and 3.4% were passive; among the variables related to financial services participation, the proportion of sample households taking out bank loans, private loans and Internet loans was only 1.1%, 1.2% and 0.2%, and the proportion of financial services participation in the form of single participation was Among the control variables for individual household head characteristics, 75.3% of the sample household heads were of unmarried gender, most of them were between 43 and 70 years old, their education level was concentrated at primary and secondary levels, only 17.5% were party members, 84.5% were married, and 79.5% of the sample household heads were in good health; among the control variables for household characteristics Within the control variables for household characteristics, the mean value of social capital (i.e. the logarithm of holiday transfer income) is 7.288, with a standard deviation of 1.254, indicating that the majority of households have between 6 and 8.5 units of social capital.

Table 2: Descriptive statistics of variables

Variable	Sample size	Variable description	Mean	Standard deviation	Min	Max
Entrepreneurship	34643	1=yes; 0=no	0.114	0.318	0	1
Proactive entrepreneurship	34643	1=yes; 0=no	0.080	0.271	0	1
Passive entrepreneurship	34643	1=yes; 0=no	0.034	0.182	0	1
Bank loans	34643	1=yes; 0=no	0.011	0.107	0	1
Private loans	34643	1=yes; 0=no	0.012	0.108	0	1
Internet lending	34643	1=yes; 0=no	0.002	0.043	0	1
Single participation	34643	1=yes; 0=no	.017	0.131	0	1
Compound participation	34643	1=yes; 0=no	0.004	0.061	0	1
Sex	34643	1=yes; 0=no	0.753	0.431	0	1
Age	34631	Continuous variables	56.371	13.708	13	101
Educational attainment	34643	0=not in school; 1=primary; 2=secondary; 3=university and above	1.675	0.718	0	3
Party membership or not	34643	1=yes; 0=no 0	0.175	0.38	0	1
Marital status	34643	1=married; 0=other	0.845	0.362	0	1
Health status	34643	1=healthy; 0=unhealthy	0.795	0.403	0	1
Social capital	11788	Continuous variables	7.288	1.254	0	12.206
Internet money management	34643	1=yes; 0=no 0	0.504	0.5	0	1
Financial management	34643	1=yes; 0=no 0	0.066	0.249	0	1
Equity investments	34643	1=yes; 0=no 0	0.058	0.233	0	1
Fund investments	34643	1=yes; 0=no 0	0.019	0.135	0	1
Investments in derivatives	34643	1=yes; 0=no 0	0.009	0.096	0	1

4.2   An empirical analysis of entrepreneurial choices

4.2.1   Model Construction

According to Table 1, it can be found that there is a more concentrated distribution of residents' entrepreneurial choices. Therefore, although the entrepreneurial choice is a binary variable, using a Probit model or a Logit model will cause a greater bias to the empirical results, therefore, according to the characteristics of the data and

the research object, this paper chooses to use a Tobit model to conduct the empirical analysis.

To reveal the impact of different financial services participation methods on residents' entrepreneurial choices, this paper constructs a regression model (1) to analyze:

$$EC = \alpha_0 + \alpha_1 FPW + \sum_{i=2}^{n} \alpha_i X_i + \varepsilon \tag{1}$$

The EC (Entrepreneur Choice) represents residents' entrepreneurial decisions, while the FPW (Financial Participation Way) represents residents' financial services participation methods, including both single and composite participation.

The single participation way includes bank loans, private loans, and internet loans, while the compound participation way refers to participation in more than one form of a loan.

In addition, this paper examines the differences in the impact of different financial service participation modes on entrepreneurial decisions by constructing a model (3) and model (4):

$$EC = \beta_0 + \beta_1 LF + \sum_{i=2}^{n} \beta_i X_i + \varepsilon \tag{2}$$

Y stands for the entrepreneur's choice of business, while LF stands for the entrepreneur's form of loan, which includes three types of loans: formal, private, and internet loans.

$$EC = \beta_0 + \beta_1 PW + \sum_{i=2}^{n} \beta_i X_i + \varepsilon \tag{3}$$

Y stands for the entrepreneur's choice of business, while PW stands for the entrepreneur's compound participation method, including "bank loan + private loan", "bank loan + internet loan", "private loan + internet loan" and "bank loan + private loan + internet loan".

4.2.2 Comparative analysis of single versus composite participation approaches

Table 3 reports the regression results for the effect of single versus compound participation on entrepreneurial choice, and to save space, the control variable cases are omitted from reporting in this paper, as shown in Table 3. From Table 3, it can be seen that the marginal effects of single versus compound participation are 0.324 and 0.3257 respectively, and both are significant at the 1% level, with the marginal effect of compound participation being slightly higher than that of single participation, but the difference is within 1%, the difference is not significant. This result indicates that both single and composite participation significantly promote residents' entrepreneurial behavior, and both increase the probability of starting a business by around 32%, while the marginal coefficient of composite participation is slightly higher than that of single participation. Therefore, this paper concludes that hypothesis H_1 is valid while the alternative hypothesis H_{1a} is not, i.e., compared to the single participation form, the composite participation form can more effectively promote residents' entrepreneurial choice.

Table 3: Comparative analysis of single versus compound participation

	(1)	(2)
Single participation	0.324***	
	(0.014)	
Compound participation		0.325***
		(0.029)
Gender	0.016**	0.026***
	(0.007)	(0.008)
Age	-0.004***	-0.004***
	(0.000)	(0.000)
Education level	0.005	0.006
	(0.005)	(0.003)
Party member or not	-0.038***	-0.040***
	(0.008)	(0.009)
Marital status	0.051***	0.053***
	(0.010)	(0.010)
Health status	0.050***	0.052***
	(0.009)	(0.010)
Social capital	0.004**	0.006***
	(0.002)	(0.003)

Note: Standard errors are in brackets. *, **, and *** represent significance at the 10%, 5% and 1% levels respectively, as below.

4.2.3   A comparative analysis of different single participation methods

Table 4 further reports the impact of each of the three modes of financial services participation on entrepreneurial choice, and to save space, control variables are omitted from reporting, as shown in Table 4. from Table 4 it can be seen that each mode of financial services participation is significant at the 1% level, with the highest marginal effect for private loans, the second highest for bank loans, and the lowest for internet loans. The marginal effects of private loans are relatively close to those of bank loans (within 1% of each other), while those of internet loans are lower. This phenomenon suggests that although internet loans are naturally inclusive by relying on electronic devices such as computers and mobile phones, their role in household entrepreneurship still needs to be further explored. Therefore, hypothesis H_2 does not hold, while alternative hypothesis H_{2a} holds, i.e., internet loans do not replace bank loans and private loans and thus promote entrepreneurial choices more effectively, and private loans are still the most effective form of finance for promoting entrepreneurial choices due to the financial exclusion of the traditional financial sector.

Table 4: Comparative analysis of the impact of a single mode of engagement on entrepreneurial choice

	(1)	**(2)**	**(3)**
Bank Loans	0.324***		
	(0.017)		
Private Loans		0.334***	
		(0.017)	
Internet Loans			0.280***
			(0.043)
Gender	0.013***	0.010**	0.013***
	(0.004)	(0.004)	(0.005)
Age	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)
Education level	0.002	0.002	0.002
	(0.003)	(0.003)	(0.003)
Party member or not	-0.024***	-0.021***	-0.023***
	(0.005)	(0.005)	(0.005)
Marital status	0.019***	0.023***	0.023***
	(0.005)	(0.005)	(0.006)
Health status	0.023***	0.025***	0.025***
	(0.004)	(0.005)	(0.005)
Social capital	0.004***	0.005***	0.005***
	(0.002)	(0.002)	(0.002)

4.2.4 A comparative analysis of different composite participation methods

The marginal effects of the four combinations of the three loan forms on household entrepreneurship do not differ much, and the significance is all at the 1% level of promoting household entrepreneurship, so the control variables are omitted to save space and are not reported, as shown in Table 5. As can be seen from the table, the highest marginal effect is found for the composite form of participation "bank loan + private loan", while the lowest marginal effect is found for "private loan + internet loan". Therefore, hypothesis 3 does not hold while the alternative hypothesis 3_a holds, i.e., residents' entrepreneurial choices do not increase with the form of financial participation.

Table 5: Comparative analysis of composite approaches to entrepreneurial choice

	(1)	(2)	(3)	(4)
Bank loans + private loans	0.333***			
	(0.033)			
Bank Loans + Internet Loans		0.313***		
		(0.105)		
Private Loans + Internet Loans			0.275***	
			(0.105)	
Bank Loans + Private Loans + Internet Loans				0.295***
				(0.121)
Gender	0.014***	0.015***	0.014***	0.014***
	(0.005)	(0.005)	(0.005)	(0.005)
Age	-0.003***	-0.003***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)
Education level	0.002	0.002	0.002	0.002
	(0.003)	(0.003)	(0.003)	(0.003)
Is a party member	-0.023***	-0.023***	-0.023***	-0.024***
	(0.005)	(0.005)	(0.005)	(0.005)
Marital status	0.021***	0.022***	0.022***	0.022***
	(0.006)	(0.006)	(0.006)	(0.006)
Health status	0.026***	0.026***	0.026***	0.026***
	(0.005)	(0.005)	(0.005)	(0.006)
Social capital	0.006***	0.005***	0.005***	0.005***
	(0.002)	(0.002)	(0.002)	(0.002)

5. Robustness testing and heterogeneity analysis

5.1   Robustness tests

In the empirical analysis of this paper, the possible endogeneity problem of the financial services participation approach arises from two main sources: firstly, reverse causality, if entrepreneurs have already started their business before financial, when they find that their cash flow is tighter or they are desperate for funds to scale up in the course of their business, then their entrepreneurial choice will, in turn, affect the financial services participation approach; secondly, the problem of omitted variables, certain unobservable personal characteristics of entrepreneurs, such as ability and risk-taking, can affect both the financial services

participation approach and the entrepreneurial decision, and the omission of these common influences can lead to biased causal estimates.

5.1.1 Selection of tool variables

The lending behavior undertaken by entrepreneurs is essentially an act of participation in the financial market, so this paper constructs instrumental variables through the non-lending activities of entrepreneurs in the financial market. Specifically, this paper chooses to construct instrumental variables with five variables: internet finance, financial finance, stock investment, fund investment, and derivatives investment (see Table 2 for descriptive statistics of the variables), which can reflect residents' investment and financial management behavior in the financial market. Based on this, two instrumental variables are constructed: (1) single financial investment（SFI）, which takes the value of 1 if residents have and only have one investment behavior among these five variables, and 0 if the opposite is true; (2) compound financial investment(CFI), which takes the value of 1 if the sum of the values of the five variables is greater than 1, and 0 if the opposite is true. Based on the instrumental variables, the following two-stage regression equations are created: (4) and (5) are one-stage estimating equations, with single financial investment and compound financial investment being the main explanatory variables for single and compound participation respectively, and the control variables being consistent with the main regression model. The values obtained from the estimation of equations (4) and (5) are substituted separately.

One-stage estimating equation:

$$\overline{Single\ participation}_i = \rho_0 + \rho_1 \text{SFI}_i + \sum_{i=2}^{n} \rho_i X_i + \varepsilon_i \tag{4}$$

$$\overline{Composite\ participation}_i = \rho_0 + \rho_1 \text{CFI}_i + \sum_{i=2}^{n} \rho_i X_i + \varepsilon_i \tag{5}$$

Two-stage estimating equation:

$$EC = \alpha_0 + \alpha_1 \overline{FPW} + \sum_{i=2}^{n} \alpha_i X_i + \varepsilon \tag{6}$$

5.1.2 IV-Tobit test results

Table 6 reports the results of the IV-Tobit test. Firstly, as can be seen from the table, the regression results for both stages are significant at the 1% level and the marginal coefficients for the composite participation fitted values are greater than the marginal coefficients for the single participation fitted values, in line with the main test findings. As can be seen from the table, the F-values of 34.75 and 57.05 respectively, pass the Cragg-Yogo test for an effective instrumental variable with an F-value above 10 and there are no weak instrumental variables.

Table 6: IV-Tobit test

	(1)	(2)	(3)	(4)
	One-stage results	Entrepreneurial options	One-stage results	Entrepreneurial options
Single financial investment	0.008***			
	(0.003)			
Single participation		50.286***		
		(18.550)		
Compound financial investment			0.006***	
			(0.001)	
Composite participation				60.105***
				(17.955)
Control variables	yes	yes	yes	yes
F-value	34.75		57.05	

5.1.3 2SLS test results

Again, Table 7 reports the results of the IV-2SLS test. Firstly, as can be seen from the table, the regression results for both stages are significant at the 1% level and the marginal coefficients for the composite participation fitted values are greater than the marginal coefficients for the single participation fitted values, in line with the main test findings. As can be seen from the table, the F-values are 63.27 and 11.14 respectively, passing the Cragg-Yogo test requirement for an effective instrumental variable with an F-value above 10, and there are no weak instrumental variables.

Table 7: 2SLS test

	(1)	**(2)**	**(3)**	**(4)**
	Single participation	**Business Options**	**Composite participation**	**Business Options**
Single financial investment	0.023***			
	(0.003)			
Single participation		4.338***		
		(0.515)		
Compound financial investments			0.006***	
			(0.001)	
Compound participation				9.844***
				(2.735)
Control variables	yes	yes	yes	yes
Wald value	63.27		11.14	

5.2   Heterogeneity analysis

Residents' entrepreneurial decisions are not only related to financial services but are also influenced by internal and external influences on entrepreneurs. For example, the entrepreneur's previous entrepreneurial experience creates a 'stigma' (Davidge et al., 2016) that drives better entrepreneurial activity, while the external environment, such as the general economic level of a region, affects the accessibility of financial services to residents (Dong et al., 2021). participation to analyze the heterogeneity of the impact on residents' entrepreneurial activities.

5.2.1   Type of business

The Global Entrepreneurship Monitor (GEM) classifies entrepreneurship as survival entrepreneurship and opportunity entrepreneurship. Survival entrepreneurship is a passive entrepreneurial activity chosen by entrepreneurs due to a lack of other employment options. Opportunistic entrepreneurship is an active entrepreneurial activity that is undertaken voluntarily by entrepreneurs who identify entrepreneurial opportunities. Therefore, the paper further analyses the heterogeneity of the two entrepreneurial types. The regression results are shown in Table 8.

From Table 8, it can be found that among the two types of entrepreneurships, active and passive, the marginal impact of single and compound financial participation on entrepreneurship is more differentiated. In particular, the marginal coefficients of single participation and compound participation for active entrepreneurship are 0.225 and 0.325 respectively, while those for passive entrepreneurship are 0.081 and 0.090 respectively, the marginal impact of financial participation on active entrepreneurship is much larger than that of passive entrepreneurship. In addition, the results for both entrepreneurship types are consistent with the main test, i.e. the marginal effect of compound participation is higher than that of single participation.

Table 8: Analysis of the heterogeneity of the types of entrepreneurships

	(1)	(2)	(3)	(4)
	Proactive Entrepreneurship		**Passive entrepreneurship**	
Single participation	0.225***		0.081***	
	(0.001)		(0.008)	
Composite participation		0.325***		0.090***
		(0.029)		(0.014)
Control variables	yes	yes	yes	yes

5.2.2   Entrepreneurial Experience

The American scholar MacMillan (1986) suggests that among the many types of entrepreneurs studied, particular attention should be paid to the study of Habitual entrepreneurs, who have an 'entrepreneurial experience curve' and are the 'engines' of business activity (MacMillan., 1986). "They are the 'engines' of business activity. Therefore, this paper further classifies entrepreneurs with entrepreneurial experience and first-time entrepreneurs, and the regression results are shown in Table 9. As can be seen from the table, the marginal effect is higher for entrepreneurs with entrepreneurial experience than for those without entrepreneurial experience, both in terms of single and compound participation. The possible reasons for this are that entrepreneurs who have started their own businesses many times have a better understanding of the venture and are more likely to receive financial support for their venture.

Table 9: Heterogeneity analysis of entrepreneurial experience

	(1)	(2)	(3)	(4)
	Experienced		**No experienced**	
Single participation	0.503***		0.287***	
	(0.050)		(0.016)	
Composite participation		0.451***		0.290***
		(0.100)		(0.033)
Control variables	yes	yes	yes	yes

5.2.3   Industry differences

Access to start-up capital is also closely related to the characteristics of the industry in which you operate. In higher value-added industries, the slower return of capital after starting a business is not conducive to reducing the pressure on loans or to obtaining further loans. From the perspective of the opportunity cost of starting a business, higher value-added industries are more likely to be negatively affected by repayment pressure. To test this hypothesis, we further classified the 20 industries into high-value-added and low-value-added industries based on the breakdown of the household tracking survey data. The estimated results are shown in Table 10, which shows that digital financial participation has a smaller coefficient of influence on entrepreneurial choice in high-value-added industries, whether single or compound participation.

Table 10: Analysis of heterogeneity in the entrepreneurial sector

	(1)	**(2)**	**(3)**	**(4)**
	High value-added industries		**Low value-added industries**	
Single participation	0.437***		0.469***	
	(0.089)		(0.037)	
Composite participation		0.350**		0.422***
		(0.179)		(0.077)
Control variables	yes	yes	yes	yes

5.2.4 Urban-rural differences

By comparing the impact of financial services participation on entrepreneurial choices between urban and rural residents, it can be seen that the marginal coefficients of single and compound financial participation are 0.316 and 0.312 for urban and 0.325 and 0.332 for rural areas, and it can be seen that there is no major difference between single and compound participation within urban and rural areas, while between urban and rural The marginal effects are slightly higher in both rural than in urban areas. Therefore, further analysis was carried out in this paper and as can be seen in Table 12, the marginal effect of internet lending is lower than bank lending within both urban and rural areas, while between urban and rural areas, the marginal effect values for all forms of lending are higher in urban areas than in rural areas.

Table 11: Heterogeneity analysis of urban-rural differences

	(1)	**(2)**	**(3)**	**(4)**
	City		**Rural**	
Single participation	0.316***		0.325***	
	(0.023)		(0.018)	
Composite participation		0.312***		0.332***
		(0.045)		(0.039)
Control variables	yes	yes	yes	yes

Table 12: Heterogeneity analysis of urban-rural differences

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	City			**Rural**		
Bank Loans	0.546***			0.537***		
	(0.024)			(0.021)		
Private loans		0.551***			0.546***	
		(0.027)			(0.019)	
Internet Loans			0.518***			0.495***
			(0.058)			(0.062)
Control variables	yes	yes	yes	yes	yes	yes

5.2.5   Regional differences

As the level of financial development is closely related to regional economic development, this paper conducts a regional-level heterogeneity analysis based on the level of economic development. Specifically, we divide the country into three regions, East, West, and Central, according to the National Bureau of Statistics' division of national regions, and run separate regressions. The estimated results are shown in Table 13. Surprisingly, the impact coefficients of both single and compound financial participation are higher in the west than in the east and central regions, with the editorial coefficient of single participation being 0.555, higher than that of 0.547 in the east and 0.539 in the central region; the marginal coefficient of compound participation in the west is 0.538, higher than that of 0.536 in the east and 0.523 in the central region. A more plausible explanation is that access to financial loans is relatively difficult in the west, and households that receive loans are more likely to choose entrepreneurship.

As the level of financial development is closely related to regional economic development, this paper conducts a regional-level heterogeneity analysis based on the level of economic development. Specifically, we divide the country into three regions, East, West, and Central, according to the National Bureau of Statistics' classification of national regions and run separate regressions. The estimated results are shown in Table 10. Surprisingly, the impact coefficients are higher in the central region than in the east and west regions for both single and composite financial participation. A more plausible explanation is that residents in the East have more wealth of their own and do not need much borrowing to start entrepreneurial activities, whereas, in the West, the will to start a business and the need for loans are difficult to realize due to the imperfection of financial services, while the Central region happens to have a certain foundation for both and is, therefore, higher than the East and West regions.

Table 13: Heterogeneity analysis of regional differences

	(1)	(2)	(3)	(4)	(5)	(6)
	Eastern Region		Central Region		Western Region	
Single participation	0.305***		0.338***		0.326***	
	(0.023)		(0.025)		(0.025)	
Composite participation		0.309***		0.340***		0.325***
		(0.049)		(0.058)		(0.047)
Control variables	yes	yes	yes	yes	yes	yes

6. Conclusions and policy recommendations

6.1 Conclusions

Based on data from the 2019 China Household Finance Survey of the Southwest University of Finance and Economics, this paper empirically analyses the impact of financial services participation patterns on household entrepreneurial choices. The study finds that:

(1) Both single and compound participation modes can have a significant positive impact on residents' entrepreneurial choices, with the compound participation mode having a relatively higher facilitation effect than the single participation mode. When the single mode of participation is broken down further, it is found that private loans have the highest impact on residents' entrepreneurial choices, followed by bank loans and finally internet loans. This suggests that digital finance, despite its "low cost, wide coverage, and sustainability" characteristics, is not yet having the desired impact. When we break down the compound participation method, we find that the highest marginal effect on entrepreneurship is found in the compound participation form of "bank loan + private loan", while the lowest marginal effect is found in "private loan + internet loan". It can be found that although there is a certain threshold for bank loans, among the composite participation methods, the composite participation form including bank loans has a higher marginal effect, which means that bank loans are still very important for residents' entrepreneurship.

(2) To further explore the heterogeneous effect of financial services participation on residents' entrepreneurial choices, this paper analyses the heterogeneity of internal and external circumstances of entrepreneurial activities: based on the heterogeneity of active and passive entrepreneurship, it is found that financial services participation is more pronounced for passive entrepreneurship; based on the heterogeneity of entrepreneurial experience, it is found that financial services participation is more pronounced for entrepreneurs who lack entrepreneurial experience; based on the heterogeneity of industry, it is found that financial services participation is more pronounced for entrepreneurs who lack entrepreneurial

experience; Based on industry heterogeneity, it is found that financial services participation has a more significant effect on entrepreneurs in low value-added industries; based on urban-rural heterogeneity, it is found that there is no significant difference between the two, but there is a difference in the specific form of single participation, and the difference in formal financial services participation and digital financial services participation between urban and rural areas is the main reason for the difference in compound financial participation; based on regional heterogeneity, it is found that financial services participation has a more significant effect on Based on regional heterogeneity, it is found that financial services participation has a more significant impact on entrepreneurial choices in the central region. Overall, the results of the heterogeneity analysis suggest that financial services participation has a more significant effect on entrepreneurial activity among low endowment households.

6.2   Policy recommendations

Based on the findings of this paper, the following policy recommendations are made:
(1) Give full play to the role of formal financial support. On the one hand, we should make full use of the network and institutional advantages of large banks to increase the construction of specialised institutions for family entrepreneurship financial services; guide small and medium-sized banks to increase their credit support for family entrepreneurship; and further improve the support role of local commercial banks for local small and medium-sized enterprises. Banks at all levels should improve their financing guarantee policies and reasonably determine guarantee fees to provide targeted financial products and differentiated services for family entrepreneurship. On the other hand, the government should establish a sound financial supervision system and reasonably guide large commercial banks and other formal financial funds to meet the financing needs of family entrepreneurship; improve the risk management system, develop a credit rating system that reflects family entrepreneurship, establish reasonable and scientific rating indicators, and build a credit collection system that is applicable to family entrepreneurship.
(2) Reasonably guide the development of informal finance. On the one hand, we should deregulate informal finance, clarify the legal status of informal finance, guide it to better serve family entrepreneurship, and make use of the local social network, information, norms and trust of the community and the social capital brought about by the organisation of residents, innovate group joint guarantee loan mechanisms and credit loans, further establish the link between formal and informal finance, increase the capital supply of informal finance, and guide its reasonable expansion. The Government should further establish links between formal and informal finance, increase the supply of informal finance and guide its reasonable expansion. On the other hand, in view of the risky nature of informal finance, the legalisation process of informal finance should be accelerated, an effective early warning mechanism and crisis management mechanism for informal finance should be established, and the regulation of informal finance activities should be

strengthened to guide its standardised development.

(3) Deeply explore the role of digital finance for the benefit of all. On the one hand, for some regions with low economic development, the government should strengthen the balanced distribution of financial resources in each region and continue to improve the construction of communication and digital financial infrastructure in remote areas, including mobile Internet and modern financial supervision systems, so that residents in rural and remote areas can enjoy more equal access to digital financial services. On the other hand, the government should enhance the financial literacy of residents through financial literacy training to expand the service groups of digital finance, while promoting the competing development of traditional and digital finance, gradually enriching and improving the product system of the digital finance market to better meet the financing needs of household entrepreneurship.

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