Research Article

Digital Inclusive Finance, Multidimensional Education, and Farmers' Entrepreneurial Behavior

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Scarce financial supply and low education level are important factors that inhibit the entrepreneurial behavior of rural residents in China. Based on the Static Career Choice Model, this paper matches the 2016 China Household Finance Survey (CHFS) micro-data with the Peking University Digital Financial Inclusive Index of the previous years to empirically test the impact of digital financial inclusion and academic education, tacit knowledge, and Internet learning on farmers. The direct influence and linkage effect of entrepreneurial behaviors revealed that digital financial inclusion and multidimensional education could significantly promote farmers' entrepreneurial choices. Digital financial inclusion can relieve the constraints of insufficient academic education on farmers' entrepreneurial choices, partially replace the tacit knowledge for rural residents, and improve the efficiency of Internet learning, which ultimately enhances the entrepreneurial behavior choices of the farmers. Our results are still significant and robust with respect to the sample data, explained variables, and estimation methods. We also consider the use of instrumental variables to overcome the potential endogeneity issues. Through comparative analysis of different regions, it is found that the performance is particularly obvious in the eastern region.

1. Introduction

Entrepreneurship of farmers can help improve rural employment and farmers' incomes, which is an important means to implement the Rural Revitalization Strategy of the Central Government of China. The research on the factors affecting farmers' entrepreneurship and policies to promote entrepreneurship has aroused extensive discussions in the academic community. The factors affecting farmers' entrepreneurship, individual education, and the rapid development of digital financial inclusion have played an important supporting role.

Education is closely related to the entrepreneurial behavior of farmers. In addition to the traditional academic education, other types of education will also become a key factor influencing rural residents' entrepreneurial choices. Since academic education has a certain lag in the impact of farmers' entrepreneurial behavior, for the promotion of farmers' entrepreneurship at this stage, broadening of multidimensional education channels will enable farmers to

enhance their entrepreneurial capabilities in practice and alleviate the constraints of insufficient academic qualifications on entrepreneurship. The economic environment is also an important factor affecting entrepreneurial behavior. In recent years, with the continuous enhancement of the integration of digital technology and traditional finance, digital finance has become an emerging format of inclusive financial services. Through the strong geographic penetration and the information advantage of capturing long-tail customers, digital financial inclusion has become a key financial tool on entrepreneurship for serving small private businesses, small and micro enterprises, and especially the more disadvantaged rural households. For farmers, the use of digital financial inclusion can alleviate credit constraints and is an important way to achieve multidimensional education and improve financial literacy and entrepreneurial capabilities.

This article focuses on answering the following questions. How do multidimensional education, academic education, tacit knowledge, Internet learning, and digital

financial inclusion affect farmers' entrepreneurial responses, respectively? How does multidimensional education affect farmers' entrepreneurial behavior in the digital financial inclusion environment? What is the interaction between academic education and digital financial inclusion on entrepreneurial performance? Can farmers in different regions benefit from digital financial inclusion relatively equally in terms of entrepreneurship?

The rest of the paper is organized as follows: In Section 2, we review the related literature and discuss the theoretical justification of our research. The theoretical analysis framework and proposed hypotheses for empirical testing are also discussed in this section. In Section 3, regression models, variables, and data are discussed. In Section 4, the empirical results are presented. In Section 5, we perform robustness checking and also test the endogeneity. Regional analysis by subsamples is presented in Section 6. Finally, Section 7 concludes the paper.

2. Literature Review and Theoretical Basis

2.1. Literature Review. At present, academic research on digital inclusive finance and multidimensional education on residents' entrepreneurial decision-making mainly focuses on the effects of digital inclusive finance on residents' entrepreneurship and the impact of multidimensional education on residents' entrepreneurship, respectively.

As far as the role of digital financial inclusion in residents' entrepreneurship is concerned, the existing literature mainly focuses on the following two aspects. First, from the perspective of practical application and financial product innovation, it illustrates the support path of digital financial inclusion for entrepreneurial behavior through cases, such as the "Inclusive Finance and Smart County" project of the Internet Commercial Bank in Wugong County, Shaanxi Province, and the "Youth Entrepreneurship Loan" model developed by the Yingquan Rural Commercial Bank of Fuyang City, which provide strong support for local farmers to start businesses [1]. Second, it is to use different levels of macro- and micro-data to study the impact of digital financial inclusion on the entrepreneurial behavior of farmers. For example, Luo and Zhang [2] measured the entrepreneurial participation rate of residents in each city by (number of individual employees + number of employees engaged by private enterprise investors)/resident population. They believe that when the level of development of digital financial inclusion, insurance coverage, traditional finance, and industrial structure crosses the corresponding thresholds, the role of digital financial inclusion in promoting residents' entrepreneurship will continue to increase as the threshold variables increase. In contrast, they believe that when human capital crosses the corresponding threshold, the role of digital financial inclusion in promoting residents' entrepreneurship will continue to weaken as the level of threshold variables increases. Tao et al. [3] used provincial panel data and CFPS data to show that digital finance is inclusive, promoting family entrepreneurial decision-making. At this stage, the effect of digital finance on rural household entrepreneurship is greater than that of

urban households. Based on the Peking University Digital Financial Inclusive Index and the Sun Yat-sen University China Labor Force Dynamics Survey (CLDS) Database, Zhang and Huang [4] found that the level of development of digital financial inclusion and its various dimensions have a significant positive effect on the self-employment of rural labor, especially for rural labor to become self-employed. In addition, digital financial inclusion has a stronger role in promoting self-employment activities of rural laborers over the age of 35 in underdeveloped areas with lower education levels. He and Li [5] used the rural inclusive finance survey conducted by China Agricultural University. They believed that digital finance eases the credit constraints of farmers, increases the availability of information for farmers, enhances farmers' social trust, and ultimately promotes farmers' entrepreneurial decision-making. At the same time, it is believed that the impact of digital finance on nonagricultural and survival entrepreneurship is very significant. Still, the impact on agricultural and development entrepreneurship is not obvious.

In addition to traditional academic education [6, 7], tacit knowledge [8, 9], "learning by doing" entrepreneurial practice [10, 11], financial literacy [12–14], Internet learning [15, 16], and so on will also become important factors influencing the entrepreneurial choices of rural residents. Wang and Li [22] proposed multidimensional education, specifically academic education, tacit knowledge, and Internet learning. From these three dimensions, the impact of multidimensional education on farmers' entrepreneurship can be sorted out, including the following aspects. First, academic qualifications have a significant positive impact on farmers' entrepreneurship [18, 19]. Zhou [20] argued that the level of artistic quality of farmers directly affects the choice of occupation, location, and time for migrant workers to go out to work, and indirectly affects the decision of migrant workers to return home to start a business. Huang et al. [21] explained that rural students involving formal full-time education can positively promote entrepreneurship intentions exposed to campus entrepreneurship culture and practice courses. Second, tacit knowledge has a significant role in promoting entrepreneurship. Tacit knowledge was originally referred to as knowledge that people know but is indescribable [22], and later it was widely regarded as the part of knowledge that is generated in the organization and owned by individuals, which can be obtained and transferred through observation and interaction [23]. Cao and Luo [6] demonstrated that farmers who have close contacts with relatives and friends, and those whose family members or relatives are village cadres, government staff, or bank clerk, are more inclined to participate in entrepreneurial financing. In Hu and Zhang [8], the notable role of social networks in promoting entrepreneurship in urban and rural families is discussed. But, it has a greater effect on the latter. Liu et al. [24] believed that the kinship network can improve the entrepreneurial performance of farmers, and compared with returning farmers, the kinship network has a greater effect on the farmers who have not gone out. Third, Internet learning can also positively promote farmers' entrepreneurial behavior, including Internet embedding [25],

Internet procurement and sales [16], mobile payment [26], and similar factors. Internet learning is conducive to farmers' exploratory and utilization entrepreneurial learning, thereby promoting their entrepreneurial decision-making and business performance [27].

Combining the literature mentioned above, although current studies have focused on the impact of education level and digital financial inclusion on rural residents' entrepreneurial choices from multiple perspectives, there is a lack of integration of these three into the same theoretical framework for research. The financing environment and education level are the two key factors for farmers' entrepreneurial behavior. Digital financial inclusion is a new type of financial format based on Internet technology, which can help farmers expand their knowledge in their use. In this process, the financial environment and multi-dimensional education interact, and ultimately the two have a cross-influence on the entrepreneurial decision-making of farmers. This article establishes an analytical framework that includes three elements: digital financial inclusion, multidimensional education, and farmers' entrepreneurship. We consider data selected from "2016 China Family Tracking Survey (CFPS)," "2017 China Household Finance Survey (CHFS)," "China Economic Statistics Yearbook (2017 and 2018)," and "Digital Inclusive Finance Index (2015 and 2016)," and use regression models such as binary Probit, Logit, IV-Probit, and Tobit to focus on the cross-influence of the digital inclusive financial environment and multidimensional education on the entrepreneurial behavior of the farmers.

This study makes three contributions to the existing literature. Firstly, based on the static career choice model, it analyzes the linkage mechanism of the digital inclusive financial environment and multidimensional education on the entrepreneurial behavior of farmers. By analyzing the external environment, farmers' entrepreneurial characteristics, and their mechanism of action, we seek to stimulate the sustainable vitality of entrepreneurship and improve the choice of entrepreneurial paths. Secondly, we aim to find ways that actively respond to development concepts such as "village revitalization strategy" and "digital empowerment," and provide a theoretical reference for improving the endogenous power of rural economic development. Finally, we comprehensively consider the regional heterogeneity of digital inclusive finance, multidimensional education, and farmer entrepreneurship, which is conducive to understanding the actual value of digital financial inclusion in various regions.

2.2. Theoretical Analysis Framework.

The static career choice model shows that after the individual's multidimensional education level increases, the same financial capital investment will produce different entrepreneurial benefits [28]. The basic premise assumes that rational individuals follow the principle of maximization of utility. They will choose to start a business only when their income from becoming an entrepreneur is higher than that from becoming an employee. This model assumes that the resources owned by farmers can be divided into two types: financial capital represented by digital financial inclusion K and educational capital represented by multidimensional education A. Assume that all farmers are risk-neutral. They can freely choose to be hired or start their businesses.

If a farmer is employed, the wage income function obtained is affected by educational capital:

$$w(A) = \eta A^{\gamma}, \tag{1}$$

where η is a constant, $\eta > 0$, and $\gamma \in (0, 1)$, representing the level of capital of farm households.

Idle financial assets of farmers can also generate certain rewards. Assuming that the rate of return on assets is i, the total output of the employed farmers y_w is

$$y_w(K, A) = w(A) + (1 + i)K. \tag{2}$$

Assuming that the comprehensive contribution coefficient of capital is μ and the total output of its entrepreneurial activity production function y_c is only determined by financial capital K and educational capital A; then,

$$y_c(K, A) = \mu K^{\alpha} A^{\beta}. \tag{3}$$

Among them, $\mu > 0$ and $\alpha, \beta \in (0, 1)$.

Furthermore, the net income of farmers' entrepreneurship π_c is the total output of entrepreneurship minus the financing principal and interest, and we obtain

$$\pi_c(K, A) = y_c(K, A) - (1 + i)K. \tag{4}$$

For rational farmers with entrepreneurial willingness, the necessary condition for choosing entrepreneurship is that the total output of entrepreneurship is greater than the total output of being employed. At this time,

$$\begin{aligned} y_c(K, A) &> y_w(K, A), \\ \pi_c(K, A) &> w(A). \end{aligned} \tag{5}$$

In other words, the necessary condition for farmers to engage in entrepreneurial behavior is that the family's net income level is greater than the operating income at the time of employment. Assuming that the financial capital investment K is constant, the first-order partial derivatives of net entrepreneurial income and wage income concerning multidimensional education levels are both greater than zero, namely,

$$\frac{\partial \pi_c}{\partial A} = \mu \beta K^{\alpha} A^{\beta-1} > 0,$$

$$\frac{\partial w}{\partial A} = \eta \gamma A^{\gamma-1} > 0. \tag{6}$$

When $\beta > \gamma$ and $\mu \beta K^{\alpha} > \eta \gamma$, we have $(\partial \pi_c / \partial A) > (\partial w / \partial A)$, $\pi_c(0) > 0$, and $W(0) = 0$. The function of $\pi_c(K, A)$ and $W(A)$ is shown in Figure 1, the abscissa is education level A, and the ordinate is net entrepreneurial income or wage income. The only focus is A^*.

Figure 1 analyzes the impact of educational capital on career choices, ignoring financial capital, and calculating the partial derivatives of net entrepreneurial income and wage income with respect to academic education. Figure 2 analyzes the impact of financial capital on career choices, without considering academic education, and calculating the
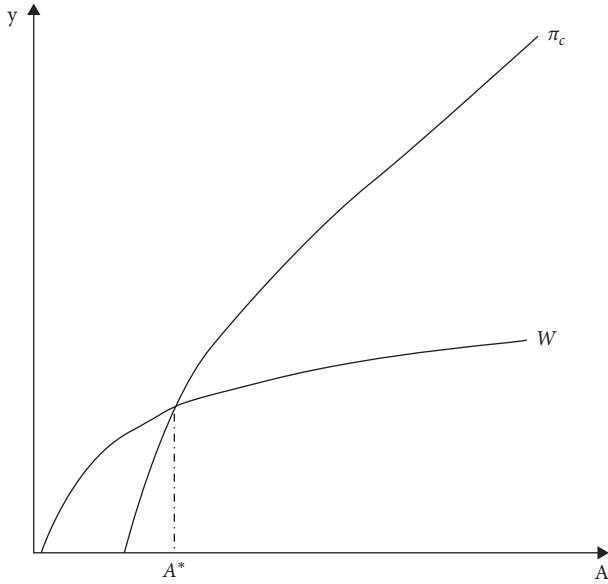
FIGURE 1: Farmers' multidimensional education and entrepreneurial decision-making.
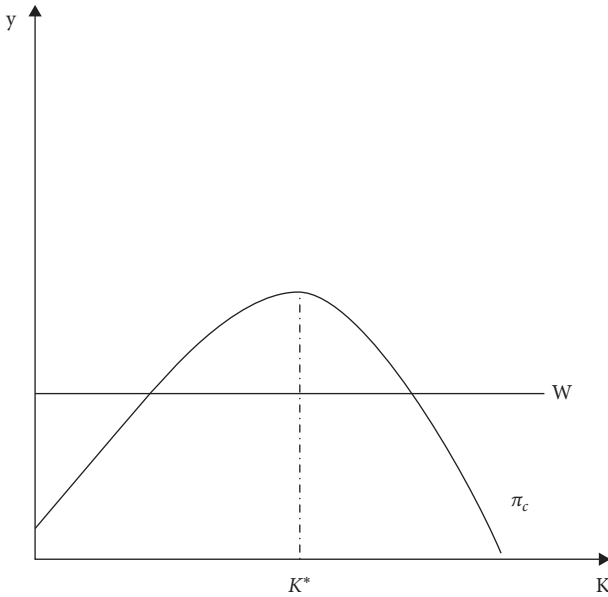

FIGURE 2: Digital inclusive finance and rural household entrepreneurial decision.

partial derivatives of net entrepreneurial income and wage income with respect to financial capital. Figure 3 comprehensively analyzes the impact of educational capital and financial capital on career choices. With the increase of financial capital, the wage income of rural households remains unchanged, but the total output of entrepreneurship presents an inverted U-shaped curve, as shown in Figure 2. The net income of entrepreneurship finds the first-order derivative of financial capital. Then, we set the derivative equal to 0, and find the optimal borrowing scale of farmers when A is constant, namely,

$$\frac{\partial \pi_c}{\partial K} = \alpha \mu K^{\alpha - 1} A^{\beta} - (1 + i) = 0. \tag{7}$$

That is,

$$K^* = \left(\frac{\alpha \mu}{1 + i}\right)^{1/(1-\alpha)} A^{\beta/(1-\alpha)} > 0. \tag{8}$$

Substituting into equation (4), we get

$$\pi_c^*(A) = \mu(1 - \alpha)\left(\frac{\alpha \mu}{1 + i}\right)^{\alpha/(1-\alpha)} A^{\beta/(1-\alpha)}. \tag{9}$$

The inevitable condition for choosing entrepreneurship is $\pi_c^*(A) > w(A)$. Dong et al. [29] pointed out that the multidimensional education level in rural areas is lower than the equilibrium point A^*. In reality, farmers are generally subject to credit constraints. Therefore, farmers' venture capital K is lower than the optimal capital scale K^*, indicating that both digital financial inclusion development and multidimensional education will increase the probability of entrepreneurship.

When $K < K^*$, the development of digital financial inclusion can alleviate the adverse effects of the lack of multidimensional education of farmers to a certain extent, increase the multidimensional education level of farmers, and change the entrepreneurial curve of farmers from π_{c1} to π_{c2} in Figure 3, thus increasing the optimal financial capital scale of farmers from K_1^* to K_2^*. When the same ΔK (productive lending directly provided by digital financial inclusion) is provided, farmers who use digital financial inclusion are more inclined to start businesses and get more benefits than those who do not. Digital financial inclusion improves the probability of residents' entrepreneurship from three aspects of multidimensional education.

2.3. Proposed Hypotheses for Empirical Analysis. Based on the above literature review and our research purpose discussion, we consider the following hypotheses for our empirical analysis.

Hypothesis 1. Digital financial inclusion will alleviate the constraints of insufficient academic education on farmers' entrepreneurial choices.

The average level of education of rural households in China is not high. When starting a business, they encounter prejudices in the financial market. The problems of expensive and difficult financing coexist, and access to funds is restricted. In 2016, the State Council promulgated the "Promoting Inclusive Finance Development Plan (2016–2020)," which proposed encouraging the provision of financial services to entrepreneurial farmers and other long-tail customers at affordable costs through Internet financial service platforms. Digital inclusive finance uses the Internet and the technology of information and communication to complete a series of financial activities such as third-party payment, online lending, funding direct sales, crowdfunding, and online insurance, alleviating the low efficiency, high threshold, and professionalism in the process of traditional inclusive financial services. It broadens the financing channels of farmers, brings about
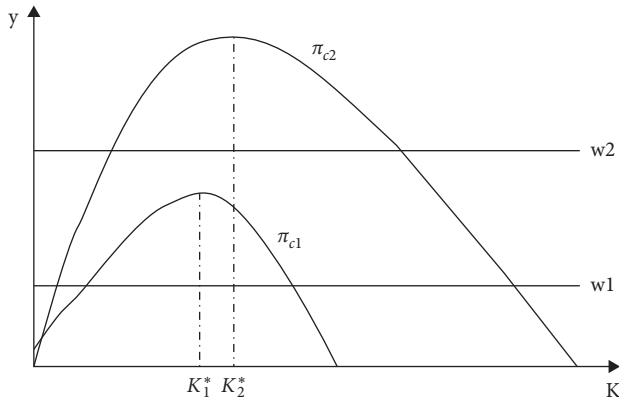
Figure 3: Influence of multidimensional education on farmers' entrepreneurial choice under the environment of digital inclusive finance.

an increase in the family income, and provides financial support for entrepreneurs in poor and vulnerable areas [30]. At the same time, in the process of exposure to digital financial inclusion, farmers have subtly improved financial literacy and information screening ability. They are more inclined to participate in e-commerce or other digital economic activities, thereby regulating the impact of insufficient academic qualifications on identifying entrepreneurial opportunities.

Hypothesis 2. Digital financial inclusion will partially replace the influence of tacit knowledge on rural residents' entrepreneurial choices.

Rural China is an "acquaintance society" based on blood, kinship, and geographic locations, wherein most of the tacit knowledge is acquired by farmers. Although it is beneficial to the actual entrepreneurial behavior of some farmers, there are temporal and spatial boundaries that are likely to consolidate their knowledge and experience. Digital inclusive finance relies on digital technology and is incorporated into commercial banks, financial technology companies, technology associations, public welfare teams, and other organizations to form a relatively rich and complete social circle. It indirectly reduces tacit knowledge on farmers' capital and information acquisition, thereby promoting their entrepreneurial behavior. Specifically, digital financial inclusion may adjust tacit knowledge to stimulate farmers' entrepreneurship in two ways: on the one hand, the use of digital finance by farmers has weakened the mutual guarantee or lending between acquaintances, thereby reducing the financing constraints of entrepreneurs [31]; on the other hand, digital finance uses technology dissemination and information sharing to explore business opportunities and extend the social network radius of microeconomic entities. For example, Alipay's interfaces such as Ant Forest, Ant Manor, and Baba Farm integrate daily life, online interaction, public welfare, and environmental protection into a powerful social network system, expanding demand for agricultural products such as fruits and saplings, ultimately partially replacing tacit knowledge and enhancing entrepreneurial response.

Hypothesis 3. Digital financial inclusion improves the efficiency of Internet learning and enhances farmers' entrepreneurial behavior choices.

The improvement of the rural network infrastructure and the long-term use of the Internet can strengthen the entrepreneur's knowledge category and accept external information [32]. Compared with traditional Internet learning, digital financial inclusion aims to deeply integrate technology represented by artificial intelligence, big data, cloud computing, and the Internet of Things with the traditional financial industry, which encourages financial technology companies to guide large state-owned banks, joint-stock commercial banks, rural commercial banks, and rural banks to conduct their businesses into rural financial markets, and then reduces information asymmetry and transaction costs. It has professional technical guidance and management training functions, which can provide an open online learning path, strong oriented and professional operation reducing the cost of user information search, and promoting farmers to understand, recognize, compare, and imitate information more purposefully. An efficient entrepreneurial information acquisition process replaces the Internet's relatively common knowledge retrieval process, reducing the time cost of farmers' Internet search-based learning and enhancing farmers' entrepreneurial choices. Simply put, it replaces the relatively common knowledge retrieval process on the Internet with a more efficient process, so it reduces the time cost of farmers' Internet search-based learning and enhances farmers' entrepreneurial choices. Digital financial inclusion in financial institutions is often a combination of policies that benefit the people and digital technology. The application of digital technology usually includes information collection, credit rating assessment, automatic calculation of credit lines and loan interest rates. Farmers often only need to download relevant banking apps to their mobile phones in order to independently involve in comprehensive financial services such as loan processing, payment, transfer, deposit, wealth management, social security card activation, collecting for another agency, pay for another, wage payment, and so on. In addition to the bank's corresponding publicity and some training activities, farmers can take questions to the bank to consult the staff on how to use mobile banking. In this process, the efficiency of Internet learning has been improved, more financial knowledge and application capabilities have been accumulated, and ultimately it enhances the possibility of farmers' entrepreneurial choices.

Concisely, as an entrepreneurial environment, digital inclusive finance and multidimensional education have an interactive impact, which plays a role in the entrepreneurial choices of farmers, as shown in Figure 4.

3. Models, Variables, and Data

3.1. Models. First, we study the impact of digital financial inclusion and multidimensional education on the entrepreneurial behavior of rural residents in China. Considering that the individual characteristics, family characteristics, and regional characteristics will affect their entrepreneurial
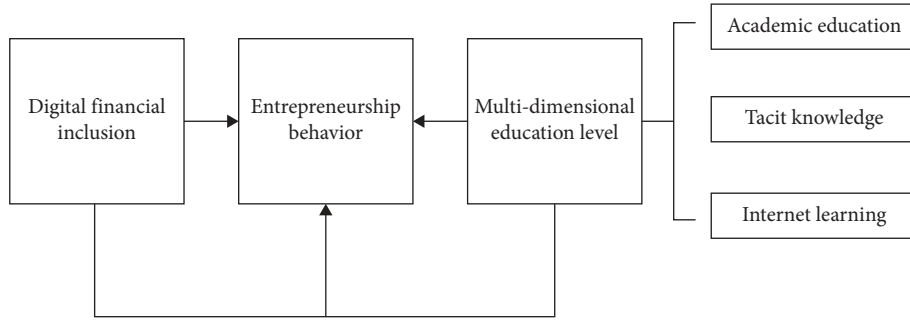
FIGURE 4: Theoretical framework of the influence of multidimensional education on farmers' entrepreneurial choice in the context of digital inclusive finance.

choices, the specific measurement model is designed as follows:

$$Entre_{i,j} = \alpha + \beta_0 In\ de\ x_j + \beta_1 E\ DU_{i,j} + \beta_2 X_{i,j} + \beta_3 Z_j + \varepsilon_{i,j}. \quad (10)$$

$Entre_{i,j}$ represents the binary variable of whether the i-th rural resident in the j-th province chooses to start a business; $In\ de\ x_j$ represents the independent variable, which is the level of digital financial inclusion in the j-th province; $E\ DU_{i,j}$ represents all education-related variables of the i-th farmer household surveyed in the j-th province; $X_{i,j}$ represents the set of individual characteristic variables; Z_j represents the set of regional characteristic variables; $\varepsilon_{i,j}$ represents a random error.

To further test the impact of multidimensional education on farmers' entrepreneurial choices in the digital financial inclusion environment, the interactive term of digital financial inclusion and education is added to the above model. Thus, we have

$$Entre_{i,j} = \alpha + \beta_0 In\ de\ x_j + \beta_1 E\ DU_{i,j} + \beta_2 X_{i,j} \\ + \beta_3 In\ de\ x_j \times E\ DU_{i,j} + \beta_4 Z_j + \varepsilon_{i,j}. \quad (11)$$

3.2. Variables

3.2.1. Dependent Variables.
The dependent variable is: whether rural residents start a business ($Entre_{i,j}$). According to Wang and Huang [10], we choose the CFPS2016, "Is your job working for yourself/your family or being employed by another person/another family/organization/unit/company?" and "Is your job agricultural or nonagricultural work?" to represent the type of job generated. If the respondent chooses "private enterprise/individual business/other self-employed," it means starting a business and a value of 1 is assigned. On the contrary, if the respondent chooses "own agricultural production and operation," "agricultural employment," and "nonagricultural employment," it means not starting a business, a value of 0 is assigned. Statistics show that there are 1,147 entrepreneurs, accounting for 7.47% of the total sample.

3.2.2. Core Independent Variables.
We consider the following variables: multidimensional education which includes academic education, tacit knowledge, Internet learning. First, educational qualifications (*eduC*) are judged by the question of "the highest degree in the most recent survey." The results show that no schooling (34.40%), elementary school (26.26%), junior high school (24.36%), high school (7.79%), junior college (2.25%)), undergraduate (0.72%), master (0.02%), respectively. Second, social networks are closely related to traditional tacit knowledge. Referring to Han and Zhang [33], who used human relations as an indicator variable to measure social relations, tacit knowledge (*eduN*) is expressed by the question "How much cash or in-kind help has your family received from other relatives living in different places in the past 12 months? (ten thousand yuan)." Third, the indicator of farmers' self-learning through the Internet (*eduW*) chooses the question "Are you online" to measure. Last but not the least, we consider the interaction terms of multidimensional education and index to observe the changes in the impact of three dimensions of education on the entrepreneurial choices of rural residents under digital financial inclusion.

3.2.3. Moderator.
According to Fu and Huang [34], considering that there may be a reverse causal relationship between digital financial inclusion and farmers' entrepreneurship, digital financial inclusion is measured by the provincial digital financial inclusion index (*Index*) of the previous year.

3.2.4. Control Variables.
First, for personal characteristics, we use age, gender, and "frequency of using Internet business activities (times)" (trade) in CFPS2016; second, for regional characteristics, we use the logarithm of the local GDP in 2016 (lnGDP) in the "China Statistical Yearbook 2017" to represent the local economy development level; third, because various tax preferential policies have an incentive effect on innovative services [35], we choose the rate of various taxes to GDP (rate) to describe the local entrepreneurial environment. The statistical description of the variables is shown in Table 1.

TABLE 1: Statistical description of variables.

Variables	Obs	Mean	Std. dev.	Min	Median	Max
Whether rural residents start a business (Entre)	14501	0.07	0.26	0	0	1
Academic education (eduC)	17574	2.16	1.13	1	2	7
Tacit knowledge (eduN)	17574	0.10	0.76	0	0	40
Internet learning (eduW)	15653	0.32	0.47	0	0	1
Digital financial inclusion index (Index)	17574	213.50	17.28	193.30	206.30	278.10
Respondent's age (age)	17574	46.90	17.45	16	48	99
Respondent's gender (gender)	17574	0.51	0.50	0	1	1
Frequency of internet business activities (trade)	15653	0.33	0.85	0	0	4
The level of economic development (lnGDP)	17574	0.07	0.02	0.05	0.07	0.20
The proportion of various taxes in GDP (rate)	17574	10.02	0.76	7.85	10.01	11.30

3.3. Data. First, the micro-data of farmers comes from the 2016 China Family Panel Studies, referred to as CFPS. The survey was organized and implemented by the Chinese Social Science Research Center of Peking University. It aims to track and collect data at three levels of individuals, families, and communities to reflect the changes in China's society, economy, population, education, and health. The CFPS sample covers 25 provinces/municipalities/autonomous regions, the target sample size is 16,000 households, and the survey objects include all family members in the sample households. Second, the data related to digital financial inclusion comes from the China Digital Financial Inclusive Development Index. The index is released after a follow-up survey conducted by the Peking University Digital Finance Research Center and Ant Financial Services Corporation since 2011. Third, the provincial environmental data come from the China Statistical Yearbook (2016). According to the province to which the individual micro-data belongs in CFPS (2016), the relevant data are connected with the Digital Financial Inclusion Index (2016). After excluding invalid samples, 18,740 samples from rural areas are extracted for our research and analysis.

4. Regression Results and Analysis

We discuss the impact of multidimensional education on farmers' entrepreneurial choices in the context of digital financial inclusion. Table 2 reports the regression results of the benchmark model (11 (10) and (11)). First, in column (1), only independent variables such as academic education and digital financial inclusion are added. The results show that academic education positively affects the entrepreneurial behavior of the farmers, that is, the increase of academic education will affect the increase in the probability of entrepreneurship. Second, in column (2), we further add the cross-terms. The regression results show that the coefficients of the cross-terms between the index and academic education are negative, that is, digital financial inclusion has a certain supplementary effect on academic education and alleviates the lack of academic education for rural residents' entrepreneurial choices. The possible explanation is that digital financial inclusion allows rural residents to accumulate more specialized information and knowledge, which will partially supplement the impact of academic education on rural residents'

entrepreneurial choices. Third, in column (3), we add control variables to the model, and the results remain robust. The results support Hypothesis 1.

Fourth, the model in column (4) only involves tacit knowledge, total index, and control variables, and we find that tacit knowledge has a significant positive impact on the entrepreneurial choices of rural residents. Fifth, the cross-term of tacit knowledge and index is added to the model in column (5). It is found that the influence of tacit knowledge on entrepreneurial choices of rural residents is significantly negative, and the cross-term of the index and tacit knowledge is opposite to the coefficient of tacit knowledge. It shows that digital finance reduces the impact of tacit knowledge on entrepreneurship. The possible explanation is that with the development of digital financial inclusion, the impact of relying on the tacit knowledge of social relationships on farmers' entrepreneurship has begun to diminish. As a result, farmers have more standardized channels to obtain information. They may gradually get rid of the influence of the "acquaintance society" and are accustomed to accepting the consciousness about the modern commercial society. The results support Hypothesis 2.

Sixth, in the model in column (6), we add Internet learning, index, and control variables, and the results show that using the Internet will increase the probability of starting a business. Seventh, when the interaction term between the index and Internet learning is added to the model in column (7), its coefficient is significantly negative, which shows that under the digital financial inclusion environment, the degree of dependence of rural residents' entrepreneurial choices on Internet learning level is decreasing. The possible reason is that digital financial inclusion provides professional, entrepreneurial information and knowledge, making knowledge retrieval more concentrated in entrepreneurial credit, which in turn has a positive impact on rural residents' entrepreneurship. Hypothesis 3 is supported. By observing the above models, it can be seen that the positive impact of academic education, Internet learning, and tacit knowledge on entrepreneurship has begun to diminish. In contrast, digital financial inclusion has complementary effects on multidimensional education.

In addition, the control variables also show the following unique characteristics: (1) The more frequently the farmers use the Internet for business activities, the greater the chance of choosing entrepreneurship. (2) The age of the farmers and

TABLE 2: Baseline regression results of the impact of multidimensional education on rural residents' entrepreneurial choice under the context of digital financial inclusion.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Academic education			Tacit knowledge		Internet learning	
Index	0.005***	0.008***	0.011***	0.01***	0.01***	0.01***	0.01***
	(5.11)	(3.50)	(3.60)	(3.56)	(3.38)	(3.26)	(3.48)
eduC	0.177***	0.903***	0.93***	0.922***	0.931***	0.851***	0.588***
	(14.48)	(5.15)	(4.62)	(4.59)	(4.72)	(4.22)	(2.68)
eduC×eduC		−0.08***	−0.07***	−0.07***	−0.07***	−0.07***	−0.07***
		(−7.87)	(−6.69)	(−6.72)	(−6.83)	(−6.19)	(−6.25)
index×eduC		−0.001*	−0.002**	−0.002**	−0.002**	−0.002**	−0.0006
		(−1.68)	(−2.19)	(−2.15)	(−2.19)	(−2.01)	(−0.58)
eduN				0.034**	−0.829***		
				(2.15)	(−3.29)		
index×eduN					0.004***		
					(3.40)		
eduW						0.305***	1.813***
						(6.16)	(3.86)
index×eduW							−0.007***
							(−3.23)
Trade			0.12***	0.119***	0.119***	0.076***	0.08***
			(5.48)	(5.45)	(5.45)	(3.38)	(3.61)
Age			0.024***	0.024***	0.024***	0.031***	0.033***
			(2.88)	(2.87)	(2.84)	(3.72)	(3.84)
age×age			−0.0004***	−0.0004***	−0.0004***	−0.0004***	−0.0004***
			(−3.76)	(−3.75)	(−3.73)	(−4.10)	(−4.21)
gender			0.163***	0.164***	0.164***	0.154***	0.157***
			(4.59)	(4.62)	(4.61)	(4.33)	(4.42)
Rate			−2.278*	−2.244*	−2.224*	−2.058*	−2.220*
			(−1.83)	(−1.80)	(−1.77)	(−1.66)	(−1.80)
lnGDP			0.047	0.046	0.047	0.051	0.048
			(1.48)	(1.45)	(1.47)	(1.60)	(1.51)
Intercept	−2.852***	−4.120***	−5.162***	−5.127***	−5.024***	−5.298***	−5.377***
	(−15.08)	(−8.33)	(−8.62)	(−8.58)	(−8.43)	(−8.86)	(−9.13)
Pseudo R2	0.0280	0.0379	0.0608	0.0616	0.0637	0.0667	0.0685
Obs	14501	14501	13302	13302	13302	13302	13302

Note. Robust standard errors are in parentheses; ***$p < 0.01$, **$p < 0.05$, and *$p < 0.1$.

the entrepreneurial choice are in an inverted U-shaped relationship, which means the probability of farmers starting a business first increases and then decreases with age. The possible reason is that age is closely related to risk appetite, and there is an inverted U-shaped relationship between risk aversion and age. (3) Female farmers are more likely to choose to start a business. (4) The higher the proportion of tax in GDP, the stricter the entrepreneurial environment, and the lower the probability of farmers choosing to start a business. (5) The local economic development level, LnGDP, has no significant impact on farmers' choice of entrepreneurship.

In general, through the following three mechanisms, digital financial inclusion has improved multidimensional education and increased the probability of rural residents' entrepreneurial choices, which further responds to the theoretical analysis in the previous research. First, digital financial inclusion partially compensates for academic education by accumulating new knowledge. Second, digital financial inclusion can effectively expand standardized information acquisition channels and reduce the influence of tacit knowledge on the entrepreneurial choices of rural residents. Third, digital financial inclusion directly provides

a large number of specialized information channels for rural residents' entrepreneurial choices, which improves the efficiency of Internet learning to a certain extent.

5. Robustness Test

5.1. Replacing Sample Data for the Robustness Test. First, we consider using the nationwide household finance survey (CHFS) conducted by the Southwestern University of Finance and Economics in 2017 for robustness testing. The database covers 29 provinces, 363 counties, and more than 1,400 villages. After excluding problematic samples, there are a total of 43229 individual observations. The CHFS micro-data are merged with the Digital Financial Inclusion Index (2017) and China Economic Statistics Yearbook 2018 according to the province where the individual is located. Then, we select variables as follows. Select the question "Are you engaged in industrial and commercial production and operation?" as the entrepreneurial variable (*Entre*). Select the question of "after-tax income from industrial and commercial projects and income" as the entrepreneurial performance variable (*income*). Select the number of years of education as a variable to

TABLE 3: Descriptive statistics of variables based on CHFS2017.

Variables	Obs	Mean	Std. dev.	Min	Max
Entre	43229	0.12	0.32	0	1
Income	529	180000	480000	0	3.000e+06
Index	43229	271.5	19.4	240.2	336.6
eduC	37900	2.72	1.4	1	9
Age	43229	38.86	21.21	0	97
Gender	43229	0.52	0.5	0	1
Married	43229	0.64	0.48	0	1
Health	43198	0.78	0.41	0	1
Insure	42628	0.94	0.24	0	1
Party	23916	0.0500	0.21	0	1
lnGDP	43229	8.780	0.33	8.14	9.66

measure the level of education (*eduC*). Select the digital financial inclusion index to measure the development level of digital financial inclusion (*Index*) and use the interactive item of education and digital financial inclusion. Choose gender, age, marital status, physical status, party membership, and participation in medical insurance as individual and family control variables (*gender, age, married, health, party, insure*) to observe their changes. The logarithm of the province's per capita GDP in 2017 (*lnGDP*) in the "China Statistical Yearbook 2018" is selected as the regional control variable. The statistical description of the variables is shown in Table 3.

The regression results are reported in Table 4. Columns (1) and (3) of Table 4 use the Logit model to verify Hypothesis 1 again. The results show that academic education has a significant positive impact on rural residents' choice of entrepreneurship. At the same time, digital financial inclusion reduces the dependence of entrepreneurial choices on academic education. After adding the control variables, the results are the same.

5.2. Replacing the Dependent Variable and Model for the Robustness Test.

The dependent variable income data (*income*) are partly continuous and partly discrete, so the Tobit model is used to verify the impact of academic education on the entrepreneurial performance of rural residents under the digital financial inclusion environment. Column (2) shows that academic education has a positive impact on the entrepreneurial performance of rural residents, and digital financial inclusion replaces the increase in entrepreneurial performance of academic education. After adding the control variable in column (4), the basic result remains unchanged. The results show that the key variables are highly robust.

5.3. Endogeneity Test.

Although the independent variable uses the previous period's macro index, it can partially alleviate the endogeneity problem caused by reverse causality. However, due to the variables that affect education, many unobservable missing variables may also affect entrepreneurial choices, such as individual ability, personality, etc., leading to the correlation between educational variables and error terms, making the Probit model contain endogenous variables. To solve the estimation error caused by

TABLE 4: Robustness test based on CHFS2017 data.

	(1) Logit 1	(2) Tobit 1	(3) Logit 2	(4) Tobit 2
Index	0.015***	0.013***	0.026***	0.021***
	(−0.002)	(−0.002)	(−0.003)	(−0.003)
eduC	1.033***	0.849***	1.085***	0.825***
	(−0.15)	(−0.133)	(−0.264)	(−0.233)
eduC×eduC	−0.049***	−0.041***	−0.037***	−0.028***
	(−0.006)	(−0.005)	(−0.011)	(−0.009)
Index×eduC	−0.002***	−0.001***	−0.002**	−0.002**
	(−0.0005)	(−0.0005)	(−0.0009)	(−0.0008)
Age			−0.028***	−0.023***
			(−0.002)	(−0.002)
Gender			−0.098**	−0.093**
			(−0.05)	(−0.04)
Married			0.553***	0.385***
			(−0.095)	(−0.076)
Health			0.562***	0.471***
			(−0.060)	(−0.049)
Insure			0.171	0.177*
			(−0.108)	(−0.091)
Party			0.284***	0.238***
			(−0.091)	(−0.082)
lnGDP			−0.545***	−0.445***
			(−0.133)	(−0.113)
Intercept	−7.441***	−6.552***	−4.896***	−4.207***
	(−0.494)	(−0.434)	(−0.99)	(−0.846)
Pseudo R2	0.0238	0.0570	0.0186	0.0442
Obs	37,900	37,900	23,717	23,717

Note. Robust standard errors are in parentheses; ***$p < 0.01$, **$p < 0.05$, and *$p < 0.1$.

endogeneity, the control function method is selected to carry out the "two-step method" estimation. We choose parents' education level as an instrumental variable [36] and add quadratic terms and control variables for regression analysis. This is because the education level of rural residents' parents is less likely to have a direct impact on children's entrepreneurship.

In contrast, the parent's education level significantly impacts the children's education level. The results in columns (1), (2), and (3) in Table 5 show that the instrumental variables of the first stage are significant at the 1% level, and the *F* value is greater than 10, indicating that there is no problem of weak instrumental variables; meanwhile, in the Wald endogeneity of the second stage, the *p*-values of the test in columns (4), (5), and (6) show that academic education is an endogenous variable. The IV-Probit model shows that academic education and entrepreneurial behavior have a significant positive impact, indicating that for the farmers who rationally choose to start a business (excluding those who must and must not), the improvement of academic education can promote the entrepreneurial choice of rural residents.

6. Analysis of the Heterogeneity of Samples by Region

In the benchmark analysis, it is observed that the local economic development level GDP has no significant impact on the entrepreneurial choices of rural residents. Thus,

TABLE 5: Influence of education on the entrepreneurial choice of rural residents: instrumental variable regression.

	(1)	(2)	(3)	(4)	(5)	(6)
	Step one			Step two		
	eduC	eduC	eduC	Entre	Entre	Entre
edu	0.586 ***	0.053 ***	0.036***			
	(0.014)	(0.004)	(0.005)			
eduC				0.325***	2.522***	2.074**
				(0.04)	(0.492)	(0.813)
eduC×eduC					−0.409***	−0.343**
					(0.086)	(0.14)
Controls	No	No	Yes	No	No	Yes
Obs	11,031	11,031	11,031	11,031	11,031	11,031
F statistic value	1762	74943	16436			
Wald test				15.83	15.12	3.45
p value				$p \leq 0.001$	$p \leq 0.001$	$p \leq 0.1$

Note. Robust standard errors are in parentheses; $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.1$.

whether the development of digital financial inclusion can break through the original traditional financial development situation in the region remains to be studied. To analyze in different regions what impact multidimensional education has on farmers' entrepreneurial choices under the digital financial inclusion, the 31 provinces were divided into eastern, central, and western regions for subsample testing (The eastern region includes 11 provinces including Liaoning, Beijing, Tianjin, Shanghai, Hebei, Shandong, Jiangsu, Zhejiang, Fujian, Guangdong, and Hainan; the central region includes 8 provinces including Heilongjiang, Jilin, Shanxi, Anhui, Henan, Hubei, Hunan, and Jiangxi Provinces; the western region includes 12 provinces including Chongqing, Sichuan, Yunnan, Guizhou, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, Inner Mongolia, and Guangxi). The subsample regression results in Table 6 show that the economic significance and statistical significance of the eastern region are basically consistent with the benchmark regression results, but the counterparts are not significant. A possible explanation is that on the one hand, the extensive and in-depth use of digital financial inclusion requires a process. The coverage of traditional financial outlets is wider in economically developed areas. Rural residents in the east use traditional finance and the Internet more frequently than its counterparts. On the other hand, it is in the east that there are smaller, medium, and micro enterprises, and farmers are more accepting in using digital financial inclusion. Therefore, in noncentral and western provinces, digital financial inclusion has a greater substitution effect on academic education and Internet learning, and the possibility of entrepreneurship is greater. In general, digital financial inclusion cannot break through the traditional financial development at this stage to regulate multidimensional education and entrepreneurial choices.

7. Results and Discussion

This paper incorporates the new financial format of digital financial inclusion into the consideration of the entrepreneurial environment. It attempts to analyze the combined effect of multidimensional education and digital financial inclusion on the entrepreneurial choices of farmers from the perspective of the interaction of independent variables with empirical methods. First, based on the static career choice model, it explains that digital financial inclusion interacts with rural residents' academic education, tacit knowledge, and Internet learning to improve the multidimensional education level and influence their entrepreneurial choices. Three hypotheses were subsequently proposed. Then, CFPS2016 individual micro-survey data and the digital financial inclusion index are used to test the above three hypotheses empirically. The results show that: first, the expansion of digital financial inclusion supplements the impact of academic education on entrepreneurial choices of rural residents, thereby relaxing the constraints of academic education on entrepreneurial choices. Second, the popularization of digital financial inclusion partially replaces and gradually changes the influence of traditional tacit knowledge on farmers' entrepreneurship. Third, digital financial inclusion has effectively improved the efficiency of Internet learning. Finally, further analysis found that the role of multidimensional education on rural residents' entrepreneurial choices in the digital financial inclusion environment is affected by regional heterogeneity. Rural residents in the eastern region have a higher acceptance and use of digital financial inclusion. At the same time, compared with tacit knowledge, digital financial inclusion has a greater substitution effect on academic education and Internet learning.

The conclusion has important policy implications. First, strengthening the promotion of digital financial inclusion, including vigorously implementing network environment infrastructure construction in remote areas, providing material guarantees for encouraging farmers to use digital financial inclusion, comprehensively breaking up the technical barriers between financial services and users, actively guiding the conducting of digital services in commercial banks to rural areas, and promptly launching digital inclusive financial products to meet the needs of the "three rural" groups. Second, encouraging the coordinated development of digital inclusive finance and

TABLE 6: Influence of multidimensional education on rural residents' choice of entrepreneurship in different regions under the environment of digital inclusive finance.

	(1) Eastern	(2) Eastern	(3) Eastern	(4) Central	(5) Central	(6) Central	(7) Western	(8) Western	(9) Western
Index	0.02***	0.01***	0.02***	−0.033	−0.018**	−0.027**	0.024**	0.016*	0.018**
	(4.85)	(3.78)	(5.40)	(−1.07)	(−2.17)	(−2.18)	(2.09)	(1.93)	(2.09)
eduC	1.272***	0.07**	0.07**	−0.491	0.094***	0.075**	1.163	0.128***	0.096***
	(3.90)	(2.57)	(2.52)	(−0.24)	(3.30)	(2.54)	(1.42)	(4.62)	(3.29)
eduC×eduC	−0.045***			−0.09***			−0.1***		
	(−2.65)			(−4.10)			(−4.56)		
EduC×index	−0.004***			0.005			−0.002		
	(−3.10)			(0.51)			(−0.64)		
eduN		−0.129			4.180			−3.193	
		(−0.28)			(0.82)			(−1.53)	
eduN×index		0.001			−0.020			0.015	
		(0.60)			(−0.81)			(1.54)	
EduW			2.723***			−2.458			1.322
			(4.00)			(−0.72)			(0.79)
Eduw×index			−0.011***			0.014			−0.004
			(−3.82)			(0.82)			(−0.50)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R2	0.0649	0.0646	0.0652	0.0575	0.0494	0.0569	0.0644	0.0530	0.0678
Obs	4533	4533	4533	3731	3731	3731	5038	5038	5038

Note. Robust standard errors are in parentheses; ***$p < 0.01$, **$p < 0.05$, and *$p < 0.1$.

multidimensional education, including attaching importance to the new vocational education system for farmers, improving the financial literacy of rural young people and their acceptance of digital inclusive finance, providing targeted assistance to rural labor with entrepreneurship needs, for those who have low academic qualifications and lack tacit knowledge or have low frequency of Internet use, organizing learning lectures and exchange meetings, and inviting model entrepreneurs with experience and digital financial inclusion professionals to share their experiences. Third, alleviate regional differences step by step. That is, paying attention to the gaps in the development of digital financial inclusion in the eastern, central, and western regions, and taking relevant measures to increase the acceptance and use of digital financial inclusion by farmers in fragile areas, thereby effectively spreading the marginal role of digital financial inclusion.

Data Availability

The CHFS Stata Dataset data used to support the findings of this study may be released upon application to the SurveyAnd Research Center for China Household Finance, who can be contacted at https://chfs.swufe.edu.cn/. The CFPS Stata Dataset data used to support the findings of this study may be released upon application to the Institute of Social Science Survey, Peking University, who can be contacted at http://isss.pku.edu.cn/cfps/download/login. The Peking University Digital Financial Inclusion Index (2011–2020) PDF used to support the findings of this study may be released upon application to the Institute of Digital Finance Peking University, who can be contacted at https://idf.pku.edu.cn/yjcg/zsbg/index.htm. The 2017 and 2018 China Economic Statistical Yearbooks Excel data used to support the findings of this study may be released upon application

to the National Bureau of Statistics, who can be contacted at http://data.stats.gov.cn/.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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