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Power of Agricultural Credit in Farmland Abandonment: Evidence from Rural China

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Abstract: Labor, land, and funds are keys to revitalizing rural areas around the world. Previous studies have focused on the impacts of funds on agricultural production, but placed little emphasis on its role in agricultural land-use transformation. Thus, this study explores the quantitative relationship between agricultural credit and farmland abandonment from the perspective of rural revitalization. Using data on 8031 households from 27 provinces obtained from China's Labor Force Dynamics Survey (CLDS), this study uses a Tobit model to examine the quantitative impacts of informal and formal agricultural credit on farmland abandonment. The results indicate that: (1) Access to agricultural credit helps to reduce farmland abandonment. (2) Compared with formal agricultural credit (provided by institutions), informal agricultural credit (provided by family and friends) is more significant in reducing farmland abandonment. Thus, this study enhances our understanding of the relationship between agricultural credit and farmland use. It will also prompt policymakers to improve rural financial markets in order to reduce the misallocation of farmland resources, thereby improving food security and rural economies.

Keywords: farmland abandonment; agricultural credit; rural development; China

1. Introduction

Farmland abandonment occurs extensively worldwide, in both developed and developing countries [1–3]. Since the 20th century, approximately 385–572 million km^2 of farmland has been abandoned [4]. Baumann et al. [5], Queiroz et al. [6] and Li and Li [7] believe that the phenomenon of farmland abandonment has mainly occurred in developed countries, such as in Europe, the United States, Australia and Japan. However, in recent years, farmland abandonment has also occurred in developing countries [8–10]. For example, in China, the world's largest developing country, some 12–15% of rural farmland was abandoned between 2013 and 2015 [11–13]. In addition, China is becoming rapidly urbanized, such that the phenomenon of farmland abandonment in rural China may become more common in the future. As farmland abandonment is closely related to food security and ecological security [14], it warrants greater attention.

Farmland abandonment may threaten food security and ecological security [1,11,15] in the following ways. Firstly, farmland produces most human food and is critical to global food security [16,17]. China has only 7% of the world's farmland, yet feeds about 22% of the world's population. Thus, the phenomenon of farmland abandonment is crucial to solving food security problems in China and around the world [18,19]. Secondly, farmland abandonment can threaten ecological security [20] by, (1) reducing agricultural landscapes and farmland biodiversity [21–25],

(2) causing soil degradation in abandoned terraced fields [26–30], and (3) increasing the probability of forest fires [31,32].

Thus, the determinants and mechanisms of farmland abandonment have become hotspots of economic, geographic and ecological research. Previous studies have discussed the environmental and socioeconomic drivers of abandonment. On the one hand, farmland has been abandoned due to the decline in benefits arising from the limitations of the natural environment. For example, Deng et al. [11] found a relationship between landslides and farmland abandonment; Müller et al. [33] found unfavorable topography (remote areas, hilly areas, and so on) to be a vital determinant of farmland abandonment; Bezu and Holden [34] believed that the lack of farmland caused rural youth to give up farming; Yan et al. [8] reported that farmland fragmentation was a key cause of farmland abandonment. On the other hand, with the development of social economy, off-farm employment of rural labor leads to the shortage of agricultural labor, which also leads to farmland abandonment [1,8,35]. For example, Deng et al. [35] found that off-farm employment had an inverted U-shaped relationship between farmland abandonment behavior and farmland abandonment area, while Xu et al. [1] found that farmland abandonment increased by 4% and 5% for every 10% increase in off-farm full- and part-time employment, respectively. In addition, Jiang et al. [36] and Jiang and Zhang [37] argued that urbanization leads to farmland abandonment, while Xie et al. [38], Zhang et al. [39], and Deng et al. [13] found that rising agricultural costs could also lead to farmland abandonment.

Meanwhile, in the rural areas of developing countries, agricultural production often lacks sufficient labor and financial support [40]. Failures of rural financial markets have rendered them inefficient in many developing countries, such that farmers often face severe credit constraints [41–44]. Some studies have shown that credit constraints cause farmers to fail to achieve the optimal investment level needed for profit maximization. Therefore, alleviating farmers' credit constraints can be beneficial to agricultural production [45–47]. For example, Dong et al. [48] found that eliminating credit constraints could increase agricultural productivity and household income, while Omonona et al. [49] found that the agricultural productivity of households that were not subject to credit constraints was higher than that of households that were. Abate et al. [50] found that easing credit constraints for small-scale farmers helped to increase their enthusiasm for adopting agricultural technology. More importantly, Porgo et al. [51] found that credit constraints affect farmers' decisions in farmland allocation. Therefore, in this study, we ask: Is the widespread farmland abandonment occurring in China affected by credit constraints? In other words, does the availability of credit help reduce farmland abandonment?

The Chinese government is actively promoting a rural revitalization strategy, which will profoundly affect rural development [52,53]. The strategy aims to promote the two-way flow of "labor-land-funds" between rural and urban sectors, which will further achieve the integrated development of these sectors. The relationship between labor and land has been fully discussed in previous studies [54–56], but the relationship between funds and land has not. With the ongoing development of the rural revitalization strategy, farmland may become a hotspot for investment [16,57,58]. Therefore, we use large-scale survey data from rural China in order to discuss the quantitative relationship between agricultural credit (funds) and farmland abandonment (land), so as to provide a reference for the revitalization of rural areas in China, and even in other developing countries around the world. The key research questions of this study are:

(1) How does agricultural credit quantitatively affect farmland abandonment?
(2) Do the effects differ according to the source of agricultural credit?

2. Theoretical Mechanism

Credit plays an important role in agricultural production [45]. Yaron et al. [40] reported that agriculture carries a high natural risk, and so too does its financing. For example, agricultural production with long cycles and agricultural incomes that fluctuate greatly can cause farmers to face credit constraints [59]. Subsequently, credit constraints reduce the possibility that farmers can

participate in rural markets [50,60], which eventually leads to farmland abandonment. In particular, agricultural credit may affect farmland abandonment through rural markets (as shown in Figure 1).

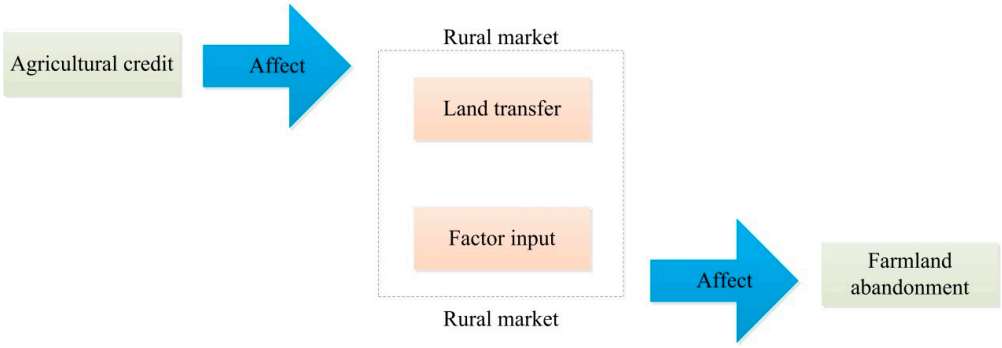

Figure 1. The theoretical mechanism of agricultural credit affecting farmland abandonment.

As shown in Figure 1, credit constraints affect farmland abandonment by affecting the land market. Deininger and Jin [61] argued that the land market allows land management rights to be spontaneously transferred from low-productivity to high-productivity households. Kimura et al. [62] argued that the land market provides opportunities to exchange land management rights between farmers with limited labor and those that are labor-rich. In summary, Deininger and Jin [61] and Kimura et al. [62] showed that the land market can effectively allocate farmland, which avoids farmland becoming idle. However, the presence of a rural financial market is a prerequisite for land transfer [63]. Specifically, when rural financial markets fail, farmers generally face severe credit constraints, which result in them being unable to obtain funds for land transfer. If land management rights cannot be effectively transferred between farmers, farming households with a lack of labor or low productivity may abandon part of their farmland. Hence, agricultural credit affects farmland abandonment by affecting land transfer.

As shown in Figure 1, credit constraints affect farmland abandonment by affecting factor inputs (e.g., improved seeds, fertilizers, and agricultural machinery). Rashid et al. [64] found that farmers with credit constraints had low motivation to improve factor inputs; for example, they tended to use traditional seeds rather than purchase improved ones. Abate et al. [50], Abdallah [65], and Mottaleb et al. [66] found that credit constraints reduced farmers' willingness to adopt modern agricultural factors (e.g., fertilizers and agricultural machinery). Specifically, due to credit constraints, farmers cannot obtain enough funds to improve factor inputs, which may result in lower agricultural productivity. Thus, farmers with credit constraints may change to off-farm employment, leading to the abandonment of farmland.

Agricultural credit can be divided into formal and informal sources [67]. Formal agricultural credit refers to funds for agricultural production obtained from financial institutions (for example, banks and loan companies), while informal agricultural credit is obtained from non-financial institutions (for example, relatives and friends). Information asymmetry is one of the main reasons why farmers face agricultural credit constraints [40]. However, China's rural society is an "acquaintance society". Compared with banks and loan companies, relatives and friends have better information on farmers. Therefore, an informal agricultural credit system may be more effective than that of formal agricultural credit [68].

In summary, this study proposes the following hypotheses:

Hypothesis 1 (H1). *Access to agricultural credit reduces farmland abandonment. Namely, in the regression model of the impacts of agricultural credit on farmland abandonment, the coefficient of agricultural credit is significant and negative.*

Hypothesis 2 (H2). *Compared with formal agricultural credit, informal agricultural credit more effectively reduces farmland abandonment. Namely, in the regression model of the impacts of formal agricultural credit or*

informal agricultural credit on farmland abandonment, the coefficient of formal agricultural credit is not significant and the coefficient of informal agricultural credit is significant and negative. Otherwise, the absolute value of coefficient of formal agricultural credit is less than the absolute value of coefficient of informal agricultural credit.

3. Data, Variables and Methodology

3.1. Data

The data used in this study came from the China Labor Dynamics Survey (CLDS). According to the introduction of Hao and Liang [69], Deng et al. [70], and Deng et al. [16], the CLDS was conducted by the Social Science Research Center of Sun Yat-sen University in China. It covers 29 provinces in China (excluding Hong Kong, Macao and Taiwan, Tibet, Hainan) and aimed to understand social and economic phenomena such as rural labor migration, agricultural production, agricultural credit, and land-use transformation. This study used data obtained in 2014, which is the most recent publicly-available data. According to the introduction from http://css.sysu.edu.cn, CLDS2014 was determined using a multistage sampling procedure for observation units. First, the 209 sample counties selected were systematically sampled with a random start based on the sorting of GDP and the scale of labor from 29 provinces in China. Second, the 401 sample villages selected were proportionate in probability to the size sampling based on the sorting of the ratio of the migrant population and the scale of labor from 209 sample counties. Third, the 14,214 sample households selected were systematically sampled with a random start based on the address map from the 401 sample villages. Finally, sample household changes followed sample village changes. The total number of rural and urban households in the sample was 14,214.

This study aims to explore the quantitative impacts of agricultural credit on farmland abandonment. Meanwhile, in China, only rural households have the farmland contracting rights and management rights [71]. Thus, urban households are not included in subsequent analysis of this study. Namely, after excluding irrelevant data (urban households), this study used a sample of 8031 rural households in 27 provinces.

3.2. Variables

3.2.1. Dependent Variable

Combined with the data characteristics of CLDS2014, *abandoned farmland* is defined as farmland that did not receive any input in 2013 [1,11,13,35,72]. Thus, in this study, the dependent variable is *Farmland abandonment*, which is defined as the ratio of abandoned farmland area to total farmland area (%), and is calculated as follow Equation (1):

$$Farmland\ abandonment = \frac{Abandoned\ area\ of\ farmland}{Total\ area\ of\ farmland} \times 100\% \quad (1)$$

where *abandoned area of farmland* is the area of farmland that received no input from the household in 2013, and *total area of farmland* is the area of farmland that the household held contract rights to form the collective. The variables were obtained from cross-sectional data that provides a snapshot of farming households at the end of 2013.

3.2.2. Focal Variable

The focal variable is *agricultural credit*, which is defined as whether farmers obtained funds for agricultural production from outside the household during or prior to 2013 (1 = yes; 0 = no). According to the credit source, agricultural credit can be divided into formal and informal types. Specifically, *formal agricultural credit* is defined as whether farmers obtained funds for agricultural production from financial institutions (e.g., banks and loan companies) during or prior to 2013 (1 = yes; 0 = no), while

informal agricultural credit is defined as whether funds were obtained from non-financial institutions (e.g., relatives and friends) during or prior to 2013 (1 = yes; 0 = no).

3.2.3. Control Variable

In order to eliminate impacts of other factors on the estimation results, this study also controls the characteristics of family, village and province. More specifically, this study controls these variables, such as *Head education*, *Head age*, *Land registration*, *Land transfer*, *Land quality*, *Land size*, *Family size*, *Farm successor*, *Off-farm employment*, *Fixed assets*, *Agricultural assets*, *Urbanization*, *Population density*, *Distance*, *Plain*, *Hill*, *Mountain*. The model variables and summary statistics are described in Table 1.

Table 1. The definition and data description of the variables in the model.

Variable	Definition	Mean	S.D.
Farmland abandonment	share of farmland abandonment in total farmland (%)	7.063	22.735
credit	whether farmers access agricultural credit (1 = Yes; 0 = No)	0.041 [a]	0.198
Formal credit	whether farmers access agricultural credit from banks or other financial institutions (1 = Yes; 0 = No)	0.016	0.126
Informal credit	whether farmers access agricultural credit from relatives or friends (1 = Yes; 0 = No)	0.031	0.172
Head education	whether the head of household has a high school education or above (1 = Yes; 0 = No)	0.116	0.320
Head age	age of householder (Years)	53.807	13.237
Land registration	whether farmland is officially registered (1 = Yes; 0 = No)	0.413	0.492
Land transfer	whether household rents out farmland (1 = Yes; 0 = No)	0.714	0.452
Land quality	whether the abandoned farmland has poor quality (1 = Yes; 0 = No)	0.028	0.164
Land size	per capita of farmland area (mu [a]/person)	1.666	1.971
Family size	number of total household members (num)	4.614	2.212
Farm successor	whether the descendants of the householder are engaged in agricultural production (1 = Yes; 0 = No)	0.080	0.271
Off-farm employment	share of off-farm labors in total rural labors (%)	40.013	38.537
Fixed assets	per capita of the present value of household fixed assets (10^4 RMB [a]/person)	4.323	16.746
Agricultural assets	per capita of the present value of household agricultural assets (10^4 RMB [a]/person)	0.079	0.532
Urbanization	proportion of the number of urban households in the sample to the total numbers of households (%)	11.629	20.687
Population density	population density in village (number/km^2)	140.679	134.300
Distance	distance from households to the nearest business center (km)	7.120	9.179
Plain	whether village is located in plain (1 = Yes; 0 = No)	0.396	0.489
Hill	whether village is located in hill (1 = Yes; 0 = No)	0.353	0.478
Mountain	whether village is located in mountain (1 = Yes; 0 = No)	0.251	0.433

[a] Note: During the study period, 1 USD was equal to 6.12 RMB; 1 mu ≈666.67 m^2; Very few farmers have access to both formal and informal agricultural credit.

3.3. Methodology

According to Equation (1), the dependent variable is a truncated continuous variable with a range of 0 to 100. Thus, referring to Wooldridge [73], this study uses the Tobit regression model. The model is set to Equation (2):

$$Farmland\ abandonment = \beta_0 + \beta_1 Credit + \gamma X + \varepsilon \quad (2)$$

In order to test the heterogeneous impacts of agricultural credit on farmland abandonment, this study also discusses the quantitative impacts of formal and informal agricultural credit on farmland abandonment, respectively. The model is set to Equations (3) and (4):

$$Farmland\ abandonment = \beta_0{}^* + \beta_1{}^* Formal\ credit + \gamma^* X + \varepsilon^* \quad (3)$$

$$Farmland\ abandonment = \beta_0{}' + \beta_1{}' Informal\ credit + \gamma' X + \varepsilon' \quad (4)$$

In Equations (2)–(4), *Farmland abandonment* is a truncated continuous variable, and it represents the proportion of abandoned farmland; *Credit*, *Formal credit*, *Informal credit* are binary variables, and they represents agricultural credit, formal agricultural credit, and informal agricultural credit, respectively; X represents a series of matrix of control variables; ε, ε^* and ε' are random errors; β_0, $\beta_0{}^*$, $\beta_0{}'$, β_1, $\beta_1{}^*$, $\beta_1{}'$, γ, γ^*, and γ' represent parameters to be estimated.

4. Results

4.1. Descriptive Statistics

As shown in Table 1, approximately 4.1% of the sampled farmers attained agricultural credit, which indicates that very few accessed credit for agricultural production. Hence, most farmers face agricultural credit constraints. This result is line with the findings of Li et al. [44], who reported that more than 60% of Chinese farmers face credit constraints. In addition, the heat map in Figure 2 represents the matrix of Pearson correlation coefficients between variables. The correlation coefficient between agricultural credit and farmland abandonment is −0.01, which indicates that the rate of farmland abandonment for farmers with agricultural credit is lower than that for the farmers without it. Hence, access to agricultural credit can help to reduce farmland abandonment. However, this correlation does not eliminate the mixed effects of the other variables. Thus, it is necessary to explore the quantitative relationship between agricultural credit and farmland abandonment by an econometric model.

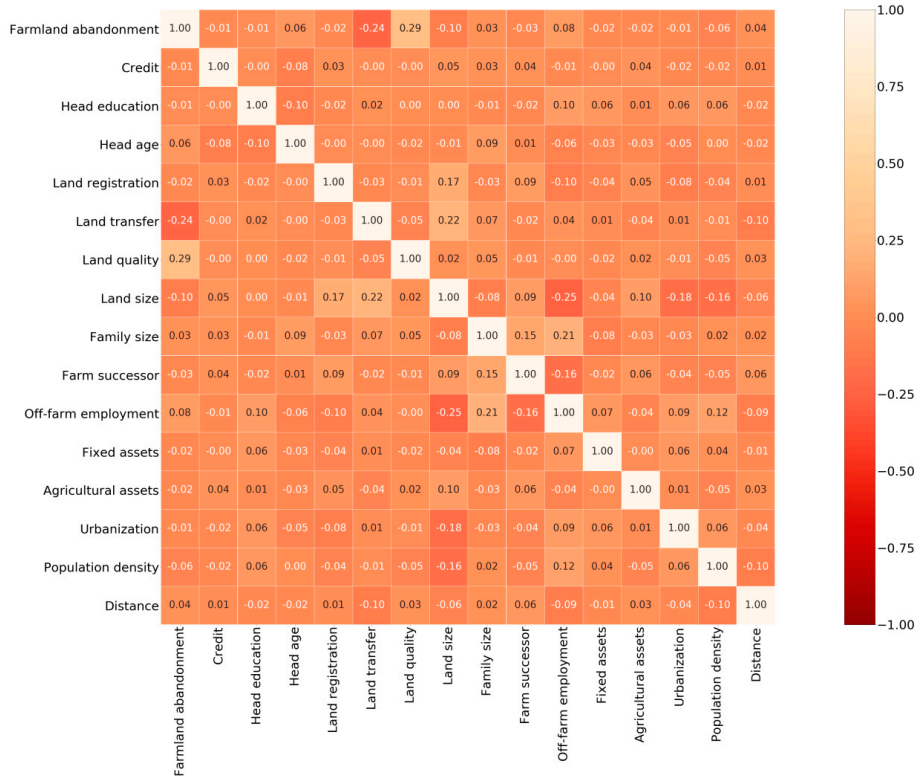

Figure 2. The heatmap for the matrix of Pearson correlation coefficients between farmland abandonment and control variables.

4.2. Empirical Results

4.2.1. Impacts of Agricultural Credit on Farmland Abandonment

Table 2 reports the empirical results. In Table 2, Models (1) to (4) represent the step-by-step addition of the focal variable, province dummy variables, farmland-related variables, and other

variables, respectively. The results in Table 2 were estimated by a Tobit model; however, this is a nonlinear model, the estimated coefficients of which do not directly reflect the quantitative relationship between the independent and dependent variables. Thus, based on the estimates of Model (4), the marginal effects (i.e., Model (5)), were calculated. The estimates of Model (5) represent the quantitative relationship between agricultural credit and farmland abandonment. As shown in Table 2, the variable Credit in Models (1) to (4) had a significantly negative sign ($p < 0.10$), which indicates that, compared to farmers without agricultural credit, farmers with agricultural credit tend to abandon farmland less often. According to the results of Model (5), after controlling other variables, farmers with agricultural credit abandoned 1.3% less farmland than those without. Hence, access to agricultural credit helps to reduce farmland abandonment, which provides empirical evidence for H1.

Table 2. The impacts of Agricultural credit on farmland abandonment.

	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**
Credit	−28.052 *	−24.708 ***	−24.245 ***	−18.073 ***	−0.013 ***
	(16.794)	(1.196)	(1.168)	(1.255)	(0.000)
Land registration			1.539	3.831 **	0.003 **
			(1.301)	(1.528)	(0.001)
Land transfer			−91.148 ***	−96.983 ***	−0.070 ***
			(1.440)	(1.679)	(0.005)
Land quality			202.887 ***	202.775 ***	0.146 ***
			(1.094)	(1.355)	(0.013)
Land size			5.593 ***	5.353 ***	0.004 ***
			(0.558)	(0.607)	(0.001)
Head education				1.551	0.001
				(1.290)	(0.001)
Head age				−3.747 ***	−0.003 ***
				(0.035)	(0.000)
Head age2				0.043***	0.000 ***
				(0.000)	(0.000)
Family size				1.273 ***	0.001 ***
				(0.305)	(0.000)
Farm successor				−18.318 ***	−0.013 ***
				(1.303)	(0.000)
Off−farm employment				0.480 ***	0.000 ***
				(0.021)	(0.000)
Ln(Fixed assets)				−10.504 ***	−0.008 ***
				(0.937)	(0.000)
Ln(Agricultural assets)				−86.200 ***	−0.062 ***
				(3.478)	(0.003)
Urbanization				−0.324 ***	−0.000 ***
				(0.032)	(0.000)
Population density				−0.150 ***	−0.000 ***
				(0.007)	(0.000)
Distance				−0.047	−0.000
				(0.070)	(0.000)
Hill				13.096 ***	0.009 ***
				(1.799)	(0.002)
Mountain				26.363 ***	0.019 ***
				(1.722)	(0.003)
Constant	−196.985 ***	−942.965 ***	−840.944 ***	−741.696 ***	
	(8.472)	(1.368)	(1.481)	(2.036)	
Province dummies	No	Yes	Yes	Yes	Yes
Log pseudo likelihood	−6417.906	−6159.050	−5836.423	−5738.217	−5738.217
Pseudo χ^2	0.000	0.041	0.091	0.106	0.106
Obs.	8031.000	8031.000	8031.000	8031.000	8031.000

Note: Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

In order to test the robustness of the relationship between agricultural credit and farmland abandonment, this study employed two empirical regressions (Table 3). First, we replaced the farmland abandonment ratio with farmland abandonment area, then discuss the impacts of agricultural credit on it. As shown in Model (1) of Table 3, agricultural credit significantly ($p < 0.01$) and negatively affects farmland abandonment. Second, this study considered Credit as an endogenous variable and employed an IV-Tobit regression model (where the instrumental variable is defined as the proportion of other rural households in the same village that received credit). As shown in Model (2) of Table 3, agricultural credit significantly and negatively affects farmland abandonment ($p < 0.10$). In summary, whether using different measurement methods for the dependent variable or econometric models, agricultural credit has a significant and negative impact on farmland abandonment. This supports the estimates in Table 2. Thus, the results in Table 3 further provide empirical evidence for H1.

Table 3. The estimated results of robustness test.

	Model (1)	**Model (2)**
Credit	−0.028 ***	−0.095 *
	(0.002)	(0.054)
Control variables	Yes	Yes
Province dummies	Yes	Yes
Log pseudo likelihood	−3157.576	−2675.462
Obs.	8031.000	8031.000

Note: Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; the coefficient of credit is the marginal effect value.

4.2.2. Heterogeneous Impacts of Agricultural Credit on Farmland Abandonment

This study examined the heterogeneous impacts of agricultural credit on farmland abandonment. In Table 4, Models (1) and (2) represent the quantitative impacts of formal and informal agricultural credit on farmland abandonment, respectively. The control variables in Models (1) and (2) are the same. As shown in Table 4, formal agricultural credit in Model (1) had no significant impact on farmland abandonment; conversely, informal agricultural credit in Model (2) had a significant and negative impact on farmland abandonment. The results in Table 4 show that informal agricultural credit plays an important role in reducing farmland abandonment, while the role of formal agricultural credit on farmland abandonment is unclear. Thus, the results in Table 4 provide empirical evidence for H2.

Table 4. The impacts of formal credit and informal credit on farmland abandonment.

	Model (1)	**Model (2)**
Formal credit	2.163	
	(1.380)	
Informal credit		−14.726 ***
		(1.266)
Control variables	Yes	Yes
Province dummies	Yes	Yes
Log pseudo likelihood	−5738.965	−5738.598
Obs.	8031	8031

Note: Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5. Discussions

Based on the survey data from 8031 rural households of 27 provinces in China and from the perspective of rural revitalization, this study explores the quantitative impacts of agricultural credit on farmland abandonment. Compared with the previous studies, the marginal contributions of this study are as follows: (1) this study constructs a theoretical analysis framework of "agricultural credit →

rural market → farmland abandonment"; (2) this study discusses the quantitative and heterogeneous impacts of agricultural credit on farmland abandonment. Thus, this study enhances our understanding of the relationship between agricultural credit and farmland use. It will also prompt policymakers to improve rural financial markets in order to reduce the misallocation of farmland resources, thereby improving food security and rural economies.

China is the world's largest developing country, and data on its farmers show that access to agricultural credit can help reduce farmland abandonment. This result is consistent with the findings of Feder et al. [45], Foltz [46], Guirkinger and Boucher [47], and Bojnec [74], who argued that reducing credit constraints is beneficial to agricultural production. More specifically, Bojnec [74] believed that credit constraints formed a limited access to the investment credits necessary for the restructuring of small-scale individual farms. The results of this study show that access to agricultural credit may improve land-use efficiency by reducing farmland abandonment, which may improve farming income. Meanwhile, the results of this study provide empirical evidence that developing countries should solve their problems of food and ecological security by improving rural financial markets. In addition, in this study, the relationships between the control variables and dependent variable are consistent with the findings of previous studies. For example, Bertoni and Cavicchioli [75] and [Cavicchioli et al. [76],Cavicchioli et al. [77]] argued that farm successors play an important role in sustainable farmland management. Similarly, this study also found that households with farm successors tended to have lower farmland abandonment than those that did not. Similar to the study of Xu et al. [1], the present study also finds that off-farm employment is a driver of farmland abandonment. Consistent with Müller et al. [33] and Müller et al. [78], we also find that farmers tend to abandon farmland that is of poor quality or is located in a remote area; Consistent with Bezu and Holden [34], we also find that households with more per capita farmland are more inclined to manage land.

Meanwhile, this study finds that the impact of formal agricultural credit on farmland abandonment is not significant, and the impact of informal agricultural credit on farmland abandonment is significant and negative. The finding is interesting. More specifically, Jia et al. [79] pointed out that formal credit was mainly used for farmland production. However, this study found that formal agricultural credit did not significantly reduce farmland abandonment. In other words, formal agricultural credit played no active role, which suggested that formal financial institutions should pay more attention to the practical validity of agricultural credit. Yuan and Xu [80] suggested that it was difficult for some farmers (e.g., poor farmers) to obtain informal agricultural credit. However, this study found that access to informal agricultural credit could promote agricultural production by reducing farmland abandonment, which suggested that access to informal credit may improve the incomes of poor farmers. Meanwhile, the finding of this study is fit to the fact that China's rural society is an "acquaintance society". Compared with banks and loan companies, relatives and friends have better information on farmers. Therefore, informal agricultural credit may be more effective than formal agricultural credit [68]. However, we also need to focus on the potential risks of informal agricultural credit and help farmers to increase their access to formal agricultural credit.

In addition, there are some deficiencies in this study that may be addressed in future studies. (1) This study used cross-sectional data to discuss the relationship between agricultural credit and farmland abandonment. However, this relationship may be dynamic. Thus, future research could use panel data to analyze the relationship in greater detail. (2) The function of microfinance is increasingly evident [81]. However, due to the limitations of this data, this study did not discuss the quantitative impacts of microfinance on farmland abandonment. Future research could further discuss the heterogeneous impacts of microfinance on farmland abandonment. (3) This study used a Tobit model to discuss the relationship between agricultural credit and farmland abandonment. Referring to the research of Duflo et al. [82], random field experiments could be used to explore the relationship between agricultural credit and farmland abandonment.

6. Conclusions and Implications

Globally, rural areas need to be revitalized, for which labor, land, and funds are key [83]. Thus, this study aimed to explore the impacts of agricultural credit on farmland abandonment from the perspective of the relationship between funds and land. Specifically, based on the survey data of 8031 households in 27 provinces of China, this study constructed a theoretical analysis framework of "agricultural credit → rural market → farmland abandonment", and described the quantitative and heterogeneous impacts of agricultural credit on farmland abandonment using an econometric model. The conclusions of this study are as follows:

(1) Access to agricultural credit can help to reduce farmland abandonment by 1.3%.
(2) The impact of formal agricultural credit on farmland abandonment is not significant, and the impact of informal agricultural credit on farmland abandonment is significant and negative. Thus, the role of informal agricultural credit in reducing farmland abandonment is more significant than that of formal agricultural credit.

The above findings raise some policy implications. First, agricultural credit plays an important role in land use and agricultural production. This suggests that we should improve rural financial markets and help more farmers to obtain agricultural credit, which may help them to reduce farmland abandonment and improve income. Second, we also need to focus on the potential risks of informal agricultural credit and help farmers to increase their access to formal agricultural credit. For example, the government could implement microfinance policies to reduce the limitations of formal agricultural credit in rural areas. In addition, formal agricultural credit does not play a significant role in reducing farmland abandonment, which suggests that financial institutions should strengthen the supervision of the funding they grant.

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