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Study on the impact of the family structure aging on the financial vulnerability of rural households —— Analysis of mediation effects based on digital literacy

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ABSTRACT
The combination of China's aging population and negative population growth exacerbates macroeconomic and financial risks, while the rise of digital finance effectively alleviates the vulnerability of family finance by improving residents' digital literacy. This paper focuses on the micro survey data of about 300 households in six central and western provinces of the Yellow River Basin (Shaanxi, Henan, Shandong, Jin, Gansu and Ning). By constructing binary Logit model and intermediary effect model, it systematically explores the transmission mechanism of population aging on family financial vulnerability and the intermediary role of digital literacy through theoretical reasoning and empirical test. The study found that: first, under the superimposed effect of negative population growth and aging, the proportion of the aging population over 60 years old will increase the occurrence probability of family financial vulnerability by about 6.34%, which is reflected in the dual dilemma of risk resistance against insufficient reserve and financial leverage; second, digital literacy helps the elderly to cross the "digital divide" and alleviate the negative impact of aging on family financial vulnerability. This paper innovatively reveals the pivotal role of digital technology empowerment in the intergenerational redistribution of resources, and provides a "digital literacy-driven" governance path for the construction of rural financial resilience in the aging society.

KEYWORDS
aging; financial vulnerability; digital literacy; intermediary effect

1 Introduction

The 20.1 document of the Central Government in 2023, as the 20th work program for agriculture, rural areas and farmers since the new century, clearly proposes to lead the construction of a strong agricultural country with the goal of "five strong". In this context, the reconstruction of rural financial system and digital financial innovation have become the key breakthrough to realize agricultural modernization. The Outline of the 14th Five-Year Plan and 2035 Vision Goals makes financial security a national strategy, requiring the establishment of a whole-chain risk control system of "prevention, early warning, disposal and accountability". As the micro basis of financial risk transmission, family financial vulnerability is not only the core observation index to measure the ability to resist risks, but also has a multiplier effect on macroeconomic stability through the balance sheet channel. In recent years, China's population structure transformation is showing the characteristics of urban-rural inversion: the rural aging rate (24.2%) is significantly higher than that of the urban population (15.8%) (the seventh census), and the resulting intergenerational resource mismatch aggravates the financial vulnerability of rural families. Under the constraints of the elderly dependency reduction ratio, it is of great practical significance to explore the poverty reduction mechanism and risk relief path of digital finance to solve the "financial suppression dilemma in the construction of agricultural power".

As a comprehensive indicator of measuring family financial security, family financial vulnerability essentially reflects the dynamic game process of risk exposure and risk resilience (Lusardi et al., 2011). China's current population structure transformation has historical particularity —— After crossing the Lewis turning point (2004), only 17 years (in 2021, the population over 65 accounted for 14.2%), and the combined negative population growth forms an extraordinary path of "getting old before getting rich" (Zhou Xinqiang et al., 2023). The impact of this transformation on the financial system presents a dual effect: at the macro level, The contraction of the supply of working-age labor force causes the downward shift of the potential growth rate center (Chen Yulu et al., 2014), The widening pension gap forces fiscal financialization (accounting for 18.7% of fiscal spending), Risk asset selling triggered a market liquidity spiral (Qi Mingzhu, etc., 2019); At the micro level, Elderly families show "three low and one high" behavioral characteristics —— decreased risk preference (Wang Wei and Xian Jinkun, 2020), decreased participation in digital finance (Zhang Zhengping, 2023), reduced credit availability (Zhou Li and Wang Cong, 2017), And the precautionary savings rate increased (weekly profit, 2023), Cato portfolio rigidity (Korniotis & Kumar, 2011). CFPS data showed that every one unit increase in the rural elderly dependency ratio increased by 0.38 standard deviations (Zhang Zhengping, 2023). This urban-rural differentiation is rooted in the institutional digital exclusion —— The penetration rate of intelligent equipment among the rural elderly group (31.5%) is only 42.7% of the urban age group, aggravating the intergenerational financial knowledge gap (Zhou Li, 2023).

In recent years, scholars have conducted research on digital literacy and promotion practice of the elderly, revealing

the dual theoretical framework of "technology acceptance-social exclusion" (Yuan Shunjia et al., 2023). The elderly are facing three difficulties of weak network security, insufficient information processing and technical operation obstacles (Zeng Yueliang et al., 2023). At the social level, cultural capital and economic capital constitute the basis of literacy (Liu Xueqian et al., 2023); the imbalance of digital resource allocation between urban and rural areas aggravates the lag of family digital literacy through intergenerational transfer; at the individual level, education level is positively correlated with literacy (Hu Yaping et al., 2023), and physiological decline and empirical inertia restrict adaptability (Qu Junxia, 2023). In the context of digital finance, rural families are faced with accessibility barriers due to the lack of financial ability (Wang Xiuhua et al., 2022), and the aging intensifies the digital access gap and financial decision-making mistakes (Jiang Wen, 2023). However, there are still three gaps in the existing research: First, Theoretical integration aspects, Lack of systematic research on "aging-digital literacy-financial vulnerability" as a dynamic transmission chain, The inefficient mechanism of financial instruments caused by digital exclusion has not yet formed a complete framework (Zhang Ji, 2016); 10 Second course, On the measurement dimension, Family aging assessment rely on static indicators such as the proportion of the elderly population, Ignoring age gradient differences and intergenerational digital transmission characteristics, There are still limited in dynamic analysis and endogenous identification (Zhang Ji, 2022); "Third, there is" At the mechanism level, There is a lack of deep deconstruction of the intermediary transmission mechanism of digital literacy (such as the risk buffer path of information acquisition and financial participation) and the digital gap between urban and rural adjustment variables. Based on the background of rural aging, this study constructs a three-factor transmission model, and uses micro-research data and intermediary effect model to conduct empirical tests to provide theoretical support for digital inclusive financial policies. Therefore, this project based on the background of rural aging, build "aging-digital literacy-financial vulnerability" transmission mechanism theory model, to the microscopic research data influence mechanism and research hypothesis of empirical exploration, and further use the intermediary effect model analytical digital literacy in the bridge between the age structure and financial vulnerability.

2 Theoretical analysis and research hypothesis

The financial vulnerability of rural households refers to the possibility that families will fall into financial difficulties due to their untimely or complete debt performance. The impact of the aging of family structure on the financial vulnerability of rural families is mainly reflected in the following aspects: (1) the income effect, the aging of labor force leads to the decline of agricultural output efficiency and the unification of income source, thus increasing the instability of the overall family income; (2) the intergenerational burden effect, the increase of the elderly dependency ratio occupy the household productive investment; (3) the debt pressure effect, the rigidity of medical expenditure and offspring education expenditure form debt accumulation; (4) the risk buffer effect, the risk resistance (Zhang Ji, 2016). Accordingly, hypothesis 1.

Hypothesis 1: The increasing degree of aging will aggravate the financial vulnerability of rural families.

Farmers' attitude towards economic activities is closely related to their digital literacy. Although the proportion of elderly people using the Internet in China is increasing rapidly, there is still the problem of "digital integration". Firstly, older family members may lack digital skills and knowledge to weaken their understanding of finance; secondly, due to the digital divide, families with more elderly population are less likely to access financial services through digital channels, aggravating the financial vulnerability of rural families; finally, older family members may lack awareness of digital risk and be vulnerable to online fraud and fraud (Ye Yifeng et al., 2023), thus increasing family financial risk. It can be seen that the aging of family structure will enhance the financial vulnerability of rural families by reducing the digital literacy of farmers. Accordingly, hypohypothesis 2.

Hypothesis 2: The improvement of farmers' digital literacy will reduce the negative impact of aging family structure on the financial vulnerability of rural families.

In conclusion, the theoretical framework of this paper is shown in Figure 1:

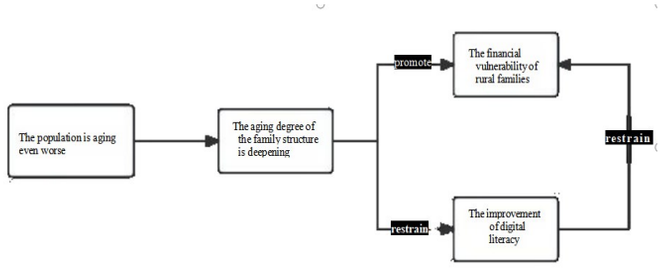

Figure Figure 1 A. Theoretical framework

3 Data source, model selection and index construction

3.1 Data source

The data of this paper are mainly from the results of the research team in Shaanxi, Henan, Shandong, Shanxi, Gansu, Ningxia Hui Autonomous Region and other regions. More than 300 rural families were surveyed, including basic variables such as household income, expenditure and debt, as well as variables related to the characteristics of the household head. Macro-variables at the regional level mainly come from the National Bureau of Statistics and the China Statistical Yearbook. A total of 347 questionnaires were collected in the survey. In order to ensure the validity of empirical tests, the samples with serious missing values and abnormal values were excluded before the analysis. 259 valid questionnaires were valid, and the effective questionnaire rate reached 76.3%.

3.2 Model selection

3.2.1 Discrete binary selection model

Family financial vulnerability is used to measure whether a family can cope with the impact of uncertainty. It is usually a binary selection variable. Referring to the practice of Yin Lei and Bian Zhicun (2016), a discrete binary selection model is constructed as follows:

$$P(HFV = 1) = \alpha 0 + \alpha 1 Oldgroup + \alpha 2 Xit + \delta 1 + \varepsilon it \quad (1)$$

Specifically, HFV is the financial vulnerability of rural household i, Oldgroup is the level of aging family structure, Xit is the control variable at individual, household, and area level, δ 1 is the dummy variable controlling time trend, and ε it is the random error term.

3.2.2 Mediation effect model

In order to further discuss whether digital literacy can reduce the impact of aging on the financial vulnerability of families, this paper, based on the comprehensive test of the mediation effect proposed by Wen Zhonglin et al., constructs the following mediation effect model to analyze the data:

$$HFVi = \theta 1 + cOldgroupi + \varepsilon 1 \quad (2)$$

$$Fintechi = \theta 2 + aOldgroupi + \varepsilon 2 \quad (3)$$

$$HFVi = \theta 3 + c' Oldgroupi + bFintechi + \varepsilon 3 \quad (4)$$

In the above formula: HFV i represents the financial vulnerability of rural family i; Oldgroupi is the level of aging family structure; Fintechi is the digital literacy level; θ represents the intercept; ε represents the random interference item; a, b, c, c'is the regression coefficient. When the estimated coefficients a, b, and c are significant, there is a mediation effect. If c is significant, but at least one of a and b is not significant, Bootstrap test is required, if significant, this indicates a mediation effect, conversotherwise, absent. In the presence of a mediation effect, c'significantly represents a partial mediator and not significantly a complete mediator.

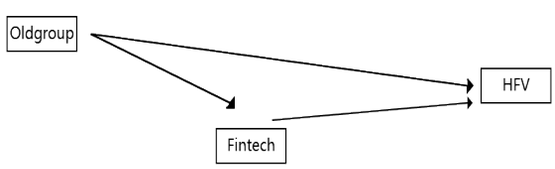

Figure 2 Mediation effect path composition

3.3 Selection of variables

3.3.1 Interpreted variable: the financial vulnerability of rural families

This paper uses the "financial margin" index to measure the financial vulnerability of rural families by calculating whether the income and financial assets can cover predictable and unexpected expenditure, and divides the financial vulnerability status of families according to the relationship between income and planned expenditure and the relationship between savings and unplanned expenditure brought by digital literacy.

3.3.2 Interpretive variables: aging of family structure and digital literacy

This study from the micro perspective based on the household sample, measure the family structure aging when the

family over 60 than the proportion of the total labor force as a measure, and further from the micro perspective according to the family members over 60 in the ratio of the family population is divided into five groups to measure the aging of family structure. This paper takes digital literacy as the intermediary variable and uses the entropy method to calculate the digital literacy index.

3.3.3 Control variables

Considering the characteristics of human capital and life cycle stage, family structure and regional economic development factors may affect the estimated results, reference to yue wei (2021), li bo and Zhu Taihua (2020), this paper selects individual level control variables (age, gender, age, household education, health), individual level of family variables (population over 60 years, family annual income, marriage status, commercial insurance expenditure) and regional level variables (financial development, GDP level) as control variables. Definitions and description of specific variables are shown in Table 1:

Table 1 Definition and description of the variables

variable classes	Variable name	Specific definition and value assignment	unit
explained variable	Household financial vulnerability	The value is 1 if FMi + LAi <0, and 0 otherwise	
Core independent variables	Aging of the family structure	The ratio of the population over 60 years of age to the total resident population of the family members 0-12%=1;12%-28%=2;28%-48%=3;48%-72%=4;72%-100%=5	
	Digital literacy	The full score is 35 points, according to the answer situation	
Individual feature variables	Head of sex	Female =0; male =1	
	Head of the household age	physical age	year
	Head of household political identity	Whether the head of the household is a Communist Party member, is =1, no =0	
	Marriage status of the householder	Househead marital status, married =1, other =0	
	Relationship between respondents and head of household	0= householder; 1= spouse; 2= children; 3= daughter-in-law; 4= grandchildren; 5= parents; 6= in-laws / in-laws; 7= grandparents; 8= siblings; 9= other relatives; 10= non-relatives	
	Head of household with education level	No school =1; primary school =2; junior high school =3; high school / technical secondary school =4; junior college or above =5	
	Health degree of householder	Health =1; Other =0	
Family feature variables	Family size	Family population	human being
	Highest academic degree for family members	Primary school and below =1, junior high school =2, high school or technical secondary school or technical school =3, junior college =4, bachelor degree or above =5	
	own house	Whether the family has the property right of the living house, is =1, no =0	
	Is there a mortgage	Whether the family has a mortgage, yes =1, no =0	
	The main source of family income	1= planting industry; 2= wage income such as working industry; 3= breeding industry; 4= industrial and commercial operation; 5= other	
	Annual per capita household income	Annual household income per capita (take the log)	Wan Yuan
Regional feature variables	Traffic conditions in the village	Very bad =1; poor =2; generally =3; good =4; very good =5	
	Economic conditions of the village	Very bad =1; poor =2; generally =3; good =4; very good =5	
	Financial development level	The ratio of regional loan balance to GDP	

4 Results analysis

4.1 Descriptive statistical analysis

4.1.1 Individual characteristics analysis

he gender (gender) variable was given as 0 for females and 1 for males, with a mean of 0.718, indicating slightly more

males than females in the sample. The age of household head (age) was mainly concentrated in the middle-aged stage, with a mean age of 50.073 years with a standard deviation of 10.073, indicating a relatively uniform age distribution. The low proportion of party members in political identity (political) indicates that the majority of household heads are non-party members. Marriage status (marriage) shows that an average of 82.2% of households are married. The mean score of health level (health) was 1.12, indicating a better overall health status of the householder. The average education level (edu) was 2.417 and the median was 2, indicating that the education level of the sample household holders was mainly concentrated in the middle or high school level.

Table 2 Descriptive statistical analyses of individual characteristics

variable name	Variable index description	crest value	least value	average value	standard deviation	me-dian	vari-ance
gender	Sex, with 0 for females and 1 for males	1	0	0.718	0.451	1	0.203
age	Head of the household age	77	18	50.073	10.073	49	101.464
political	Political identity, 1 for party members, 0 for others	1	0	0.077	0.267	0	0.072
marriage	Marital status, unmarried 0, married 1	1	0	0.822	0.383	1	0.147
health	Health level, 1 (healthy) -4 (unable to take care of themselves)	4	0	1.12	0.901	1	0.811
edu	Education level, 1 (primary school and below) - -5 (undergraduate degree or above)	5	1	2.417	0.8	2	0.639

4.1.2 Analysis of family characteristics

he total household population (all) was 4.849, with a standard deviation of 1.337, indicating a large difference in family size. The average population over 60 (sex) is 1.413, which may be related to the aging of family structure. The average monthly expenditure on daily life (expense) was 5.044, while the average annual household income (revenue) was 68.173, reflecting the income and expenditure of the family. The average number of heads with house ownership (house) is 0.722, indicating that most households own their own property. The average value of debt (debtornot) is 0.467, indicating that nearly half of the households have debt.

Table 3 Descriptive statistical analysis at the family level

variable name	Variable index description	crest value	least value	average value	standard deviation	median	variance
all	Total family population	9	2	4.849	1.337	5	1.787
sixty	Household population over 60 years of age	4	0	1.413	0.908	1	0.825
expense	Monthly monthly expenditure of daily life	25	1	5.044	2.35	5	5.522
revenue	Average annual family income	200	6	68.173	34.259	68	1173.659
house	Whether there is a house property right, there is 1, not 0	1	0	0.722	0.449	1	0.201
debtornot	Whether there is debt, there is 1, no 0	1	0	0.467	0.5	0	0.25

4.1.3 The financial vulnerability of rural households

The basic summary of dichotomous dependent variables for household financial vulnerability (HFV) is shown in Table 4. Household financial vulnerability is divided into two options, 0 and 1, which represent non-vulnerable and vulnerable states, respectively. Among them, the number of samples in non-fragile state (0) was 105, accounting for 40.5% of the total sample, while the number of samples in fragile state (1) was 154, accounting for 59.5%.

Table 4 Basic summary of dichotomous dependent variables

dependent variable	option	frequency	percentage
HFV	0	105	40.500%
Household financial vulnerability	1	154	59.500%
	amount to	259	100.000%

4.1.4 Digital Literacy

The basic summary of the variables for digital literacy (Fintech) is shown in Table 5. The maximum score of digital literacy is 32, the minimum score is 6, the average value is 32, and the standard deviation is 4.4439, indicating that the digital literacy of farmers is quite different and the digital literacy of farmers is generally low.

Table 5 Digital literacy description statistics

	figure	least value (M)	crest value (X)	average value (E)	standard deviations	variance
Fintech	259	6.0	32.0	20.089	4.4439	19.748

4.2 Reliability and validity test

4.2.1 Reliability test

Table 6 Digital Literacy reliability Analysis

	Mean values after removing the items	Variance after removing the item	Correlation of deleted items with deleted items overall	The Cronbach's α coefficient after the deletion item	Normalized Cronbach's α coefficient
Do you own a smartphone?	14.625	13.646	0.513	0.688	0.757
The average daily time you usually surf the Internet on a smartphone?	12.961	10.805	0.41	0.661	
Will you use your smartphone to check agricultural production, sales and operation information?	14.931	12.716	0.423	0.671	
Will you use your mobile phone to browse or search for financial data or information (such as stocks and financial management)?	15.004	13.182	0.265	0.69	
How easy is it for you to obtain market and related policy information?	12.695	10.097	0.476	0.643	
Do you use online banking or Alipay or wechat?	11.66	9.109	0.524	0.632	
How well do you know about agricultural products e-commerce?	12.456	9.497	0.459	0.654	
Have you ever had contact with new media (such as short video, network live broadcast, e-commerce, etc.)?	14.803	12.825	0.471	0.67	

According to the above reliability analysis results, it can be seen that the overall standardized reliability coefficient of digital literacy is 0.757, and according to the reliability coefficient after item deletion, it can be seen that it is less than 0.725 in the population. Therefore, the topic of digital literacy dimension do not need to be adjusted.

4.2.2 Validity test

Table 7 KMO tests and tests of Bartlett

KMO price		0.724
Bartlett Sphelicity test	Approximate chi square	346.454
	df	45
	P	0.000***

* * *, * * and * represent the significance levels of 1%, 5% and 10%, respectively

According to the results in Table 7, the coefficient result of KMO test was 0.724, close to 1 indicating the better validity of the questionnaire. According to the significance of the spherical test, it can also be seen that the significance of this test is infinitely close to 0, and the null hypothesis is rejected, so the questionnaire has good validity.

4.3 Benchmark model regression and result analysis

In order to better ensure the robustness of the regression conclusion, this part uses the third part to construct the financial vulnerability of families with two index measures, which tests the proportion of the elderly population over 60 to the total family population and the influence of structural grouping according to the proportion on the vulnerability index. Among them, Table 10 shows the impact of aging and digital literacy on household financial vulnerability using Probit model under different indicators.

As can be seen from the regression results of Table 8, the aging population over 60 percent of the family population

Table 8 Probit Regression analysis

Item	regression coefficient	standard error	z	P	edge effect	And the 95% confidence interval	
						superior limit	lower limit
constant	-7.864	1.9	-4.138	0.000***		-11.588	-4.14
Oldgroup	-0.762	0.465	-1.639	0.041**	-0.098	-1.673	0.149
Oldpercent	-4.925	2.368	2.079	0.038**	-0.634	0.283	9.567
Fintech	0.482	0.062	7.809	0.000***	0.062	0.361	0.602
gender	0.565	0.307	1.843	0.065*	0.074	-0.036	1.167
age	-0.022	0.017	-1.342	0.18	-0.003	-0.055	0.01

* * *, * * and * represent the significance levels of 1%, 5% and 10%, respectively

Table 8 Probit Regression analysis (Continued).

Item	regression coefficient	standard error	z	P	edge effect	And the 95% confidence interval	
						superior limit	lower limit
political	0.191	0.461	-0.413	0.679	0.025	-1.094	0.713
marriage	0.522	0.372	-1.402	0.041**	0.064	-1.251	0.208
health	-0.484	0.182	2.654	0.008***	-0.062	0.127	0.841
edu	0.097	0.168	-0.575	0.565	0.012	-0.426	0.233
all	-0.037	0.103	-0.36	0.719	-0.005	-0.239	0.165
revenue	0.011	0.005	2.139	0.032**	0.001	0.001	0.021
internet	0.314	0.183	-1.716	0.086*	0.04	-0.672	0.045
transport	0.117	0.157	-0.745	0.456	0.015	-0.426	0.191
distance	-0.018	0.024	0.75	0.453	-0.002	-0.029	0.066
model evaluation							
Likelihood than chi square			P		AIC		BIC
116.909			0.000***		148.909		205.818

* * *, * * and * represent the significance levels of 1%, 5% and 10%, respectively

and the proportion increases the possibility of financial vulnerability: the elderly population over 60 accounted for each increase will increase the probability of family financial vulnerability by about 6.34%, verify the hypothesis 1 of this paper. The reason behind this is that the aging population brings about the increase of family uncertainty expenditure and the decrease of labor income, which increases the financial risks faced by families and reduces the ability to deal with risks. At the same time, it can also be observed that the digital literacy coefficient is significantly positive, indicating that digital literacy effectively alleviates the risk of financial vulnerability of families, which partially verifies the hypothesis 2 of this paper. The empirical results of this part are well consistent with the previous theoretical analysis conclusions.

4.4 Analysis of mediation effect test

In this paper, the mediation effect model (2) (3) was constructed with the independent variable X, rural family financial vulnerability Y (HFV) as the dependent variable, and digital literacy (Fintech) M as the mediation variable M (4), and a certain amount of farmer data was collected and analyzed using statistical software. The analysis results are as follows:

Table 9 Results of mediation effect analysis (n=259)

	HFV				Fintech				HFV			
	coefficient	t	P	Standardization coefficient	coefficient	t	P	Standardization coefficient	coefficient	t	P	Standardization coefficient
constant	0.922	11.333	0.000***	-	26.229	40.94	0.000***	-	-1.535	-10.167	0.000***	-
Old-group	-0.131	-4.32	0.000***	-0.26	-2.454	-10.287	0.000***	-0.54	0.099	4.065	0.000***	0.197
Fintech									0.094	17.479	0.000***	0.846
R^2	0.068				0.292				0.575			
adjust R^2	0.064				0.286				0.57			
F	F(1,257)=18.666,P=0.000***				F(1,257)=105.827,P=0.000***				F(2,256)=173.142,P=0.000***			

* * *, * * and * represent the significance levels of 1%, 5% and 10%, respectively

Based on the results of the mediation effect analysis in Table 9, the total effect of aging degree on household financial vulnerability was significantly negative (coefficient = -0.131, p=0.000), indicating that the higher the degree of aging, the overall reduction of household financial vulnerability.

Further analysis shows that aging by reducing digital literacy indirectly push up financial vulnerability: aging strong negative influence on digital literacy (coefficient = -2.454, p=0.000), and digital literacy each 1 unit significantly increased financial vulnerability 0.094 units (p=0.000), mediation effect value of 0.231, accounted for 176% of the total effect, shows that digital literacy played a complete intermediary role. However, the direct effect of aging on HFV is reversed (coefficient =0.099, p=0.000), forming the concealment effect, that is, aging itself weakly suppresses the vulnerability, but its indirect effect through the decline of digital literacy significantly exacerbates the vulnerability effect, leading to the negative total effect. The model interpretation power improved significantly (R^2 increased from 6.8% to 57.5%), highlighting the core intermediary role of digital literacy.

4.5 Robustness test

From the empirical analysis, we show that the significance level of the degree of family structure is below the common significance threshold of 5%, which increases the credibility of the robustness of the results. At the same time, this paper uses the Logit model to further test the impact of aging and digital literacy on family financial vulnerability. From Table 10, the estimated coefficients of the two models are consistent for the sign (positive or negative effects) of the explanatory variables, indicating that the results are stable under different model Settings.

Table 10 For Logit regression analysis

Experimental group =1.0	regression coefficient	standard error	Wald	P	OR	OR value with 95% confidence interval	
						superior limit	lower limit
constant	-16.113	3.982	16.377	0.000***	0	0	0
Oldgroup	-1.716	0.863	3.951	0.047**	0.18	0.033	0.976
Oldpercent	-11.422	4.575	6.233	0.013**	91319.083	11.643	716262773.1
Fintech	0.977	0.146	44.832	0.000***	2.657	1.996	3.537
gender	0.903	0.59	2.341	0.066*	2.468	0.776	7.851
age	-0.021	0.032	0.433	0.51	0.979	0.919	1.043
political	0.536	0.859	0.389	0.533	0.585	0.109	3.149
marriage	1.567	0.768	4.163	0.041**	0.209	0.046	0.94
health	-0.793	0.341	5.426	0.008***	2.211	1.134	4.31
edu	0.411	0.355	1.339	0.247	0.663	0.331	1.33
all	-0.028	0.195	0.02	0.887	0.973	0.664	1.426
revenue	0.023	0.01	5.604	0.018**	1.023	1.004	1.043
internet	0.667	0.353	3.563	0.059*	0.513	0.257	1.026
transport	0.399	0.304	1.726	0.189	0.671	0.37	1.217
distance	-0.012	0.046	0.065	0.799	1.012	0.924	1.108
dependent variable:HFV							
model evaluation							
Likelihood than chi square		P			AIC		BIC
111.438		0.000***			145.438		205.904

* * *, * * and * represent the significance levels of 1%, 5% and 10%, respectively

5 Conclusion and policy recommendations

5.1 Conclusion

And in this paper based on the study of shaanxi, Henan, Shandong, Shanxi Province, Gansu, Ningxia hui autonomous region, a total of 6 provinces about 350 households to sample survey data, on the premise of considering sample selectivity, studied the aging of the family structure on the rural family financial vulnerability, and on the basis of the mediation effect of digital literacy. The conclusions of the empirical study are summarized as follows:

The increasing aging degree of the family structure does increase the financial vulnerability of the rural families. Aging significantly increases the occurrence probability of the family's financial vulnerability, which is an important inducement for the decline of the family's ability to deal with financial risks.

The aging of the family structure indirectly enhances the financial vulnerability of rural families by reducing the digital literacy of farmers. Empirical research shows that improving digital literacy is an important means to address the negative impact of aging on household financial vulnerability. Aging will have a significant impact on the financial stability of families, and improving the digital literacy of farmers is an effective means to promote the micro subjects to prevent the aging crisis spontaneously.

5.2 Policy recommendations

The conclusion of this paper is of practical significance to fully understand the impact of aging on family finance, and to explore the negative impact of aging on the family financial vulnerability based on the enabling path of digital finance. Based on the study conclusions, the policy recommendations of this paper are as follows:

We will improve the social security mechanism for dealing with aging risks. We will implement structural reform of pension funds, establish a dynamic adjustment mechanism linked with inflation, increase the disposable income of the elderly through policy tools such as tax-deferred pension insurance, and ease the pressure on intergenerational transfer payments.

We will promote aging-appropriate innovation in digital financial services. The digital financial knowledge

dissemination center has been established, adopting the dual-track training mode of "community grid member + financial institution specialist", focusing on popularizing practical skills such as mobile payment security and intelligent investment consulting (refer to the Singapore Silver Family digital empowerment Program).

Implement the project to improve the financial capacity of fragile families. A hierarchical early warning system for financial vulnerability is built, big data technology is used to identify the characteristics of high-risk families, and dynamic monitoring and targeted intervention are implemented. At the same time, an inclusive financial risk compensation fund will be established to provide premium subsidies for rural inclusive Internet insurance products, and commercial insurance institutions will be guided to develop comprehensive types of insurance for medical accidents with low starting threshold through financial leverage.

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