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A Study on Enhancing Digital Financial Literacy Among Rural Residents in the Face of the Impact of Illegal Digital Finance

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Abstract: The digital economy offers both opportunities and challenges for enhancing rural residents' digital financial literacy. Notably, the spread of illicit digital financial activities has seriously impeded the sound development of rural digital finance. This study integrates illegal digital financial risk prevention into an analysis of rural residents' digital financial literacy. The results show that their digital financial literacy remains low, the supporting ecosystem is underdeveloped, and risk prevention capacity is insufficient. Further analysis indicates that losses from illicit digital finance transmit shocks through consumption channels. A three-sector DSGE model is therefore constructed to simulate the negative responses of household consumption, credit, and output to such shocks. Higher digital financial literacy is found to accelerate the return to steady state and reduce economic uncertainty. Based on empirical and model-based evidence, this paper proposes policy recommendations: strengthening digital financial education for rural residents, improving the digital financial service system, optimizing relevant laws and policies, and establishing an efficient risk early-warning mechanism.

Keywords: Digital financial literacy; Rural residents; Illegal digital finance; DSGE

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1. Introduction

The rural financial environment, payment system, and modern financial instruments (e.g., mobile payments) have been continuously refined, enabling farmers to access convenient, efficient financial services. Simultaneously, policies highlight enhancing rural residents' financial literacy as a key link in agricultural modernization, beautiful village construction, and rural income growth, emphasizing the need to strengthen financial education to improve farmers' financial understanding, application capabilities, financial management, and risk reduction.

Theoretically, financial literacy is a comprehensive capability encompassing the knowledge, skills, and

attitudes required for prudent financial decision-making and wealth preservation/growth. Since 2017, the People's Bank of China has conducted biennial national consumer financial literacy surveys (established in 2016), categorizing literacy into four dimensions (financial knowledge, behavior, attitudes, skills) and constructing a composite index. Surveys show rural consumers' overall financial literacy is lower than that of urban residents, with a particularly prominent gap in financial knowledge.

Amid rapid digital economy development, enhancing rural residents' digital financial literacy is urgent. While digital finance brings convenience, it also poses risks; rural residents, constrained by low education, poor information dissemination, and inadequate financial infrastructure, have limited digital finance understanding, hindering effective use of emerging services and increasing vulnerability to online fraud and privacy breaches. Overall, Chinese residents' digital financial literacy remains low, with insufficient professional knowledge, weak digital financial application capabilities, and constrained digital finance development [1]. Conversely, digital finance can reduce risks by disseminating financial knowledge to low-literacy households, improving their literacy and financial decision-making [2].

Digital finance's borderless nature requires robust real-time behavioral supervision. The central government should establish uniform regulatory standards, strengthen crackdowns on illegal financial activities, and ensure comprehensive oversight of all financial activities. Though "illegal digital finance" lacks a clear definition, it manifests as digitalized money laundering, illegal fundraising, fraud, and virtual currency speculation amid risk prevention and digital finance development. This paper defines digital financial literacy as consumers' ability to utilize funds and make prudent decisions in the digital era, including distinguishing legitimate/illegal digital finance, which is linked to consumer rights protection and risk prevention effectiveness.

Based on digital economic development requirements, this study integrates digital financial skills and illegal digital finance risk prevention into field research. Using research findings, a three-sector DSGE model is constructed to simulate response pathways to illegal digital finance loss shocks. Combining field research and model analysis, it identifies effective pathways to enhance rural residents' digital financial literacy. This study provides actionable theoretical insights for regulators to integrate digital financial literacy into financial consumer protection and education frameworks, bolstering digital inclusive finance and underpinning rural revitalization and common prosperity [3].

2. Literature review

2.1. The concept of digital financial literacy

Currently, the academic community has not yet established a unified definition or measurement standards for digital financial literacy. Prasad *et al.* (2018) were among the first to define digital financial literacy as an individual's awareness of and frequency of use of various digital platforms [4]. Setiawan *et al.* (2022) categorized it into four dimensions: knowledge of digital financial products and services, usage experience, risk awareness, and skills in controlling and managing related activities [5]. Regarding the construction of indicators, Si *et al.* (2022) utilized six variables, digital payments, digital wealth management, digital lending, interest rate calculation, inflation, and investment risk, to construct a digital financial literacy index using the entropy method [6]. Sun and Zhao (2023) integrated aspects such as interest rate and inflation calculations, risk perception, stock account and fund holdings, credit card and online wealth management product ownership, mobile payment usage, and online lending behavior to calculate a composite score for measuring rural residents' digital financial literacy [7]. Li and Yu (2023) constructed relevant indicators based on understanding of interest

rates, inflation, investment risks, and risks associated with various financial products, combined with questions regarding household business and commercial online operations, online shopping experience, payment methods, and the use of online wealth management and mobile banking [8]. Wu *et al.* (2023), based on survey data from 1,506 Chinese residents, employed principal component analysis to distill digital financial literacy into six dimensions: financial knowledge, digital knowledge, awareness of digital financial accessibility, awareness of participation, usage skills, and awareness of rights protection [9].

It is worth noting that in reality, consumers face not only legitimate digital finance but also illicit digital finance, primarily in the form of online fraud. Liu and Zhang (2020) utilized data from the China Household Finance Survey (CHFS) to examine the impact of residents' financial literacy on whether households suffered losses due to fraud [10]. They found that households with high levels of financial literacy were less likely to suffer losses from fraud, and that as household income increased, the influence of financial literacy on fraud-related losses diminished.

A review of the existing literature reveals that the construction of digital financial literacy indicators primarily revolves around legitimate digital finance, focusing on knowledge of digital financial products and services, usage experience, risk awareness, and management skills. Most studies rely on data from the CHFS conducted by Southwestern University of Finance and Economics and have not yet incorporated the ability to identify illegal digital finance into the indicator system, making it difficult to comprehensively measure consumer financial literacy in the digital economy era.

2.2. Digital financial literacy and digital financial inclusion

Digital financial literacy centers on individual consumers, whereas digital financial inclusion focuses on the overall development of the financial system. As defined in the G20 High-Level Principles on Digital Financial Inclusion, initiatives leveraging digital financial services to advance financial inclusion fall under its scope. China's "14th Five-Year Plan for National Informatization" explicitly prioritizes four key areas for the financial sector to promote common prosperity: improving digital financial infrastructure, enhancing livelihood-oriented financial services, strengthening financial support for the real economy, and optimizing the regulatory framework for fintech innovation, efforts that will advance digital financial inclusion during this period.

A reciprocal relationship exists between digital financial inclusion and digital financial literacy. On the one hand, digital financial inclusion functions by enhancing residents' financial literacy. Ding and Wan (2022) and Chen *et al.* (2023) found that it alleviates relative asset poverty through improving financial literacy, with comprehensive and objective financial literacy exerting partial mediating effects (subjective financial literacy shows no significant mediating effect) [11,12]. Liu, Tan, and Chen (2023) further note that digital finance development enhances farmers' financial literacy via mitigating information constraints and promoting social interaction, an effect amplified when farmers cross the "wealth threshold" and narrow the "knowledge gap" and "digital divide [13]." On the other hand, improved digital financial literacy positively impacts digital financial inclusion: Liu and Yang (2023) argue that digital economic development coupled with enhanced residents' financial literacy drives the differentiated development of digital inclusive finance, facilitating its penetration into grassroots communities [14]. Yang and Lei (2024) empirically confirmed that higher financial literacy among rural residents strengthens the role of digital inclusive finance in promoting common prosperity [15].

2.3. Digital financial literacy and rural revitalization

Enhancing digital financial literacy is both a key component and an important means of advancing rural revitalization. On the one hand, high-quality farmers require a high level of digital financial literacy; the "Opinions of the Central Committee of the Communist Party of China and the State Council on Key Tasks for Comprehensively Advancing Rural Revitalization in 2023" explicitly emphasizes strengthening the rural talent pool and implementing high-quality farmer training programs to enhance training effectiveness. On the other hand, digital financial literacy boosts residents' welfare and drives economic growth by facilitating consumption, savings, investment, financing, and fraud prevention, thereby supporting rural revitalization. Wen and Liu (2023) found that digital literacy and financial knowledge have significant positive impacts on farmers' digital financial behavior across products like digital payments, credit, wealth management, and credit facilities [16]. However, rural revitalization is constrained by rural residents' relatively low digital financial literacy, with heterogeneous impact pathways. Wu and Zhao (2024) note that financial literacy links financial institutions and consumer behavior; Fu, Li, and Zhao (2022) point out that rural residents in poverty-alleviation areas exhibit "self-exclusion" in digital inclusive finance due to educational, age, behavioral, and technological constraints, while low-income groups lack credit awareness, privacy protection awareness, and financial fraud prevention capabilities [17,18].

In summary, digital financial literacy is crucial to digital finance development. Enhancing rural residents' digital financial literacy and improving the digital inclusive finance system are mutually reinforcing, forming a key pathway for rural revitalization. However, current research on digital financial literacy is in its infancy, with limited rural field surveys and no integration of consumption as a financial shock channel into DSGE models. Thus, this paper combines field research with DSGE model analysis to provide theoretical support and policy recommendations for enhancing rural residents' digital financial literacy.

3. Current status of the survey on digital financial literacy among rural residents

In July 2023, a survey questionnaire was designed based on rural residents' social characteristics, financial knowledge, and financial behavior. The questionnaire consisted of five sections: basic information, financial concepts, financial skills, ability to prevent illegal financial risks, and methods for improving financial literacy. In Wuxing Village, Zhengding County, the survey was conducted through group briefings, with participants completing the questionnaire collectively. In Nanbaiquan Village, Beibaiquan Village, Lianggezhuang Village, and Nanshimen Village of Yixian County, Baoding, a door-to-door survey method was employed. A total of 500 questionnaires were distributed, 500 were returned, and 427 were deemed valid. Based on the survey results, the following conclusions were drawn:

3.1. Digital financial literacy among rural residents is relatively low

The survey results show that 83% of the 423 respondents were only familiar with mobile payments and online banking among digital financial services, with as many as 58% of villagers knowing only mobile payments. This indicates that the penetration of digital financial services in rural areas remains low. Regarding payment methods, 83% of villagers chose mobile payments and cash payments, with cash accounting for 43% and mobile payments for 40%. This demonstrates that a significant portion of villagers still prefer cash payments.

3.2. The development of a digital financial literacy ecosystem in rural areas is inadequate

On the one hand, financial institutions in rural areas are primarily rural credit cooperatives, with few branches of other banks and virtually no coverage from other financial institutions such as securities firms, insurance companies, and mutual funds. Surveys indicate that 71.4% of villagers consider banks and rural credit cooperatives to be legitimate financial institutions, while 98.6% believe insurance companies are not legitimate financial institutions. 97% of villagers are unfamiliar with concepts related to bonds, mutual funds, and foreign exchange, and their understanding of diverse digital financial products is virtually nonexistent. On the other hand, financial literacy education for rural residents is severely uneven; digital financial literacy programs targeting this demographic are scarce, with limited and monotonous teaching methods and channels. Consequently, the impact of such education lacks breadth and has yet to achieve the expected results.

3.3. The level of prevention against illegal digital financial risks in rural areas is insufficient

Among the villagers, 67.4% of them still perceive the common tactics of illegal fundraising as primarily involving promises of high yields and returns, as well as fabricating investment projects. They are not yet well-informed about newer methods that have emerged in recent years, such as overseas investments and franchise investments; education on these topics needs to be strengthened. Although more than 90% of villagers expressed distrust and stated they were wary of illegal wealth management schemes, virtual currency investments, illegal stock recommendations, and illegal lending, their vigilance against illegal digital finance does not stem from high digital financial literacy. For most villagers, this awareness arises from caution toward the unknown, and they lack a clear understanding of the concepts and implications of digital finance itself.

4. Dynamic stochastic general equilibrium (DSGE) model

This paper constructs a three-sector Dynamic Stochastic General Equilibrium (DSGE) model comprising households, firms, and banks [19]. Households provide labor to firms and receive income (labor compensation); they save and borrow through banks, and invest in financial products such as stocks and bonds. Firms represent the productive sector of the economy, using the two factors of production, capital and labor, to transform inputs into final goods, and obtain capital from households and banks. The relationships among the three sectors, households, firms, and banks, are illustrated in **Figure 1**.

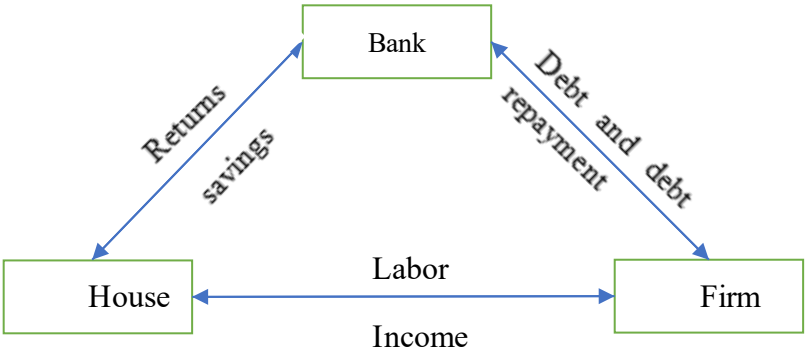

Figure 1. Relationships among economic agents in a DSGE model.

4.1. Household

Assume that household expenditure behavior includes consumption (C), savings (S), investment (PD), debt repayment (PF, at interest rateR^{PF}), and losses (PP). In the digital economy era, these expenditure behaviors are all influenced by the digital transformation of financial institutions, digital innovation in financial products, and digital financial literacy. Household expenditure is constrained by income (labor (W) * wages (L)), savings returns (savings (S) * savings rate (R^S)), investment returns (investment (PD) * investment rate of return (R^{PD})), and financing (PF). Assume that the household's utility function is a log-utility function, i.e.,

$$U(C_t, L_t) = E_t \sum_{t=0}^{\infty} \beta_h^{\ t} [\gamma \ln(C_t) + (1-\gamma) \ln(1-L_t)] \tag{1}$$

Here, $\hat{a}_h$ represents the household's intertemporal preference rate, and $\tilde{a}$ represents the utility weight of consumption in the household's utility function.

The household's budget constraint is:

$$C_t + S_t + PD_t - PF_{t-1}(1+R_{t-1}^{PF}) - PP_t \leq W_t L_t + S_{t-1}(1+R_{t-1}^{s}) + PD_{t-1}(1+R_{t-1}^{PD}) + PF_t \tag{2}$$

By formulating the Lagrange equations and calculating the first-order conditions for optimal consumption, labor, savings, investment, and financing by households, we obtain the determining equations:

$$\frac{\gamma}{C_t} = \frac{1-\gamma}{(1-L_t)W_t} \tag{3}$$

$$(R_t^s + 1) = \frac{1}{\beta_h} \frac{C_{t+1}}{C_t} \tag{4}$$

$$(R_t^{PF} + 1) = \frac{1}{\beta_h} \frac{C_{t+1}}{C_t} \tag{5}$$

$$(R_t^{PD} + 1) = \frac{1}{\beta_h} \frac{C_{t+1}}{C_t} \tag{6}$$

4.2. Firm

Assume that firm maximize profits subject to production technology constraints, and assume a perfectly competitive environment, which implies that firm profits will be zero. We use the Cobb-Douglas production function:

$$Y_t = A_t K_t^{\alpha} L_t^{1-\alpha} \tag{7}$$

where Y_t is total output, A_t is total factor productivity (TFP), L_t is the labor input, K_t is the capital input, and á is the elasticity of output with respect to capital.

Profit is defined as

$$\prod_t = Y_t - W_t L_t - R_t^K K_t \tag{8}$$

where R_t^K is the rate of return on capital (or the rate of rent).

The profit-maximization problem faced by the producer is:

$$\max \prod_t = Y_t - W_t L_t - R_t^K K_t \tag{9}$$

Based on the above formula, we obtain the two fundamental equations characterizing the product market:

$$W_t = (1-\alpha) A_t K_t^{\alpha} L_t^{-\alpha} = (1-\alpha) Y_t / L_t \tag{10}$$

$$R_t^K=\alpha A_t K_t^{\alpha-1} L_t^{1-\alpha}=\alpha Y_t/K_t \tag{11}$$

Based on the capital accumulation equation, we have

$$K_t=I_t+(1-\delta_K)K_{t-1} \tag{12}$$

where I_t is capital investment, and $I_t=D_t+PD_t$, δ_K is capital depreciation.

4.3. Bank

As intermediaries connecting households and businesses, banks seek to maximize their own profits while satisfying liquidity constraints. Suppose a commercial bank absorbs deposits S_t from households and provides financing PF_t by extending loans D_t to businesses. Then, the liquidity (balance sheet) constraint faced by the bank in each period is

$$S_t=D_t+PF_t \tag{13}$$

Assuming the commercial bank's funding management costs for deposits and loans are $\frac{1}{2}\left\{\sigma_s S_t^2+\sigma_D D_t^2+\sigma_{PF} PF_t^2\right\}$, the bank, based on the objective of profit maximization (assuming the bank's profit comes from the previous period's earnings, current-period earnings are realized in the next period, and current-period management costs for deposits and loans are incurred), obtains

$$\max \sum_{t=0}^{\infty} \beta_q{}^t \left[\begin{array}{c}(R_{t-1}^D+1)D_{t-1}-(1+R_{t-1}^s)S_{t-1} \\ +(R_{t-1}^{PF}+1)PF_{t-1} \\ -\frac{1}{2}\left\{\sigma_s S_t^2+\sigma_D D_t^2+\sigma_{PF} PF_t^2\right\}\end{array}\right] \tag{14}$$

where R_t^D is the loan interest rate, and $\hat{a}_q$ is the commercial bank's intertemporal preference rate.

Substituting **Equation (13)** into **Equation (14)** and optimizing the first-order derivatives of financing and lending yields the optimal decision solution that maximizes profits in each period:

$$\left(\sigma_D+\sigma_s\right)D_t=\sigma_s PF_t+\beta_q(R_t^D-R_t^S) \tag{15}$$

$$\left(\sigma_{PF}+\sigma_s\right)PF_t=\sigma_s D_t+\beta_q(R_t^{PF}-R_t^S) \tag{16}$$

Furthermore, assuming that the firm converts all loans into productive capital, then $R_t^D=R_t^K$.

4.4. Model solution and parameter estimation

The clearing condition for the product market is defined as

$$Y_t=C_t+I_t \tag{17}$$

Since the returns on household savings and investment are identical, household investment is assumed to be zero. The steady-state variables of the model $\left\{\bar{Y},\bar{C},\bar{D},\bar{K},\bar{W},\bar{L},\overline{R^K},\overline{R^D},\overline{R^S},\overline{PF},\bar{S}\right\}$ are described by the following equations:

$$\bar{C}=\frac{\gamma}{1-\gamma}\bar{W}\left(1-\bar{L}\right) \tag{18}$$

$$\overline{R^S}=\overline{R^{PF}}=\frac{1}{\hat{a}_h}-1 \tag{19}$$

$$\overline{Y} = A\overline{K}^{a}\overline{L}^{1-a} \tag{20}$$

$$\overline{W} = (1-a)\frac{\overline{Y}}{\overline{L}} \tag{21}$$

$$\overline{R^{K}} = a\frac{\overline{Y}}{\overline{K}} \tag{22}$$

$$\ddot{a}_{K}\overline{K} = \overline{D} \tag{23}$$

$$\overline{S} = \overline{D} + \overline{PF} \tag{24}$$

$$(\sigma_{D} + \sigma_{S})\overline{D} = \sigma_{S}\overline{PF} + \hat{a}_{q}\left(\overline{R^{D}} - \overline{R^{S}}\right) \tag{25}$$

$$(\sigma_{PF} + \sigma_{S})\overline{PF} = \sigma_{S}\overline{D} \tag{26}$$

$$\overline{Y} = \overline{C} + \overline{D} \tag{27}$$

Based on economic and financial data, policy requirements, and relevant research literature, the calibrated model parameters and related notes are shown in **Table 1**.

Table 1. Model parameter calibration results

Parameter	Calibrated value	Parameter meaning and calibration basis
$\hat{a}_{h}$	0.98	Household intertemporal discount factor
$\tilde{a}$	0.5	Preference parameter
$\hat{a}_{p}$	0.97	Intertemporal discount factor for banks
$\acute{o}_{D}$	0.02	Operating costs of corporate loans, including personnel, operations, depreciation, etc.
$\acute{o}_{s}$	0.01	Operating costs for deposits, including personnel, operations, depreciation, etc.
A	1	Total factor productivity
á	0.5	Share of capital income
$\ddot{a}_{K}$	0.06	Capital depreciation.
$\acute{o}_{PF}$	0.015	Operating costs of household loans, including personnel, operations, depreciation, etc.

Table 2 shows the steady-state values of the model.

Table 2. Steady-state values

Variable	Steady-state Value
$\overline{Y}$	3.6667
$\overline{C}$	1.9861
$\overline{S}$	2.3528

$\bar{W}$	3.8195
$\bar{L}$	0.4800
$\bar{D}$	1.6806
$\overline{PF}$	0.6722
$\bar{K}$	28.009
$\overline{R^D}$	0.0655
$\overline{R^S}$	0.0204

5. Analysis of responses to illegal digital financial risk shocks

Existing literature indicates that digital financial literacy enhances consumer income and promotes common prosperity by influencing household consumption, investment and financing, entrepreneurship, and losses from fraud [20]. Combining the findings from the survey analysis of this paper, illicit digital financial activities exert negative impacts on households through consumption channels. To further explore the long-term effects of illicit digital finance, this section incorporates a shock from illicit digital finance to analyze the shock responses of households, firms, and banks. This analysis demonstrates the crucial role of enhancing digital financial literacy in safeguarding household welfare, maintaining financial stability, and promoting economic development.

Due to the risks posed by illegal digital finance, household consumption, investment, and other activities are negatively affected and decline, leading to a decrease in household welfare. Assuming that the losses caused by illegal digital finance amount to $\overline{PP}$, total expenditure decreases by $\overline{PP}$.

As illicit digital financial activities constantly evolve, even with a certain level of digital financial literacy, losses may suddenly surge. At the same time, the government, society, and households will take immediate action to improve digital financial literacy, guard against illicit digital financial risks, and gradually reduce losses [21]. Therefore, this paper assumes that the loss PP resulting from the impact of illicit digital financial risks follows a first-order autoregressive process, namely:

$$PP_{t+1} = \rho_{pp} PP_t + \dot{o}_{t+1} \tag{28}$$

where $\dot{o}_{t+1}$ represents the impact of illegal digital financial risks, and ρ_{pp} is the autocorrelation coefficient.

The autocorrelation coefficient is related to digital financial literacy, as higher digital financial literacy provides greater resilience against illegal financial shocks; that is, high digital financial literacy corresponds to low autocorrelation, while low digital financial literacy corresponds to high autocorrelation. Let the autocorrelation coefficient for high digital financial literacy be $\rho_{pp}^H = 0.9$, and that for low digital financial literacy be $\rho_{pp}^H = 0.3$.

Assuming that losses are transmitted from the consumption channel to the entire economic system, i.e., $C_{t+1} = C_t - PP_t$, following the establishment of economic steady-state conditions in Section 4, we take the logarithm of the equations and linearize them at their steady-state values to obtain the model's log-linearized system of equations. By numerically solving the model, we analyze the deviations of the variables from their steady-state values prior to the economy reaching a new steady state following an illegal digital financial risk

shock (The linearized equations are omitted.)

Figures 2–5 illustrate the shock response processes (over 40 periods) for deposits, consumption, loans, and output under high and low digital financial literacy scenarios when a 1 percentage point increase in losses occurs due to an illegal digital financial risk shock at t = 1. **Figures 2–5** indicate that, overall, when losses occur, household consumption declines, deposits rise, loans increase, and output grows, before gradually returning to a steady state. Comparing high and low levels of digital financial literacy, high digital financial literacy facilitates a rapid return to the steady state and reduces economic uncertainty.

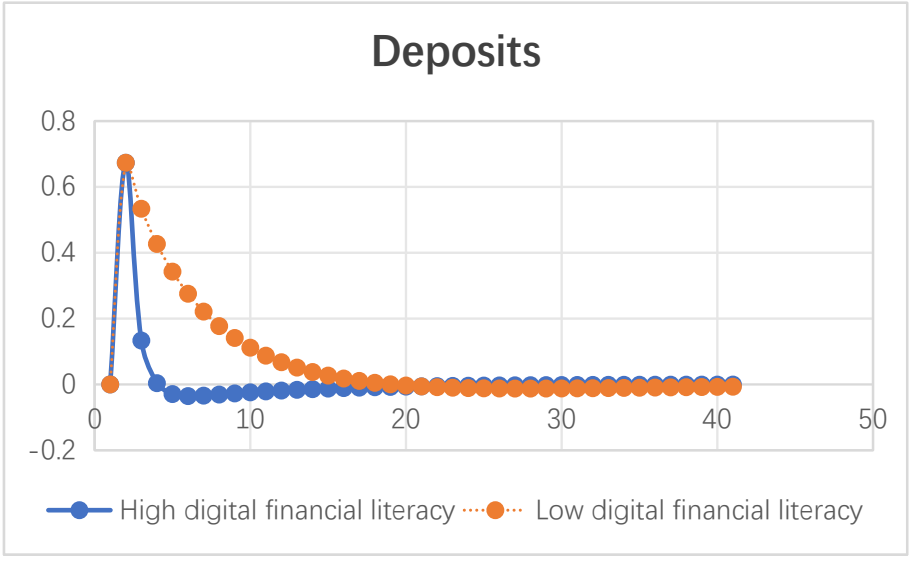

Figure 2. Response of deposits to shocks from illegal digital finance.

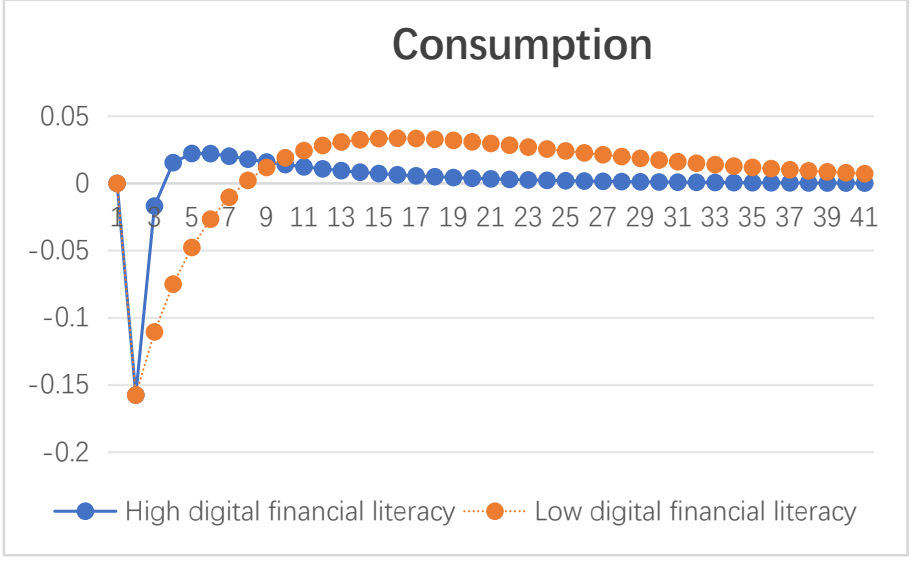

Figure 3. Consumption's response to shocks from illegal digital finance.

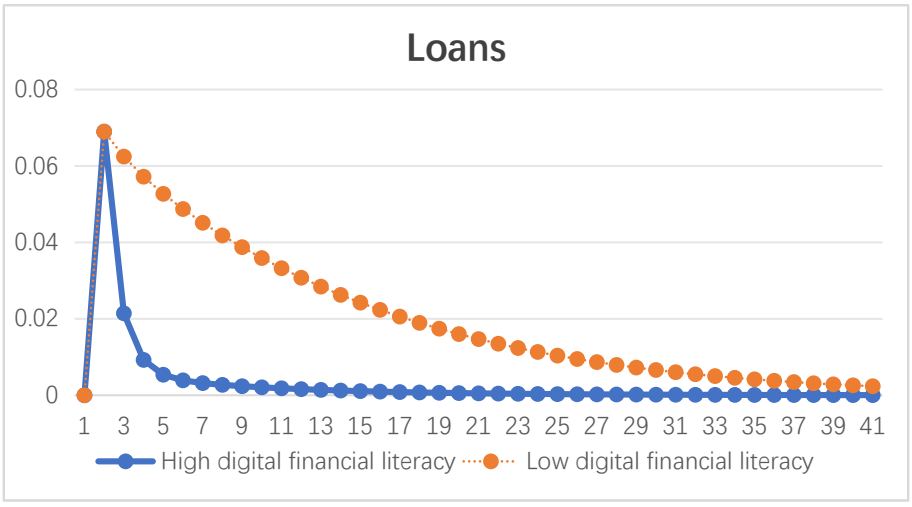

Figure 4. Response of loans to shocks from illegal digital finance.

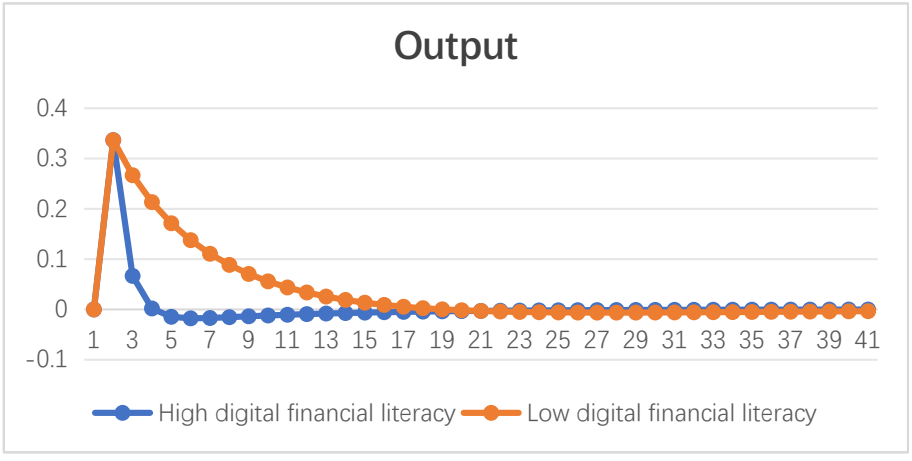

Figure 5. Output response to shocks from illegal digital finance.

6. Conclusion

On the one hand, this study incorporates the prevention of illicit digital financial risks into a survey of rural residents' digital financial literacy and analyzes the existing problems. The results show that rural residents exhibit relatively low levels of digital financial literacy, the ecosystem for cultivating digital financial literacy in rural areas remains underdeveloped, and the capacity to prevent and respond to illicit digital financial risks is inadequate. On the other hand, this study constructs a three-sector DSGE model to simulate the economic responses to shocks caused by losses from illicit digital finance. The results indicate that higher digital financial literacy helps reduce economic uncertainty. Accordingly, the following policy recommendations are proposed:

(1) Strengthen digital financial education and training for rural residents: Governments and relevant institutions should integrate digital financial literacy into the formal education system and expand the popularization of digital financial knowledge in rural areas. Diverse and targeted educational activities should be carried out through online and offline channels. For instance, lectures and seminars can be organized to enhance rural residents' understanding of legitimate digital financial services. Meanwhile, easy-to-understand instructional videos and articles can be disseminated via internet platforms. By combining traditional and

new media for publicity and education, emphasis should be placed on training rural residents in advanced internet skills to help improve their ability to identify illicit financial activities;

(2) Establish a sound digital financial service system: Formal financial institutions should be encouraged to extend their services to rural areas and shift their focus downward. Efforts should be made to vigorously develop digital inclusive finance and launch safe, convenient, and market-oriented digital financial products tailored to rural demand. A widely covered payment and settlement network should be established and improved to ensure smooth and efficient capital flows. In addition, stricter supervision should be imposed on informal financial channels, and all kinds of illegal activities should be severely cracked down on to effectively protect the rights and interests of financial consumers and purify the market environment;

(3) Optimize the legal, regulatory and policy support framework: Relevant laws and regulations governing the digital financial market, especially those targeting rural areas, should be formulated and improved to clarify the rights and obligations of all parties and provide strong legal protection for consumers. More supportive policies should be introduced to promote the sound development of digital finance, such as tax incentives and fiscal subsidies, to stimulate the vitality of market entities;

(4) Build an effective risk early-warning mechanism: Advanced technologies including big data and artificial intelligence should be adopted to collect and analyze relevant information, identify potential risks in a timely manner, and strengthen the crackdown on illicit digital finance. Modern AI technology can be used to enhance the screening of illicit digital financial activities in rural areas and take corresponding measures to defuse risks. A sound cross-departmental coordination mechanism should be established to jointly address complex and evolving risk challenges.

Disclosure statement

The authors declare no conflict of interest.

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