

Digital Inclusive Finance, Household Leverage Ratio and Economic Growth

Fucong Bi^{1, a}

¹Shanghai University, Shanghai, China

^abi_15632892805_bi@163.com

Abstract: In this paper, from 2011 to 2020 part of the provincial panel data in China as a research sample, using the system GMM model discusses the digital inclusive finance, residents leverage and the relationship between the economic growth. Through the research found: digital universal financial and economic growth between a "U" type of nonlinear relationship, residents between leverage and economic growth presents a "inverted U" nonlinear relationship. In the background of the rapid development of digital informatization, it is necessary to strengthen digital financial supervision, strictly control the leverage of the household sector and stabilize the expectations of the real estate market, coordinate the development of digital finance in the region, and promote steady economic growth.

Keywords: Digital inclusive finance; Resident leverage ratio; Economic growth.

1. Foreword

According to data released by the People's Bank of China, by the end of 2023, the balance of inclusive micro loans was 29.4 trillion yuan, up 23.5% year on year, or 5.61 trillion yuan, up 1.03 trillion yuan year on year. Inclusive finance has played an indispensable role in solving the "short, small, urgent and frequent" loan needs, supporting the sustainable development of small and micro economies, helping poverty alleviation and realizing the rural revitalization strategy.

2. Literature Review

First of all, there are mainly three different theories on the influence of household leverage ratio on economic growth, namely, positive effect theory, negative effect theory and threshold theory. Liu Ziwei, Li Xuelian, and Xue Lei (2021) believe that an appropriate increase in household debt can promote economic development without increasing the internal vulnerability of the economy. According to the PEST analysis method, Cheng Xuejun and Li Xinhe (2021) concluded that excessive debt overdraws the consumption potential and has adverse effects on economic development.

Second, the existing literature disagrees on the role of digital finance in promoting economic development. Yang Gang and Zhang Hengyi (2022) believe that digital inclusive finance and regional innovation can significantly promote economic growth. The research results of Li Tao (2016) show that with the deepening of China's economic and financial development, the development of digital inclusive finance will make its marginal cost greater than its marginal income, which will have a negative impact on China's economic development.

According to the study of past literature, there is no consensus on these two issues. Therefore, it is of great significance to further explore the internal relationship between these three to provide decision-making reference for promoting stable economic growth.

3. Research Hypothesis

Based on the above analysis of the existing literature, the

following assumptions are made:

Hypothesis 1: There is a "inverted" non-linear relationship between the U-shaped leverage ratio and economic growth;

Hypothesis 2: There is a "U" -shaped nonlinear relationship between digital inclusive finance and economic growth.

4. Empirical Study

(1) Description of the samples and the variables

Based on the availability of real data, the empirical analysis sample used in this paper includes interprovincial panel data from 29 provinces from 2011 to 2020. Table 1 shows the names, symbolic representations, economic implications, and data sources of each regressor.

In addition, instrumental variables are cited to control the possible endogeneity problems in econometric models. Referring to the research, this paper uses mobile phone popularity (Lin Lin West, 2022) and the first-order lag item of digital financial inclusion index as instrumental variables.

(2) Estimation method

This paper uses the systematic generalized moment estimation method (system GMM) proposed by Arellano & Bover et al. in 1995, as follows:

$$y_{i,t} = \alpha y_{i,t-1} + \beta X_{i,t} + \mu_i + \varepsilon_{i,t}$$

As shown in the formula, the variable $y_{i,t-1}$ represents the time delay of $y_{i,t}$, and $X_{i,t}$ represents the core explanatory variables. β is the coefficient to be estimated for each variable. Based on previous literature (Ma Yong and Chen Yulu, 2017), in order to avoid the endogeneity between variables and between variables and residues, a two-step system generalized moment method is used to estimate the model.

In addition, based on the existing research results, this paper conducts two tests on the estimation results of GMM: first, Hansen test, which is mainly used to test the validity of the instrumental variables; second, second-order sequence correlation test (AR (2) test), which is mainly used to test whether the residual items have a second-order sequence correlation.

(3) Empirical analysis and robust test

As shown in Table 2, models (1), (2) and (3) are the regression results before the addition of the instrumental

variable (mobile phone penetration), and models (4), (5) and (6) are the regression results after the addition of the instrumental variables. It can be seen that the coefficients of

the core explanatory variables before and after the addition of the instrumental variables are consistent.

Table 1. Regression variables and data sources

Variable name	symbol	Economic meaning	data sources
Economic growth level	lnGDP	Amount of gross real national income The log of the (100 million yuan)	National Bureau of Statistics of China (NBS)
Residential leverage ratio	debt	Household sector loans / GDP	NBS, Provincial Bureau of Statistics, the People's Bank of China
The square side of the resident leverage ratio	debt2	Household sector loans / GDP square	Institute of Digital Finance, Peking University
The development level of digital inclusive finance	fina	Digital Financial inclusion General Index	NBS and the Wind database
Corporate leverage ratio	TDR	Non-financial corporate equity capital / assets	NBS
Housing prices	HP	Average sales price of commercial housing (yuan / m ²)	NBS
Housing sales	HS	Commercial housing sales area (ten thousand square meters)	NBS
Financial development level	fd	Financial sector value added value / GDP	Wind database
Degree of industrialization	ind	Industrial added value / GDP	Wind database
urbanization level	urban	Urban population / permanent resident population at the end of the year	NBS
per capita disposable income	dip	Per capita disposable income of all provinces and cities (yuan)	NBS
Per capita available consumption expenditure	hcp	Per capita consumption expenditure of all provinces and cities (yuan)	NBS

Through the analysis of the empirical results, the following conclusions can be drawn:

Digital inclusive finance and economic growth show a "U"-shaped non-linear relationship, that is, with the improvement of the former level, the latter shows a trend of first decline and then increase. Hypothesis 1 is established;

The non-linear relationship between the leverage level of Chinese residents and economic growth is established. That is to say, there is a resident leverage level. Before this level, it has a positive impact on economic development. Hypothesis 2 is established.

Table 2. Systematic GMM estimation results

	mobel(1)	mobel(2)	mobel(3)	mobel(4)	mobel(5)	mobel(6)
_cons	2789.2*** (7.56)	2813.2*** (7.63)	2695.0*** (7.27)	2652.9*** (6.84)	2683.8*** (6.92)	2548.8*** (6.55)
L.lnGDPP	0.986*** (218.24)	0.985*** (219.94)	0.984*** (211.50)	0.986*** (217.50)	0.985*** (219.31)	0.984*** (211.34)
fina	-1.076** (-2.73)		-1.290** (-2.98)	-1.125** (-2.84)		-1.316** (-3.04)
fina2		-0.00257** (-2.95)			-0.00265** (-3.03)	
debt			16.55* (2.09)			16.69* (2.11)
debt2			-17.32* (-2.08)			-17.89* (-2.15)
mob				1.683 (1.14)	1.580 (1.07)	1.847 (1.23)
AR(2) statistics				-0.30 (0.765)	-0.52 (0.605)	0.44 (0.657)
Hansen statistics				9.23 (0.161)	8.59 (0.284)	11.62 (0.169)

Notes: (1) *, ** and *** indicate that the regression coefficients for each variable are significant at the confidence levels of 10%, 5% and 1%, respectively; (2) L.lnGDPP Is the first-order lag term of the variable lnGDPP; (3) the second line of the variable coefficient contains the corresponding Z-statistic; (4) the first line of the Hansen test and AR (2) test is the statistics of the corresponding test, and the second row is the corresponding P-value.similarly hereinafter; (5) data for control variables has been omitted from this table.

As shown in Table 2, the model set in this paper has passed the Hansen test and AR (2) test, from which it can be judged that the selection of instrumental variables is appropriate in

the model estimation process, and it also shows that the model estimation results will not be affected by the second order sequence correlation, which verifies the effectiveness of the

results.

5. Study Conclusions and Policy Recommendations

(1) Study conclusions

First of all, it can be seen from the benchmark regression analysis that the leverage effect of Chinese residents has played a certain role in promoting the development of China's economy. However, in the long run, the debt ratio of Chinese residents and economic growth show an "inverted U-shaped" relationship. Secondly, from the perspective of benchmark regression, China's digital finance still has a certain inhibitory effect on economic growth, but in the long run, digital inclusive finance and residents' debt level show a "U" shaped nonlinear relationship.

(2) Policy recommendations

As a major way to stimulate domestic demand, consumption plays a decisive role in promoting internal circulation. The leverage of households can promote the expansion of consumption and promote the economy from external demand-driven growth to consumption-driven growth, but at the same time, the risk of household debt should not be ignored. Therefore, based on the above research conclusions, the author tries to provide reference opinions for the policy formulation of digital inclusive finance in China:

First, strengthen the supervision and management of digital finance to prevent major financial system risks. Secondly,

strengthen the control of the increasing leverage of household enterprises, and deploy the risk reduction work as early as possible. Finally, maintain the policy orientation of "housing not speculation" to stabilize the expectations of the property market.

Reference Documentation

- [1] Liu Ziwei, Li Xuelian, Xue Lei. Resident debt growth, financial risk and debt structure adjustment under the high leverage rate [J]. Finance and Economics Science, 2021 (09): 14-28.
- [2] Cheng Xuejun, Li Xinhe. Suggestions on the development, risk and response of household leverage ratio: Based on the research perspective of legal finance [J]. Southwestern Finance, 2021 (10): 20-31.
- [3] Yang Gang, Zhang Hengyi. Digital financial inclusion, Regional Innovation, and Economic Growth [J]. Statistics and Decision-making, 2022,38 (02): 155-158.
- [4] Li Tao, Xu Xiang, Sun Shuo. Financial Inclusion and Economic Growth [J]. Financial Research, 2016 (04): 32-43.
- [5] Lin Lin West, Xiao Yubo. Digital finance, technological innovation and regional Economic growth [J]. Journal of Lanzhou University (Social Science Edition), 2022,50 (02): 47-59.
- [6] Ma Yong, Chen Yulu. Financial leverage, leverage volatility and economic growth [J]. Economic Research, 2017,52 (06): 31-45.