



ARTICLE

## The Impact of Digital Divide on Household Participation in Risky Financial Investments: Evidence From China

*Yuan Kefeng*

Tomsk State University, Tomsk, Russia  
Ningde Normal University, Ningde, China

*Zhang Xiaoxia*

Tomsk State University, Tomsk, Russia  
Ningde Normal University, Ningde, China

*Olga P. Nedospasova*

Tomsk State University, Tomsk, Russia

### ABSTRACT

The digital divide has now become a worldwide problem and has the potential to lead to greater inequality. This paper empirically analyses the impact of the “digital access divide”, “digital use divide” and “digital inequality divide” on household participation in risky financial investments using micro data from China. The results show that all three digital divides have a positive and significant impact on the probability of households participating in risky financial investments; in addition, the digital divide between urban and rural areas and between households is also significant. Finally, the authors propose strategies for bridging the digital divide based on China’s national context, such as building a national cultivation and evaluation system of digital literacy, reducing the family’s parenting burden, improving the investment environment for residents, developing the power resources of the younger elderly, and promoting intergenerational digital feedbacks.

### KEYWORDS

digital divide, financial investment, household asset allocation, internet finance, digital inequality

Received 15 June 2022

Accepted 28 March 2023

Published online 10 April 2023

© 2023 Yuan Kefeng, Zhang Xiaoxia,

Olga P. Nedospasova

[ykfzxx@foxmail.com](mailto:ykfzxx@foxmail.com), [282596452@qq.com](mailto:282596452@qq.com),

[olgaeconomy@mail.ru](mailto:olgaeconomy@mail.ru)

### ACKNOWLEDGEMENT

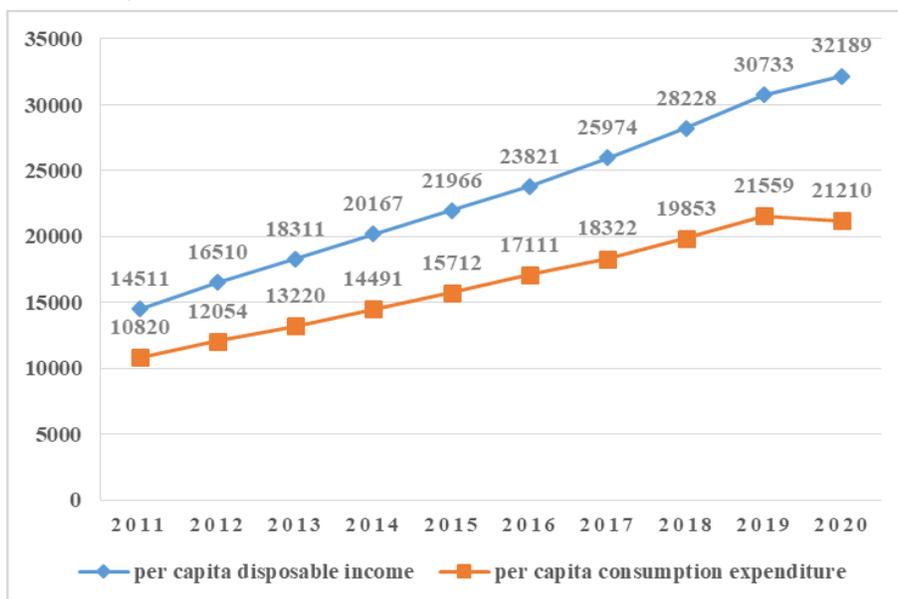
This work was supported by grant from the National Social Science Foundation of China (No. 22BJY045) and by the Russian Science Foundation project No. 19-18-00300-П «Institutions to unlock the untapped resource potential of the older generation in an aging economy».

### Introduction

With the rapid development of China's economy, the per capita disposable income of Chinese residents has increased from 14,511 yuan in 2011 to 32,189 yuan in 2020, an increase of 2.22 times, but less than 110% of GDP growth. The per capita consumption expenditure increased from 10,820 yuan in 2011 to 21,210 yuan in 2020 (Figure 1). In 2020, due to the impact of the epidemic, the growth rate of disposable income decreased significantly. Secondly, the median and average proportions of residents' disposable income increased from 85.37% in 2013 to 87.78% in 2015, and then began to decline continuously until 85.56% in 2020. Although the ratio declined significantly in 2020 due to the impact of the epidemic, it has been declining year by year since 2015 (China National Bureau of Statistics, 2021). This data shows that the divide between the rich and the poor has gradually widened since 2015, a trend exacerbated by the epidemic.

**Figure 1**

*Change Trend of Per Capita Disposable Income of Chinese Residents  
(Unit: RMB yuan)*



Note. Data source: National Bureau of Statistics of China.

---

However, according to the Wealth Trend of Chinese Families under the Epidemic: A Survey Report on Chinese Family Wealth Index (Southwestern University of Finance and Economics, 2020) released in June 2021, the overall wealth income of Chinese families in 2020 was in good condition, with wealth growing faster than income growth and job stability recovery. There are four main factors influencing the change of Chinese household wealth: housing assets, financial investment, industrial and commercial operation, and disposable cash. Among them, real estate and financial investment are the main factors leading to the increase of household wealth, contributing 69.9% and 21.2% respectively, while other—disposable cash and industrial and commercial operations—contribute less than 10%. At the same time, the online investment intention of Chinese households increased quarter by quarter, with young households having the highest online investment intention, though the online investment index of the elderly also increased significantly (Southwestern University of Finance and Economics, 2020). Considering the Chinese government's policy background of "housing not speculation" and the implementation of long-term adjustment mechanisms such as the comprehensive pilot of real estate tax, it is obvious that Chinese residents should change their investment mode. So, which investment method should Chinese residents choose? According to the experience of developed countries and the current situation of increasing household wealth in China, an effective way is to reduce the proportion of housing investment and increase the proportion of financial investment. In the rapid development of digital economy today, it is obvious that online financial investment is the general trend.

According to the 47<sup>th</sup> Statistical Report on China's Internet Development released by the China Internet Network Information Center, the number of Internet users in China increased from 688 million at the end of 2015 to 989 million at the end of 2020, and the Internet penetration rate increased from 50.3% to 70.4%. Average rates for fixed broadband and mobile phone data dropped by more than 95% from 2015, and average Internet speeds increased by more than seven times (China Internet Network, 2021). However, there is still a large digital divide between urban and rural areas, digital infrastructure construction between different groups, Internet access rate and Internet usage frequency. Then, what is the impact of digital divide on the wealth income of Chinese households? In view of this, this paper empirically studies the impact of digital divide on the participation probability of Chinese households in risky financial investment.

## Literature Review

With the rapid development of digital economy in the world, Internet information technology has penetrated into all walks of life, changing our way of life, production, and consumption, and also bringing a huge impact on the financial industry. With the help of Internet coupling, traditional financial investment is upgraded to a new financial model—Internet finance (Lin et al., 2001). Internet finance is a new financial business model in which traditional financial institutions and Internet enterprises use Internet technology and information and communication technology to realize

---

capital financing, payment, investment and information intermediary services (Xie et al., 2015). It breaks through the breadth, depth, and regional scope of coverage of traditional financial implementation carriers (Merton & Bodie, 1993) and reshapes the global financial structure (Claessens et al., 2002). It breaks the monopoly position of traditional financial operation mode (Shahrokhi, 2008) and greatly reduces transaction costs of enterprises, which facilitates financing for enterprises (Jiang et al., 2022). It also provides convenient conditions for daily consumption and financial investment of ordinary people (Mao, 2021).

In essence, Internet platform and financial function are the two most important elements of Internet finance (Wang et al., 2016). In order to give full play to the financial function of Internet finance, access and use of the Internet are its basic conditions. However, UN survey data show that almost half of the world's population (about 3.7 billion people) is still "offline" and will largely evolve into new global inequalities (Guillén & Suarez, 2005). Therefore, digital divide has also aroused the concern of scholars and policy makers. Some scholars have taken a global macro view, they considered computer popularization (Chinn & Fairlie, 2004), per capita income (Balioune-Lutz, 2003), urbanization process (Wong, 2002), social system (Zhao et al., 2007), and democratization level (Nam, 2010; Norris, 2001), Gini coefficient (Fuchs, 2008), foreign investment and level of science and technology (Pick & Azari, 2008) are important factors influencing the widening of digital divide. It is also divided into three levels according to the evolution sequence. The first level of digital divide is "digital access divide", the demographic group difference between telephone, personal computer, and Internet owners and those who do not own (NTIA, 1999). The second level is "digital usage divide" indicating that with the rapid popularization of computer hardware technology and information software technology, digital divide gradually transforms into group differences in the use degree, content and skills of digital resources (Attewell, 2001). Third-level digital divide is "digital inequality divide". That is, the inequality of benefits caused by the difference in digital dividend brought by the application of information and communication technology (DiMaggio & Hargittai, 2001; Scheerder et al., 2017).

While Internet information technology has brought great changes to the development of financial market, it also has a certain impact on household asset allocation. On the one hand, the changes in the way of financial transactions brought by the Internet weaken the time and space restrictions of transactions and lower the threshold of investment in the financial market (Bogan, 2008; Yin et al., 2015), which enables more families to participate in financial asset investment (Du et al., 2018; Xu & Jiang, 2017; Zhang & Lu, 2021). Moreover, as a carrier of information dissemination, the Internet is characterized by fast and large dissemination of information, which has a certain impact on residents' financial literacy and "information asymmetry" in venture capital (Dong et al., 2017; Yin et al., 2014), which can then influence the proportion of household financial risk assets investment (Wang et al., 2019; Yin & Zhang, 2017). On the other hand, under the influence of the three digital divide, some families are excluded from the digital financial system due to the difference in Internet access, Internet use frequency, Internet knowledge, and information resource utilization efficiency of different families

(Liu & Luo, 2019). And the possibility of further widening the divide between the rich and the poor has emerged (Luo & Cha, 2018; Su & Han, 2021).

In summary, scholars have shown that the widespread use of digital technologies has led to the rapid development of the digital economy and the rapid transformation of the global economy, which in turn has changed the way households live, produce, consume, and invest. However, the significant differences in Internet usage among different groups of people (or households) have led to a three-tiered digital divide, which has exacerbated social inequalities. While some scholars have studied the impact of the digital divide on households' economic development, most of these results have examined one or two dimensions of the digital divide alone, and there is very little research that progressively discriminates between the three layers of the digital divide on households' risky financial investment participation. Therefore, this paper selects China, a developing country with a significant digital divide, as the subject of this study and uses its micro-survey data to empirically investigate the impact of household participation in risky financial investments in a hierarchical manner.

### **Mechanism Analysis and Hypothesis Proposal**

At a time when digital transformation is in full swing in all industries, few investors sit in the lobby of a financial exchange and look at the investment information rolling on the big screen, and make their own rational investment. The vast majority of investors rely on Internet-connected computers or smartphones to access a wealth of investment information and make sound investment judgments. However, access to the Internet is the primary condition for residents to participate in Internet financial activities. From the reality of the situation at home and abroad, there are still a large number of families do not access the Internet, the use of the Internet to obtain investment information and income is out of the question. Therefore, the authors put forward Hypothesis 1 of this paper.

**Hypothesis 1:** Digital access divide significantly affects households' participation in risky financial investment.

After Internet access, on the one hand, residents can carry out financial investment activities with the help of the Internet without having to spend a lot of transaction costs. On the other hand, residents can search for desirable financial products with reasonable returns in the vast Internet world to enhance financial availability. Moreover, the use of Internet instant messaging software can strengthen the connection between residents and relatives and friends and promote the stability (or growth) of social capital. Therefore, the authors put forward Hypothesis 2 of this paper.

**Hypothesis 2:** Digital use divide significantly affects households' participation in risky financial investments.

In the Chinese and Russian universities where the authors teach, some students often use the Internet to play games, watch movies, listen to music, read novels, browse short videos and other recreational activities. While some college students often use the Internet to watch current events to broaden their horizons, learn cultural knowledge to improve their ability. Over the course of a few years, it is obvious which college students addicted to online entertainment will become better than those

who keep improving themselves. Similarly, if one family often uses the Internet for entertainment and another for business, it is obvious which family can realize the increase of family wealth through the Internet. Therefore, the direction and frequency of Internet use by different families will affect the investment decisions of risky finance of families to a certain extent, thus widening the divide of financial returns. Therefore, the authors put forward Hypothesis 3.

**Hypothesis 3:** Digital inequality divide significantly affects households' participation in risky financial investments.

In the process of China's urbanization, a large number of people flood into cities, and a large amount of infrastructure and capital are invested in urban construction, while the rural areas have relatively little change. As a result, urban and rural areas cannot be compared in terms of hardware or software, and digital divide is becoming increasingly significant. Accordingly, the authors put forward Hypothesis 4 of this paper.

**Hypothesis 4:** Digital divide between urban and rural areas leads to the difference in probability of urban and rural households participating in risky financial investment.

In China, raising children and supporting the elderly are major financial burdens for families. In recent years, the consumption structure of Chinese households has also undergone significant changes under the influence of the digital economy, with an overall upward trend in spending on education, healthcare, housing, and retirement. This change has not only squeezed the scope for household financial investment, but has also had a negative impact on household fertility intentions (Figure 2). It can be seen that household burden will seriously affect household investment behavior. Accordingly, the authors propose Hypothesis 5 of this paper.

**Hypothesis 5:** Family burden difference significantly affects family participation in risky financial investment.

## Data Processing and Empirical Analysis

### Data Sources

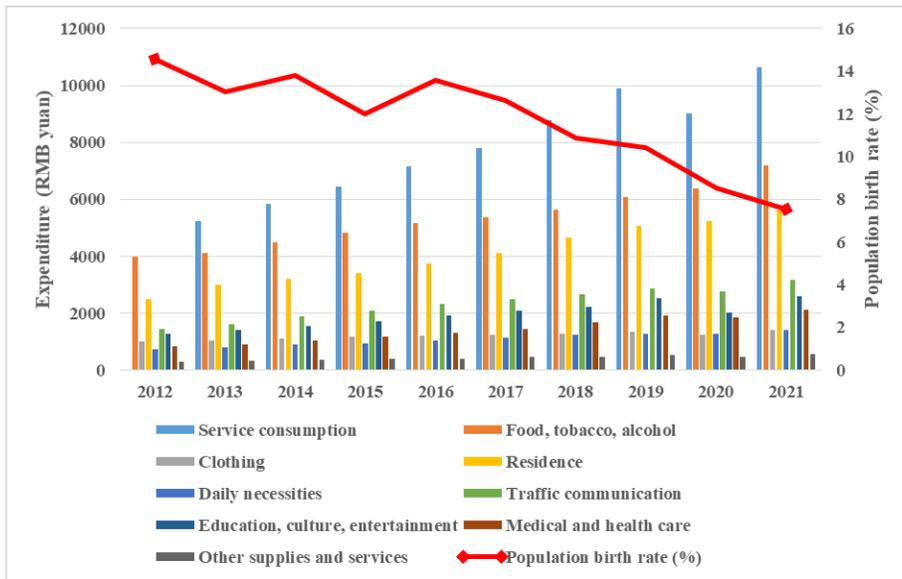
To study the impact of digital divide on household risky financial investment requires comprehensive micro-survey data. The authors select the micro databases in China, and finally select the database of The Chinese General Social Survey of Renmin University of China (CGSS) in 2017 as the data source of this paper (CGSS, 2017). CGSS2017 database for residents of China's 31 provinces (municipalities directly under the central government) the usage of Internet has carried on the detailed investigation, the data collected from the micro level to a more intuitive reflect the status of investigation object is the risk of financial investment, individual, social, and economic characteristics, effective data samples for a total of 12,582 copies. According to the needs of the study, the authors selected the related dependent, independent, and control variables, and eliminated the missing values and invalid samples of the selected variables. A total of 3,110 groups of samples were obtained.

**Variable Selection**

The core of this paper is to verify the impact of digital divide on risky financial investment participation. We learned from the variable selection experience of existing research results and selected dependent variables, independent variables and control variables respectively in CGSS2017 database based on China’s national conditions (see Table 1).

**Figure 2**

*Trends in China’s Household Consumption Structure and Population Birth Rate, 2012–2021*



Note. Data source: National Bureau of Statistics of China.

(a) Dependent variable. The authors found “Is your family currently engaged in the following investment activities?” in CGSS2017 database. The survey includes data on risky investments such as stocks, funds, bonds, futures, warrants, and foreign exchange. By comparing the data, the authors find that stock is the most popular risky investment item among Chinese residents, and the relevant questionnaire is relatively complete. Finally, the risky financial investment is determined as the core dependent variable of this paper and named as “Stock investment”, whose value rule is: the non-participating financial investment = 0, the participating financial investment = 1.

(b) Independent variables. According to the previous literature review, there is still no consensus on the three digital divide in academic circles. The authors summarize the three digital divides according to the existing literature: “digital access divide”, “digital use divide” and “digital inequality divide”. On this basis, the authors selected “Is your home connected to the Internet?” in the database of CGSS2017. Survey item data measured the impact of household digital access on risky financial investment

participation, named “Access divide”. Next, the authors selected “How often have you used the Internet in the past year?” named “Use divide”, the survey item data measured the influence of number use on risky financial investment participation, and, finally, selected “How often have you used the Internet for business transactions in the past year?” The survey item data measured the influence of household digital transaction status on risky financial investment participation, named as the “Inequality divide”.

(c) Control variables. This paper refers to the research results of other scholars on family risky financial investment, and combines the demographic characteristics of the respondents: Gender, Age and Age2 (used together with the variable “Age” to judge whether there is a “U” trend or an inverted “U” trend with increasing Age), Health status and Marital status, and Education level. Family economic status is an important factor affecting family financial investment. So, the authors select “What is your annual personal income?” The data item “Income” is also used as a control variable in this analysis. For the convenience of statistical analysis, we take logarithm of it.

In a family, it costs a lot of money to raise children, so the Number of children will affect the family’s expenditure and investment decisions. Therefore, we take “Number of children” as a control variable. The family enjoys a certain amount of social security policy is an important backing of family investment, which can provide basic security for them. Therefore, the authors select the question “Do you participate in the public medical insurance?”, “Whether to participate in the public pension insurance?”—Medical insurance and Pension, respectively. In addition, China has been urbanizing very fast in recent years, with an average urbanization rate of more than 60%. A large number of people live in cities with large concentrations of enterprises, hospitals, financial institutions, education and training institutions, and Internet services. In order to verify the difference between urban and rural areas in household risky financial investment, the authors also take “Living in a city” as a control variable and names it “Living place”.

## Model Setting

The core of this paper is to study the impact of three digital divides on households’ participation in risky financial investment. Since the dependent variable “Stock Investment” is a dummy variable selected by the binary value (non-participation = 0, participation =1), Probit model is selected for regression analysis. Its basic function is expressed in (1).

$$risk_i = \beta_0 + \beta_1 divide_i + \beta_2 X_i + \varepsilon_i \quad (i = 1, \dots, n) \quad (1)$$

In equation (1),  $risk_i$  denotes household risky assets and is the explanatory variable,  $divide_i$  is the explanatory variable,  $X_i$  is the control variable,  $\varepsilon_i$  denotes the disturbance term,  $\beta_1$  and  $\beta_2$  are the parameters to be estimated, and  $i$  denotes the respondent household. After substituting the control variables into the equation, the function is expressed as equation (2).

$$risk_i = \beta_0 + \beta_1 divide_i + \beta_2 gender_i + \beta_3 age_i + \beta_4 age2_i + \beta_5 edu_i + \beta_6 marital_i + \beta_7 health_i + \beta_8 income_i + \beta_9 med-insurance_i + \beta_{10} pension_i + \beta_{11} isurban_i + \varepsilon_i, \quad (i = 1, \dots, n) \quad (2)$$

## Empirical Analysis

First, we perform a descriptive statistical analysis of all selected data variables. The specific results are shown in Table 1.

**Table 1**  
*Descriptive Statistics of Variables*

Variable type	Variable name	Obs	Mean	Std. Dev.	Min	Max
Dependent Variable	Stock investment	3110	0.083	0.275	0	1
Independent variables	Access divide	3110	0.744	0.436	0	1
	Use divide	3110	2.965	1.700	1	5
	Inequality divide	3110	2.173	1.389	1	5
Control variables	Gender	3110	0.494	0.500	0	1
	Age	3110	47.068	13.971	18	70
	Age2	3110	24.106	12.875	3.24	49
	Health status	3110	3.509	1.088	1	5
	Marital status	3110	0.803	0.398	0	1
	Education level	3110	5.300	3.176	1	13
	Income	3110	9.995	1.259	4.605	16.111
	Medical insurance	3110	0.718	0.450	0	1
	Pension	3110	0.922	0.269	0	1
	Living place	3110	0.633	0.482	0	1
	Number of children	3110	1.540	1.031	0	10

Then, the Probit model was used for regression analysis of digital access divide, and the results were shown in Model (1) in Table 2,  $p = .001$ , with a marginal effect of 0.110. After controlling the digital access variables as access status (value 1), the Probit model was continued to be used for regression analysis of the digital use divide. The results showed that in Model (2) in Table 2,  $p = .000$  and its marginal effect was 0.024. Finally, after controlling the use of digital variables in the use state (value > 1), the Probit model was continued to be used to regression the digital inequality divide, and the results showed that in Model (3) of Table 2,  $p = .000$ , and its marginal effect was 0.027. On the whole, the three digital divide has a significant positive correlation with household participation in risky financial investment. That is, the first three hypotheses proposed by the author are all valid.

From the marginal effect of Model (1), for every 1-unit improvement in digital access, the probability of households participating in risky financial investments increases by 11%. From the marginal effect of Model (2), the probability of households'

participation in risky financial investment increases by 2.4% for every 1 unit increase in the frequency of number use. From the marginal effect of Model (3), if the frequency of business activities using the Internet increases by 1 unit, the inequality probability of households' participation in risky financial investment increases by 2.7%. By comparing Model (1) to Model (3), it is found that whether digital access has the greatest influence on the probability of household participation in risky financial investment.

Also, Age and Age2 showed positive correlation and negative correlation in the three models, that is, with the growth of residents' age, the possibility of participating in risky financial investment showed an inverted "U" shape trend of increasing first and then decreasing. The higher the education level and income of the respondents, the higher the probability of their households participating in risky financial investments. Having health insurance increases the probability that households will participate in risky financial investments, which may be related to the immediate reimbursement of health insurance. Urban residents are more likely to participate in risky financial investment than rural residents, which indicates that digital divide between urban and rural areas in China leads to a large divide between urban and rural households in the field of risky financial investment, and also proves the validity of the authors' Hypothesis 4. The more children there are in a family, the lower the probability that the family will participate in risky financial investment. This proves that the authors' Hypothesis 5 is established, and also proves the reason why there is no baby boom after the Chinese government liberalizes the "two-child" and "three-child" policy.

**Table 2**  
*Household Risky Financial Asset Investment Participation*

Variable	Model (1)		Model (2)		Model (3)		Model (4)	
	$p >  z $	Marginal effect						
Access divide	0.001	0.110						
Use divide			0.000	0.024				
Inequality divide					0.000	0.027		
Proportion of working with computer							0.001	0.001
Gender	0.110	0.017	0.073	0.025	0.089	0.027	0.108	0.026
Age	0.001	0.010	0.002	0.012	0.001	0.015	0.001	0.016
Age2	0.022	0.007	0.037	0.009	0.037	0.010	0.033	0.000
Health status	0.119	0.009	0.089	0.013	0.170	0.012	0.080	0.016
Marital status	0.489	0.011	0.673	0.009	0.601	0.013	0.893	0.003
Education level	0.000	0.009	0.000	0.009	0.001	0.010	0.001	0.010
Income	0.000	0.051	0.000	0.066	0.000	0.071	0.000	0.075
Medical insurance	0.028	0.041	0.025	0.055	0.061	0.051	0.046	0.059

**Table 2 Continued**

Variable	Model (1)		Model (2)		Model (3)		Model (4)	
	$p >  z $	Marginal effect						
Pension	0.692	0.011	0.818	0.009	0.981	0.001	0.751	0.014
Living place	0.002	0.077	0.005	0.097	0.007	0.104	0.013	0.101
Number of children	0.000	0.035	0.002	0.039	0.003	0.044	0.002	0.045

In order to verify the robustness of the model, the authors selected the question “What percentage of work per week do you use a computer?” in the CGSS2017 database, named “Proportion of working with Computer”, and conducted regression analysis based on Model (3). The results are shown in Table 2, Model (4). Both independent variables and control variables maintain the same significant correlation with the previous three models. This shows that the model set in this paper is very robust.

According to the regression results of the four models in Table 2, under the influence of digital divide, Chinese urban residents have a higher probability of participating in risky financial investment than rural residents. In order to verify the heterogeneity of the two, we control the variable of “Living Place” and conduct regression analysis on the basis of Model (3). The regression results of the survey objects living in cities and rural areas are respectively output in Model (5) and Model (6) in Table 3. The results show that the digital inequality divide has a significant positive correlation with the probability of urban residents participating in risky financial investment, but not with rural residents. The probability of urban residents participating in risky financial investment increases by 3.2% when the frequency of urban residents using the Internet to carry out business activities increases by one unit. This shows that the huge digital divide between urban and rural residents in China has led to unequal investment returns.

Since the outbreak of the Novel Coronavirus at the end of 2019, the rapid development of “Internet plus Education” in the deep integration of Internet technology and education has promoted revolutionary changes in the education system, making it more flexible and effective. And judging from the present, “Internet + education” is based on the Internet infrastructure and innovation factors, constructs the new education ecology and service mode, the new education ecological across the boundaries of the school and class, constructing open education service system, can satisfy the social knowledge and learners’ demand for education of new information age. In this context, the authors multiplied the variable of “Inequality divide” and the variable of “Education level” to obtain the interaction term “Internet + Education”, and conducted regression analysis based on Model (3), the results of which are output in Model (7) in Table 3. The results show that “Internet + Education” has a significant positive impact on the probability of family participation in risky financial investment, and the probability of family participation in risky financial investment increases by 0.3% when the frequency of learning knowledge through Internet increases by one unit.

**Table 3**  
*Robust and Heterogeneous Regression Results*

Variable	Model (5)		Model (6)		Model (7)	
	$p >  z $	Marginal effect	$p >  z $	Marginal effect	$p >  z $	Marginal effect
Inequality divide	0.000	0.032	0.098	0.003		
Internet + Education					0.001	0.003
Gender	0.111	0.025	0.827	0.001	0.106	0.026
Age	0.002	0.014	0.442	0.002	0.001	0.017
Age2	0.041	0.010	0.634	0.001	0.022	0.000
Health status	0.186	0.011	0.006	0.004	0.079	0.017
Marital status	0.475	0.017	0.222	0.008	0.715	0.009
Education level	0.000	0.010	0.028	0.002	0.967	0.000
Income	0.000	0.073	0.197	0.004	0.000	0.074
Medical insurance	0.018	0.071	0.643	0.003	0.050	0.057
Pension	0.696	0.017	0.704	0.003	0.893	0.006
Living place	(omitted)	0.000	(omitted)	0.000	0.010	0.105
Number of children	0.005	0.040	0.095	0.006	0.003	0.046

## Conclusions and Recommendations

The regression results of the seven models above show that digital divide has a significant impact on the participation probability of household risky financial investment, which will lead to more income inequality and widen the wealth divide of residents. The difference of digital divide between the young and the old is reflected in the participation probability of household risky financial investment, showing the difference of investment income caused by digital divide between the generations of residents. In the era of digital economy, residents with a certain level of education will be more easily access to more information resources through the Internet, and thus obtain more benefits. The multiple digital divides formed by the divide in economy, education, infrastructure, social security and other aspects between urban and rural areas in China has seriously severed the equal opportunities for urban and rural residents to benefit from the Internet, thus seriously affecting the living standards of urban and rural residents, and even bringing about a greater crisis. Today, the aging of China's population continues to deepen, the government's fertility policy has failed to show the incentive effect, and many families are unable to carry out more investment activities in the face of heavy pressure of child-rearing.

Using micro-survey data from China, this study empirically analyses the impact of the digital divide on household financial investment behavior at three levels: digital access, digital use, and digital inequality, respectively. To a certain extent, this thesis fills a gap in research in the related field, and thus provides a research perspective

---

and theoretical methodological reference for subsequent researchers. However, the micro-survey data for China is country specific and does not correspond to all countries. It is suggested that other scholars can use data from different countries to further validate the findings of this paper.

In addition, given the dual pressures of China's digital economy and an ageing population, the authors make the following recommendations.

(a) Bridge digital divide between urban and rural areas. Facing the information divide between urban and rural areas in China, we should first increase infrastructure construction and accelerate the informatization of rural areas. Then, it is necessary to break the bottleneck of blocked information, scattered resources, and poor communication in rural areas, integrate all kinds of scattered resources with the help of the Internet, and then accelerate the interconnection of technical and human resources between urban and rural areas. Online life skills and production skills training should also be carried out for farmers (such as e-commerce training, online agricultural technology training, etc.).

(b) To build a nationwide digital literacy cultivation and evaluation system. Drawing on foreign experience and combining with China's national conditions, the cultivation system of improving the digital literacy of the whole Chinese people is constructed by adopting sections (teenagers, adults, and the elderly), grading (general application, technical promotion, innovation, and creation), and classification (normal group, special group). In addition, an evaluation system of national digital literacy is constructed from the aspects of digital acquisition, use, security, ethics, evaluation, interaction, sharing, production, and innovation.

(c) Reduce the burden of family rearing. On the one hand, the government should formulate more favorable individual income tax payment policies for families. On the other hand, to provide families with more GSP child care institutions. In addition, there will be more incentive maternity leave and financial subsidies to encourage people to have two or three children.

(d) Improving the investment environment for residents. The government should formulate more scientific financial market supervision policies to create a good market environment for residents' financial investment, and guide residents to carry out financial investment reasonably through public opinion. Enterprises should also use the Internet to develop more new products and services and expand financial investment channels for residents.

(e) Developing human resources for the young and the elderly. First, actively promote the professional and hierarchical development of education for the elderly, improve the education level of the elderly group, and enhance the digital quality of the elderly group with the help of the Internet. Second, the construction of the elderly human resources big data information database, the establishment of the elderly group re-employment platform integrating employment consulting, job introduction, employment training, employment tracking services, and other functions, to provide data support for the elderly group re-employment. Third, we will improve supporting policies and measures to encourage enterprises to hire retired young people.

(f) Promote intergenerational digital feedback. On the one hand, we can learn from the community volunteer service mechanism to encourage college students to go into the community and teach the elderly how to use digital products. On the other hand, children should patiently help their parents to learn digital skills and get familiar with digital security knowledge, so as to speed up their parents' adaptation to the pace of life and production in the digital economy era.

## References

- Attewell, P. (2001). The first and second digital divides. *Sociology of Education*, 74(3), 252–259. <https://doi.org/10.2307/2673277>
- Baliamoune-Lutz, M. (2003). An analysis of the determinants and effects of ICT diffusion in developing countries. *Information Technology for Development*, 10(3), 151–169. <https://doi.org/10.1002/itdj.1590100303>
- Bogan, V. (2008). Stock market participation and the Internet. *Journal of Financial and Quantitative Analysis*, 43(1), 191–211. <https://doi.org/10.1017/S0022109000002799>
- China Internet Network Information Center. (2021). *47<sup>th</sup> statistical report on China's Internet development*. <http://www.cnnic.com.cn/IDR/ReportDownloads/>
- China National Bureau of Statistics. (2021). *Annual dataset*. <https://data.stats.gov.cn/english/easyquery.htm?cn=C01>
- Chinese general social survey* (CGSS). (2017). National Survey Research Center (NSRC) at Renmin University of China. <http://cgss.ruc.edu.cn/info/1014/1019.htm>
- Chinn, M. D., & Fairlie, R. W. (2004). *The determinants of the global digital divide: A cross-country analysis of computer and Internet penetration* (Discussion paper No. 881). Economic Growth Center. <https://elischolar.library.yale.edu/egcenter-discussion-paper-series/889>
- Claessens, S., Glaessner, T., & Klingebiel, D. (2002). Electronic finance: Reshaping the financial landscape around the world. *Journal of Financial Services Research*, 22(1–2), 29–61. <https://doi.org/10.1023/A:1016023528211>
- DiMaggio, P., & Hargittai, E. (2001). *From the "Digital Divide" to "Digital Inequality": Studying Internet use as penetration increases* (Working Paper No. 47). Center for Arts and Cultural Policy Studies.
- Dong, X. L., Yu, W. P., & Zhu, M. J. (2017). Butong xinxi qudao xia chengxiang jiating jinrongshichang canyu ji zichan xuanze xingwei yanjiu [Research on financial market participation and asset selection behavior of urban and rural households under different information channels]. *Finance and Trade Research*, 28(4), 33–42. <https://doi.org/10.19337/j.cnki.34-1093/f.2017.04.004>
- Du, X. Y., Yang, Q. C., Yi, M. (2018). Xin xi tong xin ji shu dui pu hui jin rong fa zhan de ying xiang—ji yu 2007–2016 nian sheng ji mian ban shu ju de shi zheng fen xi [Impact of ICT on the development of financial inclusion—An empirical analysis based on provincial panel data from 2007–2016]. *Jiangnan Tribune*, 12, 38–47.

---

Fuchs, C. (2008). The role of income inequality in a multivariate cross-national analysis of the digital divide. *Social Science Computer Review*, 27(1), 41–58. <https://doi.org/10.1177/0894439308321628>

Guillén, M. F., & Suárez, S. L. (2005). Explaining the global digital divide: Economic, political and sociological drivers of cross-national Internet use. *Social Forces*, 84(2), 681–708. <https://doi.org/10.1353/sof.2006.0015>

Jiang, K. Q., Chen, Z. F., Rughoo, A., R., & Zhou, M. L. (2022). Internet finance and corporate investment: Evidence from China. *Journal of International Financial Markets, Institutions and Money*, 77, Article 101535. <https://doi.org/10.1016/j.intfin.2022.101535>

Lin, L. H., Geng, X. J., & Whinston, A. (2001). A new perspective to finance and competition and challenges for financial institutions in the Internet era. In *Electronic finance: A new perspective and challenges* [BIS Papers No. 7] (pp. 13–25). <https://www.bis.org/publ/bppdf/bispap07b.pdf>

Liu, C. G., & Luo, W. Y. (2019). Hu lian wang shi yong yu nong hu jin rong pai chi—Ji yu CHFS 2013 de shi zheng yan jiu [Internet use and financial exclusion of farmers—An empirical study based on CHFS2013]. *Economic Survey*, 36(2), 141–148. <https://doi.org/10.15931/j.cnki.1006-1096.20190116.002>

Luo, T. K., & Cha, H. W. (2018). “Shu zi hong gou” yu fan pin kun yan jiu—Ji yu quan guo 31 ge sheng shi mian ban shu ju de shi zheng fen xi [“Digital divide” and anti-poverty research—Empirical analysis based on panel data of 31 provinces and cities across the country]. *Inquiry Into Economic Issues*, 39(2), 11–18.

Mao, X. P. (2021). Research on residents’ consumption and financial investment behavior in Internet economy. In J. Li, J. Wu & K. Chen (Eds.), *Proceedings of International Conference on Environmental and Engineering Management (EEM 2021)*, Changsha, China, April 23–25, 2021, Article 03081. <https://doi.org/10.1051/e3sconf/202125303081>

Merton, R. C., & Bodie, Z. (1993). Deposit insurance reform: A functional approach. *Carnegie-Rochester conference series on public policy*, 38, 1–34. [https://doi.org/10.1016/0167-2231\(93\)90014-N](https://doi.org/10.1016/0167-2231(93)90014-N)

Nam, T. (2010). Whither digital equality? An empirical study of the democratic divide. In *Proceedings of the 43<sup>rd</sup> Hawaii International Conference on System Sciences*, Honolulu, HI, USA, January 5–8, 2010. <https://doi.org/10.1109/HICSS.2010.442>

National Telecommunications and Information Administration [NTIA]. (1999). Falling through the net: Defining the digital divide. *United States Department of Commerce*.

Norris, P. (2001). *Digital divide: Civic engagement, information poverty and the Internet worldwide*. Cambridge University Press. <https://doi.org/10.1017/CBO9781139164887>

Pick, J. B., & Azari, R. (2008). Global digital divide: Influence of socioeconomic, governmental, and accessibility factors on information technology. *Information Technology for Development*, 14(2), 91–115. <https://doi.org/10.1002/itdj.20095>

---

Scheerder, A., van Deursen, A., & van Dijk, J. (2017). Determinants of Internet skills, uses and outcomes. A systematic review of the second- and third-level digital divide. *Telematics and Informatics*, 34(8), 1607–1624. <https://doi.org/10.1016/j.tele.2017.07.007>

Shahrokhi, M. (2008). E-finance: Status, innovations, resources and future challenges. *Managerial Finance*, 34(6), 365–398. <https://doi.org/10.1108/03074350810872787>

Southwestern University of Finance and Economics. (2020, December). *Yì qíng xià zhōng guó jiā tíng de cái fù biàn dòng qū shì (zhōng guó jiā tíng cái fù zhǐ shù diào yán bào gào 2020 nián dù)* [Trends in the Wealth of Chinese Households under the Epidemic (Survey Report on Chinese Household Wealth Index)]. <https://chfs.swufe.edu.cn/info/1031/1457.htm>

Su, Q., & Han, Q. Y. (2021). Shu zi hong gou yu jia ting cai fu cha ju—Ji yu CHFS shu ju de shi zheng jian yan [Digital divide and family wealth divide—Empirical test based on CHFS data]. *Journal of Yunnan University of Finance and Economics*, 37(9), 80–96. <https://doi.org/10.16537/j.cnki.jynufe.000729>

Wang, Z. M., Ren, B. Y., & Zhang, Y. (2019). Hu lian wang xin xi qu dao cu jin jia ting jin rong tou zi le ma? [Does Internet information channels promote household financial investment?]. *Guizhou Social Sciences*, 10, 123–130. <https://doi.org/10.13713/j.cnki.cssci.2019.10.017>

Wang, Z. R., Yang, M., & Zhou, Y. J. (2016). Logic of the emergence of internet finance: Investor's perspective. *Systems Engineering: Theory & Practice*, 36(11), 2791–2801. [https://doi.org/10.12011/1000-6788\(2016\)11-2791-11](https://doi.org/10.12011/1000-6788(2016)11-2791-11)

Wong, P.-K. (2002). ICT production and diffusion in Asia: Digital dividends or digital divide? *Information Economics and Policy*, 14(2), 167–187. [https://doi.org/10.1016/S0167-6245\(01\)00065-8](https://doi.org/10.1016/S0167-6245(01)00065-8)

Xie, P., Zou, C. W., & Liu, H. (2015). Hù lián wǎng jīn róng de jī chǔ lǐ lùn [Basic theory of Internet finance]. *Journal of Financial Research*, 8, 1–12.

Xu, G. S., & Jiang, Y. S. (2017). Xīn xī tōng xùn jì shù yǔ pǔ huì jīn róng de jiāo hù zuò yòng [Interaction between ICT and inclusive finance]. *Journal of South China Agricultural University (Social Sciences Edition)*, 16(2), 37–46.

Yin, Z. C., Song, Q. Y., & Wu, Y. (2014). Jīn róng zhī shí tóu zī jīng yàn yǔ jiā tíng zī chǎn xuǎn zé [Financial knowledge, investment experience and household asset selection]. *Economic Research Journal*, 4, 62–75.

Yin, Z. C., & Zhang, H. D. (2017). Jīn róng zhī shí hé zhōng guó jiā tíng cái fù chà jù—lái zì CHFS shù jù de zhèng jù [Financial knowledge and wealth divide of Chinese households—evidence from CHFS data]. *Studies of International Finance*, 10, 76–86. <https://doi.org/10.16475/j.cnki.1006-1029.2017.10.008>

Yin, Z. C., Wu, Y., & Gan, L. (2015). Jin rong ke de xing jin rong shi chang can yu he jia ting zi chan xuan ze [Financial availability, financial market participation and household portfolio choice]. *Economic Research Journal*, 3, 87–99.

---

Zhang, Z. P., & Lu, H. (2021). Shù zì hóng gōu duì jiā tíng jīn róng tóu zī de yǐng xiǎng—jī yú CFPS shù jù de shí zhèng yán jiū [The impact of digital divide on household financial investment-An empirical study based on CFPS data]. *Fujian Tribune (Humanities and Social Sciences Edition)*, 3, 57–70.

Zhao, H. X., Seung K., Taewon, S., & Du, J.J. (2007). Social institutional explanations of global Internet diffusion: A cross-country analysis. *Journal of Global Information Management*, 15(2). 28–55. <https://doi.org/10.4018/jgim.2007040102>