

## **Impact of financial literacy on individuals’ financial decisions: A comparative analysis of Eastern, Central, and Western Regions in China**

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## Abstract

This study examines the following research questions: 1. What are the main characteristics of financial literacy in China? 2. Are there differences in the levels of financial literacy between regions? 3. What are the factors affecting financial literacy? It uses data gathered from a survey of 474 respondents. The findings reveal different financial literacy characteristics across China's three major regions and allow for an exploration of the influencing factors and corresponding impacts on financial decisions. The financial literacy levels exhibit a decreasing trend from East to West, with small differences in the mean value. Overall, financial literacy is most strongly correlated with deposits, followed by funds, stocks, and emergency savings decisions. However, different regions perform differently in various aspects of financial literacy. Drawing from the findings, the paper proposes some policy recommendations.

**Keywords** *financial literacy; financial behavior; portfolio diversification; financial decision*

## 1. Introduction

Each country has a different definition of financial literacy. President's Advisory Council on Financial Literacy, USA (2008) defines financial literacy as consumers' ability to use knowledge and skills to manage financial resources effectively and enhance their economic well-being. The Organisation for Economic Co-operation and Development (OECD, 2019) includes within the concept of financial literacy awareness related to financial affairs, knowledge, skills, attitudes, and behaviors and points out that financial literacy can be used in financial decisions to improve personal financial welfare. Enhancing consumers' or individuals' financial literacy is of great importance for a government, particularly when disseminating financial knowledge, strengthening financial skills, and raising financial risk awareness. The promotion of financial literacy and risk prevention awareness are also the cornerstones of financial

market stability. In recent years, with the continuous development of new financial industries and increasing penetration of financial production into daily life, finance plays an increasingly important role in consumers' economic activities. Additionally, complex financial products and services have led to higher demand for consumers' or individuals' financial literacy. It is argued that financial literacy is important for the sustainability of both the consumers and the entrepreneurs and for people of all age (Swiecka et al., 2020). Therefore, ways to improve financial literacy have become an important issue in China.

To improve financial education, the People's Bank of China (China's central bank) formulated the National Strategy for China's Financial Education with the support of the China Banking Regulatory Commission, China Securities Regulatory Commission and China Insurance Regulatory Commission (OECD, 2013; Wang, 2013). The strategy represents a milestone in China's financial literacy education. Up till now, a series of financial education activities and projects have been conducted by the Chinese government, financial institutions, universities, volunteers and other stakeholders. For instance, the Financial Knowledge Popularization Monthly Project is a monthly series of financial knowledge popularization activities, financial literacy promotion, co-construction of financial inclusion, rational investment, illegal financial activities prevention and so on. The aim is to improve resident's financial literacy, particularly the disadvantaged groups, such as small and micro enterprises, school students, poor people in remote areas, labor floating population, women and the disabled community. In June 2014, the People's Bank of China issued a guideline document, highlighting China's financial system within three major sections. First, the document introduces the identification of Renminbi (RMB) authenticity, deposit and loan knowledge, treasury revenue and expenditure, treasury bonds and its types, RMB exchange rate and foreign exchange market. Second, the document contains vital information on money laundering and anti-money laundering supervision, payment clearing systems, payment settlement business, bank card and bank settlement account. Finally, it provides basic

knowledge of credit investigation, wealth management and personal financial information security. Subsequently, in November 2014, the People's Bank of China released the Financial Network Security Knowledge Manual, to raise awareness on online financial frauds and help users identify these frauds. The description above emphasizes the commitments made by the Chinese government together with financial institutions and other stakeholders to promote financial literacy among Chinese citizens.

From an international perspective, the OECD launched a financial literacy questionnaire survey in 2010. The Program for International Student Assessment (PISA) 2012 was the first large-scale international study to assess the financial literacy of young people which showed wide variations in levels of financial literacy within and across countries (OECD, 2019, p.7). The PISA 2015 and 2018 captured trends and provided data on new countries joining the assessment. The People's Bank of China was invited to participate in the survey in 2016. The OECD believes that international financial literacy surveys can provide a cross-regional database for horizontal comparison; at the same time, participating countries can use surveys to track year-by-year changes in their levels of financial literacy and further promote a national financial education campaign. From a domestic perspective, in 2013, the Financial Consumer Protection Bureau of the People's Bank of China started a biannual financial literacy consumer survey to accurately understand consumers' financial knowledge levels and weaknesses in financial education. To assess the effectiveness of consumers' financial education, substantial efforts were devoted to popularizing financial knowledge. In 2015, the Financial Consumer Protection Bureau and the World Bank Group jointly revised and refined the former survey questionnaire and created the Consumer Financial Literacy Questionnaire. In 2017, the latest survey and analysis report was used to establish a nationwide consumer financial literacy score, with the construction of a consumer financial literacy index and using multiple linear regression to quantitatively study the major factors affecting consumers' financial literacy. The report shows that the overall level of financial knowledge among Chinese population has been continuously improving and

differences in consumers' demand for financial knowledge are likely due to differences in region, occupation, income, and education. This study aims to examine these differences across different regions in China.

Currently, internet financing is well developed in Eastern China and has been rapidly penetrating throughout the country, particularly by expanding into the Central and Western regions. The overall level of financial literacy of Chinese residents, however, has not kept pace with China's financial development. Increasingly diversified and complex financial products are convenient for consumers but also involve greater difficulty in understanding and using them, including identifying their risks. It is therefore more important than ever to publicize and popularize financial knowledge and boost national financial literacy levels. In this context, it is crucial to examine the following research questions: 1. What are the main characteristics of financial literacy in China? 2. What are the differences in the levels of financial literacy between the populations in different regions? 3. What are the factors affecting populations' financial literacy?

Studies have shown that the main factors affecting residents' financial literacy are gender, age, individual education levels, financial education, income levels, types of occupation, and risk types (Hogarth and Beverley, 2003; Lusardi and Mitchell, 2007; Servon and Kaestner, 2008; Wang and Fan, 2015). However, research also shows no gender differences in financial literacy among Chinese population and finds that the relation between financial literacy and income is insignificant (Wang and Fan, 2015). Given the above gaps, it warrants further investigation on the varying characteristics of financial literacy and its impact on the populations in different regions of China. The investigation by this study is important, as it offers insights into the financial literacy of Chinese residents, by focusing on the differences among the populations of Eastern, Central, and Western China. Using survey data and quantitative analysis this study examines the regional differences based on basic financial knowledge, financial behavior and financial attitude. The analysis not only considers Chinese residents' investment decisions on financial instruments (such as bonds and stocks), but also measures their financial decision behaviors on emergency savings, retirement savings

and deposits. In doing so, we are able to capture the current situation of Chinese residents' asset allocation. Furthermore, the samples in our study are different from those in the existing literature. Instead of selecting rural and urban population, this study focuses on the employed people; participants are employees of government agencies, state-owned enterprises, private enterprises and joint ventures. These participants have a background of comparatively good education, with a majority possessing bachelor's degree or above. The findings show that the influence of their financial literacy on portfolio diversification is much stronger than the impact of financial literacy on emergency savings and retirement savings behaviors. These results provide new evidence on the important role played by financial literacy in financial portfolio diversification. Drawing from these results, the study then suggests ways to improve financial literacy among the population in China.

The remainder of the paper is organized as follows: Section 2 reviews the literature. Section 3 describes data and research methodology. Section 4 shows empirical findings. Section 5 presents the discussion of findings, and Section 6 draws out conclusions, limitations, and directions for future research.

## **2. Literature review**

### **2.1 Financial literacy**

The theory of financial literacy originated from research on the effectiveness of household finance and financial education projects. The early concept of financial literacy was limited to the mastery of financial knowledge. In the early days, there were two schools of thoughts. Some scholars view financial literacy as financial knowledge (Hung et al., 2009), while others break it into the ability to calculate interest rate, inflation, and diversify (Lusardi and Mitchell, 2007; Tian et al., 2020). Later, the understanding of financial literacy expanded to a wider range from financial knowledge to financial decision-making. The target samples chosen to study financial literacy have been extended from individuals to households, consumers and firm executives. For example, Mitchell and Lusardi (2015) view financial literacy as one's ability to

process economic information and take effective decisions regarding wealth accumulation, financial planning, debt and pensions. The European Commission defines financial literacy as the ability of consumers and small business owners to understand retail financial products and make effective financial decisions. Tien et al. (2020) view financial literacy as the ability to master basic financial concepts and make appropriate financial decisions. According to the World Food Program (2020, p.3) “Financial literacy is a combination of financial awareness, knowledge, skills, attitude and behavior necessary to make sound financial decisions and ultimately achieve individual financial wellbeing”. The Council of Economic Education (USA), Cutler and Devlin (2000), and other scholars believe that a person with financial literacy must be familiar with basic economic principles and financial management and understand key economic terms. With the continuous development of the financial industry, the connotations of financial literacy have also gradually deepened. Moore (2003) believes that financial literacy covers not only financial concepts but also the use of financial knowledge. Servon and Kaestner (2008) also emphasize the need to apply financial knowledge to personal financial planning, focusing more on assessing financial skills and capabilities. The development of behavioral finance has led many scholars to realize that they should go deeper into the spiritual field to study financial literacy. Mason and Wilson (2000) believe that financial literacy refers to consumers’ ability to obtain, understand, and evaluate relevant financial information to make financial decisions while responding rationally to the results. They state that consumers should think carefully when making financial decisions and apply their judgment.

The connotations of financial literacy mainly include the following three aspects: first, financial knowledge, that is, one’s grasp of financial knowledge closely related to daily life, such as savings, loans, credit information, debit cards, and investments; second, financial skills, that is, the effective application of financial knowledge to personal financial planning, financial product selection, and financial product use; and, third, financial attitude, that is, the degree of preference for various financial products and services. The effects of financial literacy have



been the topic of many academic discussions.

Lusardi (2019) identified three universal concepts which are important to understand whether people are armed with necessary tools to effectively navigate the maze of day-to-day financial decisions: (i) numeracy as it relates to the capacity to do interest rate calculations and understand interest compounding; (ii) understanding of inflation; and (iii) understanding of risk diversification.

Many scholars agree that financial literacy and financial education play an active role in promoting financial behavior. For example, Hogarth and Beverley (2003) believe that highly financially literate consumers are more likely to exhibit positive financial behaviors. Lusardi and Mitchell (2006) find that elderly individuals with high financial literacy tend to plan their finances and benefit from it, as well as take an interest in investing in complex financial products. A study by Sudakova (2018) involving senior school students in the city of Yekaterinburg, Russia, showed that they were less aware of the processes within the pension system, bank products and services than of the processes of saving and accumulating capital and protection of their rights. Another study conducted by Zhang and Xiong (2020) in three regions of China (Shandong, Henan and Guizhou) demonstrated that financial education improves the financial literacy of rural residents, but the positive effect tapers off after taking into account the self-selection of samples and endogenous problems.

In addition, scholars have conducted surveys on consumer financial literacy levels in the many countries including United States, Germany, Italy, Japan, Switzerland, Russia, New Zealand, Australia, France, and Canada. The results show that age, gender, education level, income, and occupation have a significant impact on financial literacy. Generally, the young, the elderly, women, low-educated or low-income individuals, the unemployed, and retirees have low levels of financial literacy (Alessie et al. 2011; Arrondel et al. 2013; Bucher-Koenen and Lusardi 2011; Elsa and Chiara, 2011; Almenberg and Jenny 2011; Klapper and Panos 2011; Lusardi and Mitchell 2011; Sekita 2011; Petersen et al., 2015; Ricci and Caratelli, 2017). From the perspective of personal finance, financial products and services have been continuously enriched in recent years.



In particular, the integration of finance, the internet, and telecommunication technologies has made the consumers facing the increasingly complex financial environment, with a wide variety of institutions, complex product structures, high-frequency transactions, and fast risk transmission, all of which objectively require consumers to be equipped with more financial literacy. Lusardi and Mitchell (2011) point out that good financial literacy helps consumers make appropriate financial decisions, reduces systemic behavioral deviation, increases financial market participation, and reduces financial risks. Different scholars arrive at different conclusions on the effects of financial literacy promotion projects. According to the analysis of Bernheim et al. (2001), the inclusion of financial education in compulsory courses in high school can increase the propensity to save. However, others propose different views showing that financial literacy is not a major contributing factor in consumers' financial decisions. For example, the results of Duflo and Saez (2004) show that peer effects and behavioral deviation have a greater impact on consumer behavior.

A relatively comprehensive framework for financial literacy assessment is the evaluation framework of the Programme for International Student Assessment (PISA), developed by the OECD in 2000. This assessment framework captures the content of financial knowledge (currency and transactions planning, wealth management, risk and returns, the financial environment), processes (identifying financial information, analyzing information in the financial context, assessing financial issues, understanding and applying financial knowledge), and background (education and occupation, family, personal finance, and social finance). These three categories and 12 detailed aspects are used to analyze and define financial literacy. However, PISA's evaluation targets are students, and it focuses on basic knowledge and learning ability and reflects the results of knowledge education. Therefore, this evaluation framework has flaws in the generalizability of applicable subjects and adjustments must be made according to the actual research objects. In 2004, Lusardi and Mitchell developed a set of compound interest, inflation, and risk spreads. Furthermore, researchers developed a set of indicators for the US Health

and Retirement Study, namely, compounding, inflation, and risk diversification, which have been widely used since then (e.g., Agarwal, Amromin, and Ben-David, 2015; Lusardi 2015; Lusardi, Mitchell, and Curto, 2010; Yin, Song, and Wu, 2014). However, these three indicators are controversial in terms of their validity and applicability. Drawing from the review of the literature, to facilitate understanding and analysis of different aspects of financial literacy in China, this paper considers personal factors such as gender, age, education, household annual income, marital status, health status, and occupation and focuses on three research aspects -- basic financial knowledge, financial behavior and financial attitude. This paper addresses a major gap in the existing literature as there are not many studies investigating financial literacy across different regions in China.

## **2.2 Financial literacy in China**

The global attention paid to promote financial literacy was a result of the reflection of the 2008 Global Financial Crisis (GFC), and many countries including China reached a consensus that low financial literacy of residents was a vital contributor to the crisis (Zhang and Xiong, 2020). This section provides a systematic review on financial literacy in China. Albeit limited, scholars agree that financial literacy play an active role in promoting financial behavior, and there is an urgent need to equip households with adequate financial education. For instance, Liao et al. (2017) finds low levels of financial literacy to be an obstacle to Chinese households in terms of allocating risky financial assets to their portfolios. Likewise, higher levels of financial literacy significantly correlate with household's asset allocation ability (Lu et al., 2021). Therefore, promoting financial literacy education presents a significant and positive correlation with the probability of the risky financial asset ownership and asset allocation ability.

Evidence amassed shows that a majority of the population do not have sufficient financial literacy, which implies a lack of financial knowledge in China (Liao et al., 2017; Zhang and Xiong, 2020). According to data from the China Family Panel Studies 2014, a national survey conducted by the Institute of Social Science Survey of Peking

University, overall financial literacy of Chinese citizens is relatively low, scoring an average 1.99 out of 3 (Li and Qian 2020). Studies have also shown that the effect of financial literacy varies based on certain socioeconomic indicators, such as income, gender and location (Niu et al., 2020; Lu et al., 2021). For instance, Peng et al. (2022) investigates the impact of financial literacy on portfolio diversity between population in the urban and rural areas. Findings indicate that participants in the rural areas have less access to financial knowledge, and therefore tend to prefer using cash for their day-to-day transactions. The gaps presented in current empirical literature warrants us to study the current main characteristics of financial literacy in China. Indeed, it is important to evaluate whether there are differences in the levels of financial literacy between the populations in different regions and discuss what factors affect populations' financial literacy.

### **3. Data and research method**

#### **3.1. Data collection**

Based on the economic zone divisions used by the National Bureau of Statistics of China<sup>1</sup>, this study adopts a questionnaire survey to collect data in the Eastern, Central, and Western regions through snowball sampling. With the help of our alumni situated in the three regions, we were able to distribute a total of 600 online questionnaires to Chinese urban residents located in 7 economic zone divisions in Eastern China, 3 in Central China and 3 in Western China during the period 1 June 2018 and 31 August 2018 (see Table 1). The surveyed economic zone divisions in Eastern China includes Beijing, Fujian, Guangdong, Zhejiang, Hebei, Jiangsu, and Shanghai; Hunan, Hubei, and Jiangxi representing Central China; and Yunnan, Guizhou, and Sichuan representing Western China. In total 13 provinces are included in our research. The reasons why we failed to collect the data in all Chinese regions are: (1) incomplete survey; some participants did not complete the survey and only addressed some of the questions. This accounts for 10% of the total distributed questionnaires. (2) lack of access to data collection in some regions. Our research team has no connection with

target samples in Tianjin, Hainan, Shandong, Shangxi, Henan, Tibet and other 9 regions. (3) Specific target samples; our target samples are employed Chinese residents. This narrows the number of qualified participants in our survey. The reason why we choose participants with jobs is because we would like to study whether these people have higher financial literacy than general Chinese people which were sampled in the exiting literature. We finally collected a total of 474 valid questionnaires. Among the returned questionnaires, 38.4 per cent comes from the Eastern region, 36.3 per cent from the Central region and the rest from the Western region. In total, the effective return rate reaches 79 per cent. The number of surveys administered in the three regions are presented in Table 1 and other regional survey details such as number of males and females surveyed in each region, occupation, level of education and marital status are shown in Table 2. All the surveyed samples are randomly selected. In all, there are 474 respondents, 225 and 249 are males and females, respectively. 29.32 per cent of the respondents worked in state-owned enterprises and most of the respondents hold bachelor's degree or above. Of the 474 respondents, 283 are married and 191 are single (see Table 2).

**Table 1** Basic Information on Surveyed Regions

Region	Survey date	Questionnaires	Questionnaires returned
Eastern China	June 2018	200	182
Central China	July 2018	200	172
Western China	August 2018	200	120

**Table 2** Basic Characteristics of the Samples Surveyed in the Three Regions

Classification	Options	EC		CC		WC	
		#	%	#	%	#	%
Gender	Male	66	36.3	109	63.4	50	41.7
	Female	116	63.7	63	36.6	70	58.3
Type of occupation	Government/institution	21	11.5	36	20.9	49	40.8
	State-owned enterprise	68	37.4	45	26.2	26	21.7
	Non-state-owned enterprise/private Enterprise	45	24.7	37	21.5	41	34.2
	Joint venture	48	26.4	54	31.4	4	3.3
	Master's or above	32	17.6	18	10.5	37	30.8
Education	Bachelor's	105	57.7	134	77.9	48	40.0
	Junior college	31	17.0	9	5.2	20	16.7
	High school or below	14	7.7	11	6.4	15	12.5
Marital status	Married	103	56.6	110	63.9	70	58.3
	Single	79	43.4	62	36.1	50	41.7

Note: Eastern China (EC), Central China (CC), and the Western China (WC), # represents the number of observations in the samples.

### 3.2. Research method

How should financial literacy be evaluated? Financial literacy is a comprehensive concept that is rooted in consumers' internal cognition and cannot be directly observed. It is therefore difficult to directly measure financial literacy. However, financial literacy can be externalized into specific daily financial activities or behaviors such as financial planning, savings, and debit card management. These activities are related to financial knowledge, skills, attitudes, and awareness. Therefore, financial literacy is widely measured by financial knowledge (Lusardi and Mitchell, 2011; CHFS2, 2017, 2019), financial behavior (Houston, 2010; Van Rooij et al., 2011; Niu and Zhou, 2018; Huang et al., 2021), financial attitude (OECD, 2018) and financial awareness (Dinc et al., 2021). Until now, in terms of the evaluation methods of financial literacy, most studies set up questions (multiple choice or multiple true-false questions) (e.g. CHFS, 2017, 2019), score according to the response status (a score of one represents a correct answer and a score of zero represents an incorrect one) (e.g. Niu and Zhou, 2018; OECD, 2018; Zheng et al., 2021) and then sum the scores directly (citation removed for blind review). Others use factor analysis to obtain

a comprehensive score to measure financial literacy (citation removed for blind review).

This study follows the mainstream research method and adopts a questionnaire to examine the impact of financial literacy on Chinese residents' financial decisions. At the very beginning of the questionnaire, it requires the respondents to fill in some basic information like gender job occupation, education level, marital status and location. After that, the respondents are required to answer four questions which are used to test their basic knowledge of finance, another six questions for measuring their financial behavior and another fourteen questions for measuring their financial attitude. In our study, we follow OECD's three dimensions of financial literacy (2018), basic financial knowledge, financial behavior, and financial attitude to evaluate financial literacy (see Table 3). Previous studies often use simple calculations about interest rates, inflation and the workings of risk diversification to measure basic financial knowledge (Lusardi and Mitchell, 2011; Feng et al., 2019; Niu et al., 2020). To facilitate the respondents to understand the questions, this study makes minor changes and evaluates basic financial knowledge by risk and return recognition, inflation understanding, interest understanding and price understanding. As for financial behavior, existing literature focus on financial market participation (Van Rooij et al., 2011; Zou and Deng, 2019), retirement planning/preparation (Niu and Zhou, 2018; Niu et al., 2020), saving behavior (Bernheim and Garrett, 2003) and portfolio diversification and selection (Chu et al., 2017). We absorb the extant research results and use contingency funds, retirement saving, deposits, bonds, mutual funds and financial market participation to measure financial behavior. The last dimension to measure financial literacy is financial attitude. This dimension evaluates the respondents' attitudes toward financial planning when facing financial uncertainty and their financial confidence.

**Table 3** Assessment Form and its Three Dimensions

Dimension		Evaluation items
Financial literacy	Basic knowledge of finance	Risk and return recognition
		Interest understanding
		Price understanding
		Inflation understanding
	Financial behavior	Emergency funds planning
		Retirement planning
		Opening deposit account
		Bond purchase
	Financial attitude	Mutual funds investment
		Financial market participation
Attitude about consumption/expenditures		
Attitude about financial difficulties		
Financial attitude	Attitude about debt	
	Attitude about repayment	
	Attitude about financial confidence	

The first part of the questionnaire (Questions 1- 4) measuring basic knowledge of finance covers essential concepts of economics and finance, expressed as they would be in daily transactions (Lusardi and Mitchell, 2011), like simple calculation about return, interest rate, inflation and discount. It allows for three results: no answer (score of zero), an incorrect answer (score of zero), and a correct answer (score of one). The second part covers financial behavior (Questions 1-6) and allows for two results: yes (score of one) and no (score of zero). The third part mainly covers financial attitude (Questions 1-14). These questions are answered with a number from one to five, designed as a five-point Likert scale. 1 to 5 represents totally disagree to totally agree. The higher the value, the healthier the financial attitude. The three parts include 24 items. To facilitate the empirical analysis, this paper uses the number of correct answers to the basic financial knowledge questions in the first part as an indicator of financial literacy, that is, answering  $n$  questions correctly generates a score of  $n$ . The part of the questionnaire on basic financial knowledge comprises four questions (see Table 4). Therefore, the possible values for financial literacy in this paper are zero, one, two, three and four.



## 4. Empirical findings

### 4.1. Descriptive statistics

The 24 questions are split among the three parts of the questionnaire. Table 4 shows the score distribution for each specific evaluation question, with the respondents' scores for each question. The individuals surveyed in Eastern, Central, and Western China present the following three major features. First, the cognitive differences in basic financial knowledge are quite large. The respondents' knowledge of finance generally follows a decreasing trend across regions, from the east to the west. Even though Western China showed better results in interest and price calculation and Central China did best in return calculation, this may be related to the respondents coming from comparatively well-developed western and central regions. In terms of price information identification, Eastern China performed the best. Overall, the respondents in Eastern China did the best in the cognitive area of basic financial knowledge, followed by Central China and Western China. Moreover, the differences between the Western and Eastern regions and between the Western and Central regions are large, whereas the differences between Eastern and Central China are small. If each question is considered a different indicator, the respondent's answers regarding an interest rate of a bank deposit and compounding information vary greatly. The rates of correct answers to the compounding question are above 45.0 per cent. However, the answers about credit interest rates are not as good: over 50 per cent of respondents answered incorrectly or were unable to answer, which shows that population in China have limited knowledge about the interest rates of bank credit. Additionally, the actual surveys find that many elderly individuals are comfortable only with deposit passbooks; although they know about the existence of debit cards, they do not understand how to use them.

Second, financial emergency behavior is poor. Most respondents in Eastern and Central China have retirement savings and have set aside emergency funds to cover the next three months. The eastern region is superior to the central region in both retirement savings and financial

performance. In addition, most respondents in the three regions have savings accounts but most answered no when it came to purchases of bonds or mutual funds. As for stock purchases, more individuals in the central region answered yes than in the eastern region.

Third, financial attitude is not strong enough. Financial attitude is used to measure the respondents' financial planning awareness. In spite of differences existing among Eastern, Central and Western China, they are not significant. Overall, the proportion of respondents who engage in financial planning decreases across regions, from east to west. A large portion of the respondents in the Eastern and Central regions have an awareness of financial planning but do not engage in it. There is also a substantial share of respondents without awareness for financial planning, which means the phenomena at both ends are obvious (with or without financial planning). Overall, respondents in all three regions lacked awareness and failed to engage in financial planning, and it can be concluded that peoples' awareness and actions in investment planning, a part of financial planning, are even weaker.

**Table 4a** Descriptive Results of the Surveyed Samples' Financial Literacy Levels (Financial Knowledge) in Three Major Regions of China.

	Questions	Score	EC (%)	CC (%)	WC (%)
Basic financial knowledge	1. Assume that you deposited 100,000 RMB in a bank account for 5 years at a 10% interest rate. The interest will be earned at the end of each year and will be added to the principal. How much money will you have in your account in 5 years if you do not withdraw either the principal or the interest?	0	29.7	23.8	51.7
		1	70.3	76.2	48.3
	2. Assume that you took a bank credit of 10,000 RMB to be paid back during a year in equal monthly payments. The credit charge is 600 RMB per year. Give a rough estimate of the annual interest rate on your credit. The interest rate is about:	0	54.9	57.6	54.2
		1	45.1	42.4	45.8
	3. Assume that in 2019 your income is twice what it is now and that consumer prices also grow twofold. Do you think that in 2019 you will be able to buy more, less, or the same amount of goods and services as today?	0	75.3	80.2	60
		1	24.7	19.8	40
	4. Assume that you see the same model TV set on sale in two different shops. The initial retail price was 10,000 RMB. One shop offers a discount of 1500 RMB, while the other one offers a 10% discount. Which one is a better bargain—a discount of 1500 yuan or 10%?	0	18.7	26.7	34.2
		1	81.3	73.3	65.8

**Table 4b** Descriptive Results of the Surveyed Samples' Financial Literacy Levels (Financial Behavior) in Three Major Regions of China

	Questions	Score	EC (%)	CC (%)	WC (%)
Financial behavior	1. Have you set aside emergency or rainy-day funds that would cover your expenses for 3 months, in case of sickness, job loss, economic downturn, or other emergencies? Yes <input type="checkbox"/> No <input type="checkbox"/>	0	18.7	22.7	57.5
		1	81.3	77.3	42.5
	2. Have you ever tried to figure out how much you need to save for retirement? Yes <input type="checkbox"/> No <input type="checkbox"/>	0	39.0	33.7	56.7
		1	61.0	66.3	43.4
	3. Have you ever opened a savings account or bought a certificate of deposit? Yes <input type="checkbox"/> No <input type="checkbox"/>	0	11.5	13.4	16.7
		1	88.5	86.6	83.3
	4. Have you ever bought a savings bond or other bonds? Yes <input type="checkbox"/> No <input type="checkbox"/>	0	75.3	70.9	78.3
		1	24.7	29.1	21.7
	5. Have you ever invested in mutual funds? Yes <input type="checkbox"/> No <input type="checkbox"/>	0	54.4	70.3	70.8
		1	45.6	29.7	29.2
	6. Have you ever invested in individual stocks? Yes <input type="checkbox"/> No <input type="checkbox"/>	0	57.1	47.1	68.3
		1	42.9	52.9	31.7

**Table 4c** Descriptive Results of the Surveyed Samples' Financial Literacy Levels (Financial Attitude - Planning) in Three Major Regions of China.

Questions		Score	EC (%)	CC (%)	WC (%)
Financial attitude (planning)	1. When unexpected expenses arise, it's hard for me to maintain the existing consumption level.	1	10.5	6.1	14.3
		2	11.4	40.8	21.4
		3	32.4	16.2	14.3
		4	7.8	26.8	39.3
		5	37.9	10.1	10.7
	2. When unexpected expenses happen, I usually have to use credit cards.	1	8.7	5.6	7.1
		2	11.9	31.8	28.6
		3	34.2	16.2	21.4
		4	9.6	35.8	21.4
		5	35.6	10.6	21.5
	3. I talk with other people (parents, friends and other important people) about my consumption levels.	1	6.8	5.6	3.6
		2	56.6	60.3	46.4
		3	15.1	16.8	7.1
		4	19.2	14.0	32.1
		5	2.3	3.3	10.8
	4. I am afraid I'll spend all my money after I retire.	1	5.0	2.8	7.1
		2	16.9	26.8	14.3
		3	13.2	20.7	21.4
		4	51.1	36.9	39.3
		5	13.8	12.8	17.9
	5. Improving my financial goals is a challenge for me.	1	10.0	8.9	17.9
		2	51.6	50.8	42.9
		3	23.7	15.6	14.3
		4	5.0	18.4	21.4
		5	9.7	6.3	3.5
	6. When facing financial difficulties, it's hard for me to think of solutions.	1	5.9	4.5	10.7
		2	19.2	31.8	3.6
		3	17.4	19.0	14.3
		4	47.9	35.2	46.4
		5	9.6	9.5	25.0
	7. I lack confidence in managing my own finance.	1	5.9	2.8	7.1
		2	26.9	33.0	14.3
		3	14.2	17.3	14.3
		4	37.9	34.6	50.0
		5	15.1	12.3	14.3
	8. I think I am in good financial shape.	1	9.6	8.4	7.1
		2	55.7	45.3	42.9
		3	16.9	21.2	21.4
		4	12.8	19.6	21.4
		5	5.0	5.5	7.2

**Table 4d** Descriptive Results of the Surveyed Samples' Financial Literacy Levels (Financial Attitude - Planning Awareness on Debt) in Three Major Regions of China.

	Questions	Score	EC (%)	CC (%)	WC (%)
			1	2	3
Financial attitude ( <u>planning</u> awareness on debt)	1. I am anxious about my debt situation.	1	4.1	7.8	10.7
		2	20.1	23.5	17.9
		3	12.8	16.2	10.7
		4	45.2	39.7	39.3
		5	17.8	12.8	21.4
	2. I often worry about my debt situation.	1	5.5	5.0	3.6
		2	16.9	30.2	21.4
		3	14.2	20.1	14.3
		4	50.2	35.2	46.4
		5	13.2	9.5	14.3
	3. A year from now, I will have no credit card debt.	1	11.0	11.7	10.7
		2	35.2	46.4	25
		3	26.9	24.0	39.3
		4	22.4	14.5	21.4
		5	4.6	3.4	3.6
	4. Five years from now, I will have no credit card debt.	1	9.6	7.3	10.7
		2	32.9	43.6	25.0
		3	27.4	28.5	28.6
		4	24.2	16.8	17.9
		5	5.9	3.8	17.8
	5. I am worried about my credit card repayments.	1	4.6	3.9	3.6
		2	16.9	24.0	10.7
		3	10.5	21.8	17.9
		4	48.9	36.9	31.1
		5	19.1	13.4	36.7
	6. I am worried about the repayment of my loan.	1	5.0	5.6	3.6
		2	18.7	26.3	10.7
		3	13.7	18.4	17.9
		4	45.2	33.0	39.3
		5	17.4	16.7	28.5

The descriptive statistics in Table 5 are based on all possible values of financial literacy. We can see most of the respondents in Eastern China have higher financial literacy score (38.89 per cent acquired 3 points and 37.04 per cent obtained 2 points), followed by Western China and Central China. In Central China, 46.88 per cent of respondents obtained 0 points and 28.13 per cent of respondents acquired 4 points. Compared to other regions of China, the financial literacy of the respondents in the Central China is more polarized. In Western China, more than 50 per cent of the respondents scored 1 or 2 points, which indicates lower literacy scores.

**Table 5** Financial Literacy Classification

Financial literacy	EC	CC	WC
0	8.64%	46.88%	8.08%
1	14.81%	25.00%	28.28%
2	37.04%	0.00%	34.34%
3	38.89%	0.00%	19.19%
4	0.62%	28.13%	10.10%

#### 4.2. Correlation between financial literacy and financial decision making

This study examines the strength and direction of the linear correlation between financial literacy and financial decision making. First, it compares the impact of financial literacy on residents' financial decisions which are measured by emergency savings behavior, retirement savings, and portfolio diversification. Portfolio diversification is represented by four categories of assets: deposits, bonds, funds, and stocks. We assume that financial literacy has a high correlation with financial decisions, because financial literacy always play an active role in financial behavior (Mitchell, 2006; Sudakova, 2018). The research findings show that financial literacy has a positive correlation with financial decisions. It is most strongly correlated with deposits behavior ( $\gamma = 0.202$ ,  $p < 0.01$ ), followed by purchases of funds ( $\gamma = 0.136$ ,  $p < 0.01$ ), emergency savings behavior ( $\gamma = 0.154$ ,  $p < 0.05$ ), and purchases of stocks ( $\gamma = 0.128$ ,  $p < 0.05$ ) as seen in Table 6, Panel A. These results are in line with the survey findings of the Chinese household income investigation conducted in 2018. The 2018 survey showed that the participation of Chinese households in non-risk financial assets reached 98 per cent, whereas 8.5 per cent invested in risky financial assets including 3.6 per cent in stocks and 2 per cent in funds (Ke and Liu, 2021). It signifies that many Chinese citizens are still inclined towards risk-free financial assets compared to risky financial assets.

Second, we examine the heterogeneity of correlation between

financial literacy and financial decisions in different regions. The analysis of regions uses Beijing, Fujian, Guangdong, Zhejiang, Hebei, Jiangsu, and Shanghai to represent Eastern China; Hunan, Hubei, and Jiangxi to represent Central China; and Yunnan, Guizhou, and Sichuan to represent Western China. Owing to the result of Table 5, we assume that financial literacy has different effects on financial decisions in the above three regions. Table 6 shows: (i) in Eastern China, financial literacy is positively correlated to all financial decisions except retirement savings. This may be attributed to a better retirement benefit system in Eastern China. However, financial literacy is most strongly correlated with the purchase of funds ( $\gamma = 0.239$ ,  $p < 0.01$ ), followed by deposits ( $\gamma = 0.193$ ,  $p < 0.01$ ) and emergency savings behavior ( $\gamma = 0.183$ ,  $p < 0.05$ ), and the correlation between financial literacy and stock purchase behavior is positive but not significant (Panel B); (ii) in Western China, the correlations between financial literacy and various financial decisions are not significant (see Panel C). Financial literacy is positively correlated to emergency savings behavior, deposits and stocks. Residents in Western China have lower income compared with their compatriots in Eastern and Central China. Those with higher financial literacy tend to allocate their limited financial resources to handle emergencies, invest in stock market for higher return and deposit in banks for stable and secured interest; and (iii) in Central China, financial literacy is positively correlated to all financial decisions but is most strongly correlated with deposits ( $\gamma = 0.316$ ,  $p < 0.01$ ), followed by retirement savings ( $\gamma = 0.265$ ,  $p < 0.01$ ) and stock purchases ( $\gamma = 0.189$ ,  $p < 0.05$ ) (Panel D). This shows that residents in Central China are more concerned about the safety of their financial assets (deposit money in banks), their retirement and are willing to invest more in stock markets than their compatriots in Eastern and Western China. The heterogeneity of correlation results reflects the unbalanced effect of financial literacy on financial asset allocation in different regions.



**Table 6** Correlations

<b>Panel A: Overall</b>							
	FL	Emergency	Retirement	Deposits	Bonds	Funds	Stocks
FL	1						
Emergency	0.154**	1					
Retirement	0.068	0.262***	1				
Deposits	0.202***	0.213***	0.080*	1			
Bonds	0.032	0.108**	0.189***	0.132***	1		
Funds	0.136***	0.131***	0.145***	0.139***	0.372***	1	
Stocks	0.128**	0.074	0.069	-0.013	0.265***	0.277***	1
<b>Panel B: Eastern China (EC)</b>							
	FL	Emergency	Retirement	Deposits	Bonds	Funds	Stocks
FL	1						
Emergency	0.183**	1					
Retirement	-0.031	0.166**	1				
Deposits	0.193***	0.136*	0.028	1			
Bonds	0.079	-0.052	0.145*	0.127*	1		
Funds	0.239***	0.128*	0.167**	0.193***	0.370***	1	
Stocks	0.090	-0.041	0.078	-0.070	0.250***	0.389***	1
<b>Panel C: Western China (WC)</b>							
	FL	Emergency	Retirement	Deposits	Bonds	Funds	Stocks
FL	1						
Emergency	0.108	1					
Retirement	-0.077	0.167*	1				
Deposits	0.062	0.249***	0.075	1			
Bonds	-0.130	0.121	0.193**	0.018	1		
Funds	-0.034	0.005	0.179**	-0.057	0.197**	1	
Stocks	0.082	-0.078	-0.017	-0.080	0.207**	0.194**	1
<b>Panel D: Central China (CC)</b>							
	FL	Emergency	Retirement	Deposits	Bonds	Funds	Stocks
FL	1						
Emergency	0.117	1					
Retirement	0.265***	0.319***	1				
Deposits	0.316***	0.236***	0.117	1			
Bonds	0.091	0.224***	0.213***	0.214***	1		
Funds	0.114	0.169**	0.086	0.218***	0.510***	1	
Stocks	0.189**	0.185**	0.042	0.074	0.296***	0.230***	1

Note: The symbols \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively

Financial literacy levels of China's three regions are then analyzed separately. The average level of financial literacy is found to be 2.00 in the Western region, 2.21 in the Eastern region, and 2.12 in the Central region (see Table 7). This indicates that residents in Eastern region have higher financial literacy on average than those in Central and Western regions. The reasons may stem from more dynamic economic development, better financial and education environment in Eastern China. These factors could contribute to higher individual financial

literacy (Chen and Luo, 2019).

**Table 7** Descriptive Statistics of Financial Literacy

	N	Minimum	Maximum	Mean	Std. deviation
FL	<b>Panel A: Overall</b>				
	474	.00	4.00	2.1245	1.04006
	<b>Panel B: EC</b>				
	182	.00	4.00	2.2143	1.02629
	<b>Panel C: WC</b>				
	120	.00	4.00	2.0000	1.09237
	<b>Panel D: CC</b>				
	172	.00	4.00	2.1163	1.01358

Note: The symbols \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively

**4.3. Regression analysis of financial literacy and financial decision making**

We measure financial decision making with emergency savings behavior, retirement savings, and portfolio diversification, where the latter includes four categories of assets: deposits, bonds, funds, and stocks. First, we use portfolio diversification (Diversification) as our dependent variable, which is the sum of the above four categories (deposits, bonds, funds, and stocks) ranging from 0 (lowest diversification) to 4 (highest diversification). We assume that the higher the financial literacy of residents, the more diversified their portfolios are. In Table 8, the ordinary least squares (OLS) regression for column (1) does not include financial literacy, whereas that for column (2) does. There is a positive correlation between financial literacy and portfolio diversification, with a coefficient of 0.182, significantly positive at the 1 per cent level, indicating that the higher the financial literacy level, the more diversified the investment portfolio. This result is in line with previous research findings that the increase in financial knowledge promotes participation of Chinese households in financial markets and

motivates them to hold more risk financial assets like stocks (Yin et al., 2014).

**Table 8** Regression Results of Financial Literacy and Portfolio Diversification

	Emergency	Emergency
	OLS (1)	OLS (2)
FL		0.043** (0.030)
gender	0.032 (0.425)	0.037 (0.361)
age	0.063** (0.025)	0.062** (0.028)
edu	-0.037 (0.231)	-0.029 (0.351)
income	0.028 (0.204)	0.020 (0.363)
married	0.082 (0.169)	0.085 (0.154)
healthy	-0.057*** (0.004)	-0.057*** (0.004)
job	0.012 (0.636)	0.011 (0.673)
cons	0.667	0.576
F	4.23	4.32
N	448	448
Adj. R <sup>2</sup>	0.048	0.056

Note: The symbols \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Second, as for financial decisions on non-risk financial assets, we assume that the higher the financial literacy of residents, the more emergency savings they have, based on the results in Table 6. The regression results can be seen in Table 9. There is a positive correlation between financial literacy and emergency savings behavior, with a coefficient of 0.043, significantly positive at the 5 per cent level (see Table 9), indicating that the higher the financial literacy level, the more funds an individual will reserve for emergencies. Even though over 90 per cent of Chinese residents enjoy five social insurance and one housing fund provided by their employers, the social insurance system

only covers around 70 per cent of all the medical expenditure (Tencent News, 2021). Thus, it is necessary for individuals to save some of their income apart for compensating the uncovered medical expenditure in case of emergencies. For those with higher financial literacy, they are more aware of the importance of emergency savings, thus, any additional money is more likely to be used for emergency savings instead of purchasing commercial insurance. This is because to some degree, traditional family values such as the importance of raising children, constrains the participation in commercial insurance activity (Zheng and Xu, 2021).

**Table 9** Regression Results of Financial Literacy and Emergency Savings Behavior

	Emergency	Emergency
	OLS (1)	OLS (2)
FL		0.043** (0.030)
gender	0.032 (0.425)	0.037 (0.361)
age	0.063** (0.025)	0.062** (0.028)
edu	-0.037 (0.231)	-0.029 (0.351)
income	0.028 (0.204)	0.020 (0.363)
married	0.082 (0.169)	0.085 (0.154)
healthy	-0.057*** (0.004)	-0.057*** (0.004)
job	0.012 (0.636)	0.011 (0.673)
cons	0.667	0.576
F	4.23	4.32
N	448	448
Adj. R <sup>2</sup>	0.048	0.056

Note: The symbols \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

Third, as for the correlation between financial literacy and retirement savings, we assume that the financial literacy of residents does not have a significant effect on their retirement savings, based on the results in Table 6. As it can be seen in Table 10, the coefficient between financial literacy and retirement savings is weakly positive but not significant, indicating that financial literacy does not have an influence on retirement savings. This may be because all respondents in this study have their jobs and they will receive retirement pension after they retire. Retirement savings is not their big concern. However, as shown in Table 10, only healthy individuals and the employed show a significant correlation with retirement savings. The poorer an individual's health and the more stable the job, the greater the individual's propensity to save for retirement.

**Table 10** Regression Results of Financial Literacy and Retirement

	Retirement OLS (1)	Retirement OLS (2)
FL		0.024 (0.298)
gender	-0.021 (0.655)	-0.018 (0.695)
age	0.007 (0.833)	0.006 (0.849)
edu	-0.041 (0.245)	-0.036 (0.304)
income	-0.027 (0.275)	-0.032 (0.214)
married	-0.066 (0.338)	-0.065 (0.349)
healthy	-0.068*** (0.003)	-0.068*** (0.003)
job	0.053* (0.067)	0.052* (0.071)
cons	0.874	0.824
F	3.26	2.99
N	448	448
Adj. R <sup>2</sup>	0.034	0.034

Note: The symbols \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

## 5 Discussion

This study started to collect data in June 2018, and it took around four months to get the 474 valid questionnaires. To our knowledge, this is one of the latest surveys on Chinese residents' financial literacy. The existing literature often uses either the data from the 2011, 2013, 2015 China Household Finance Survey (CHFS) conducted by Southwestern University of Finance and Economics (Peng et al., 2022; Peng et al, 2020; Peng et al., 2019; Niu and Zhou, 2018 ) or the data from the 2010 Consumer Finance Survey for Urban China Households (CFS) conducted by Tsinghua University (Pan et al., 2020) and the 2012 household consumption and finance survey conducted by the China Center for Financial Research (Xia et al., 2014; Huang et al., 2021; Zou and Deng, 2019). Our survey absorbs the widely adopted items from the existing literature (e.g., CHFS, 2017; CFS, 2012; OECD, 2018; Lusardi and Mitchell, 2011) to measure financial literacy. Financial literacy is estimated through three dimensions in our paper such as basic financial knowledge, financial behavior and financial attitude, which extends the measurement from basic financial knowledge to other two dimensions. This is highly in line with the measurement proposed by OECD (2018). In the regression analysis, we mainly consider the impact of basic financial knowledge on financial decision making in order to avoid the overlapping between financial behavior, financial attitude and financial decision making. Furthermore, the samples in our study are not Chinese households or consumers or rural people. They are employed Chinese residents living in urban areas. Even though the size of our samples is not as big as those in CHFS and CFS, our study distinguishes from other research due to this specific sample type of Chinese employees. Compared with rural Chinese residents or mass urban Chinese households, they may have higher financial literacy on average. Because most of them are at least Bachelor's degree holders. Therefore, the impact of financial literacy on financial decision might be different from the previous research findings.

Analysis of findings shows that the overall financial literacy levels differ across regions, with highest literacy rates in East China, followed

by Central and West China. However, findings signify that the overall participation of Chinese residents in financial markets is relatively low compared with those in developed countries, due to the preference for risk-free financial assets. These results are consistent with the findings from recent nationwide household wealth reports, and similar to the findings of Huang et al. (2020) and Lu et al. (2021). For example, in 2018, China Urban Family Wealth Health Report discovered that financial assets only account for 11.8 per cent of urban family's wealth per capita, whereas American households account for 42.6 per cent and 61.1 per cent for households in Japan (Chen and Luo, 2019). The net property value accounted for 71.35 per cent of urban household's wealth per capita and 52.28 per cent for rural household wealth's per capita. The financial asset allocation concentrates in cash, demand deposits and time deposits, accounting for 88 per cent in China and much higher than Northern European countries, like Sweden (19.34 per cent), Denmark (19.95 per cent), Finland (31.14 per cent) and Norway (38.75 per cent). Huang et al. (2020) reiterates the importance for Chinese residents to not only having high financial literacy levels, but also the need to having a right perception to participate in financial markets. Indeed, financial literacy plays a significant role in household bond market participation in less-developed cities, particularly among households with higher housing value (Zou and Deng, 2019).

Over 60 per cent of Chinese residents are risk averse. The main purposes for savings are preventions for medical care, pension and children's education. The Chinese government consistently has been taking efforts to improve financial literacy and overall wellbeing of its population. Although Chinese stock markets have climbed to second place in the world in terms of market value, the current financial decision behaviors of Chinese residents have not made great progress in terms of investing in mature financial markets. Based on the findings, the average consumer financial literacy score is 2.12, which indicates that there is so much room for improvement. With a standard deviation score of 1.04, there is little difference in the distribution of financial literacy levels within regions. Therefore, financial literacy popularization is still needed, particularly for rural citizens. These



findings are similar to Zhang and Xiong (2020), which suggest that education and risk levels have a significant impact on rural residents' participation in financial education. Even though the People's Bank of China has launched a nationwide campaign to popularize financial knowledge every September since 2013 (Li and Qian, 2020), resident's participation in financial activities is affected by many factors such as family income, education, their own motivation and confidence in learning new knowledge (Zhang and Xiong, 2020). The differing levels of financial literacy between regions is largely due to unbalanced economic development levels, heterogeneous financial product or service quality, and uneven distribution of resources between the Eastern, Central, and Western regions. Results show that samples in Eastern China hold the highest level of financial literacy and residents prefer to invest in funds. In the Central region, residents prefer to allocate financial assets to deposits, followed by retirement savings and stocks. The evidence presented in this study coincides with Liao et al. (2017) who postulates that households with higher levels of financial literacy are more likely to hold risky financial assets than those with lower levels.

## 6. Conclusion

Our research shows differences in the overall level of financial literacy among populations across different regions, with a declining trend from east to west and only a small difference in mean values. Different regions perform differently in various aspects of financial literacy. There are also differences in various aspects of financial literacy within regions. The level of economic development, the level of financial depth, and the type of financial products and services vary from region to region. Generally, financial literacy is most strongly correlated with deposits, followed by the purchase of funds, the purchase of stocks, and emergency savings behavior. In terms of regions, in Eastern China, financial literacy is the most strongly correlated with the purchase of funds; in Western China, financial literacy is not significantly correlated with financial decisions; and, in Central China, financial literacy is the most strongly correlated with deposits. Findings signify the lack of

progress among Chinese's residents to participate in financial related activities. Thus, we propose the following recommendations for policymakers and practitioners. Indeed, there is a need to further popularize fundamental financial literacy, particularly in rural areas. Therefore, the government should promote the cooperation among education institutions, financial institutions, communities and other stakeholders in financial education. For instance, primary schools and middle schools can cooperate with banks to provide fundamental financial knowledge to students. Universities and colleges can cooperate with financial institutions for jointly designing curriculum and train students with basic financial knowledge. Besides, social interactions are an effective way for rural citizens to acquire financial knowledge and achieve entrepreneurship. We suggest the government provides an incentive mechanism to reward individuals or institutions that contribute to financial literacy promotion (Zhao et al., 2021).

The government should take effort to provide stratified financial education to consumers in different regions. One way would be to identify heterogeneity of financial literacy between and within regions, pay more attention to the weaknesses of Western region, and find out the key reasons which contributes to its lower financial literacy level than the other two. Local government in the West can use digital technology to popularize financial knowledge together with face-to-face training programs. Agents in district level financial institutions can provide rural people needs-based financial products or services which substitute for deposits (Liu et al., 2020). In the Eastern region, the focus should be placed on financial literacy of urban and foreign populations. Thus, formulating an appropriate financial literacy promotion plans that consider professional investment advisory services is necessary to make rational investments. The extant literature has showed that investment advisors contribute to promoting rational investment of investors with more investment experience, better financial literacy and more investible assets (Lu et al., 2020).

Finally, financial literacy could become further polarized in the digital era. Regions with large numbers of mobile terminals and strong Internet penetration can witness more rapid improvements in the overall

financial literacy among their populations. However, relatively closed off or remote areas are more likely to be stalled due to insufficient technology penetration. In this case, the gap in different regions' financial literacy levels will widen even further. Therefore, an increase in the level of publicizing and popularizing new financial knowledge and business knowledge is needed to avoid widening the digital gap currently facing consumers in terms of financial literacy. Furthermore, customized content and patterns of financial education plans and programs are needed. Information should be gathered and classified in different regions to provide reliable and tractable databases of financial information. The government should be aware that financial education and financial literacy popularization is a long-term, and continuous fundamental endeavor.

Despite this study's ardent contribution, there are some limitations. For example, the geographic regions in our study are limited to 13 provinces and do not cover all the regions in China. Because of this, the study fails to present the overall financial literacy level of China. Furthermore, the size of samples is not big enough. We have used 474 valid returned questionnaires. Finally, this study used cross-section data which is unable to capture the evolution of financial literacy of Chinese people over a long period. Thus, we encourage future studies to cover 31 provinces and municipalities in China, employ large sample and conduct longitudinal data analysis, which will enable to reflect the demographic characteristics of Chinese people objectively and accurately over time.

## Notes

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1. Division method of East, West, Central and Northeast regions”, see the web:  
[http://www.stats.gov.cn/ztc/zthd/sjtjr/dejtjkfr/tjkg/201106/t20110613\\_71947.htm](http://www.stats.gov.cn/ztc/zthd/sjtjr/dejtjkfr/tjkg/201106/t20110613_71947.htm). According to the division, Eastern China includes Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan. Central China includes Shanxi, Anhui, Jiangxi, Henan, Hubei and Hunan. Western China includes Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shanxi, Gansu, Qinghai, Ningxia and Xinjiang.
2. CHFS means the China Household Finance Survey (abbreviated as CHFS). It is the unique national wide survey on Chinese households’ financial information. The survey was initiated by Southwestern University of Finance and Economics in China in 2011. Up till now, this survey has been conducted for five times nationally, namely in 2011, 2013, 2015, 2017 and 2019.

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## Appendix Variable Definitions

Notation	Definition
<i>Diversification</i>	Explained variable, portfolio diversification, including deposits, bonds, funds, and stocks
<i>Emergency</i>	Explained variable, emergency or funds set aside that would cover expenses for 3 months, in case of sickness, job loss, economic downturn, or other emergencies
<i>Retirement</i>	Explained variable, retirement savings
<i>FL</i>	Explanatory variable, financial literacy
<i>gender</i>	Control variable, the gender of the respondents
<i>age</i>	Control variable, the age of the respondents
<i>edu</i>	Control variable, the education of the respondents
<i>income</i>	Control variable, the annual income of the respondents
<i>married</i>	Control variable, the marital status of the respondents
<i>healthy</i>	Control variable, the health of the respondents
<i>job</i>	Control variable, the job of the respondents