Research Article

Is Financial Education Positively Associated with Consumer Stock Market Satisfaction? Evidence from China

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This study aims to investigate the associations between financial education and consumer stock market satisfaction. Consumer financial education is measured through the objective aspect incorporating formal and informal financial knowledge education, and the subjective aspect is reflected through consumers' attitudes toward financial education. Using data from China's urban consumers, the results indicate a positive association between financial education and consumer stock market satisfaction. The findings suggest that consumers who were financially literate at high schools or colleges are more satisfied in participating in the stock market. Moreover, consumers who spend more money and time, as well as those who think financial education is more important, feel more satisfied in participating in stock market investment activities. The results imply that it is necessary to increase the supply of formal financial education in high schools and universities, encourage consumers to invest more in the informal education of financial knowledge, and promote policymakers to formulate informative policies to make consumers aware of the importance of financial education.

1. Introduction

An increasingly prevalent topic on the relationships between consumer financial education and financial satisfaction has been highlighted by consumer academics, policymakers, and practitioners [1–4]. According to Xiao and Porto [5]; consumer financial education refers to formal financial education on basic financial knowledge at high schools, colleges, and the like, while informal financial education is carried out in communities and workplaces. Moreover, financial education is believed to improve consumers' financial literacy and encourage them to perform positive financial behaviors, thereby augmenting their financial wellbeing [6]. While previous studies have usually been limited to examining the role of financial education in overall financial wellbeing, the nexus between consumer financial education and financial satisfaction specific to their participation in stock markets is to be further explored in this study.

Consumer financial satisfaction, as a subjective measure of financial wellbeing, is defined as a determinant of the quality of consumer lives [3, 7, 8]. Previous studies have examined the contribution of domain-specific satisfaction, incorporating job satisfaction, community satisfaction, relationship satisfaction, and financial satisfaction, to quality of life [9–12]. For instance, to test whether financial satisfaction is closely associated with subjective wellbeing, Ngamaba et al. [10] conducted a meta-analysis and indicated that the overall association between financial satisfaction and subjective wellbeing is medium, significant, and positive. With the rapid development of stock markets, more consumers have been involved in stock investments, which has played a vital role in their financial satisfaction [13, 14]. Unlike previous research, this study, to the best of our knowledge, is the first one to focus more specifically on consumer stock market satisfaction.

Consumer financial education is high on the agenda of policymakers since the financial environment that consumers face today has become more perilous, which may bring difficulties for them to make effective financial decisions. Hence, the governments in the vast majority of OECD countries and many developing economies, such as China and India, have formulated and implemented substantial policies and programs for financial education [2]. Several extant studies have shed light on the importance of financial education on consumer financial satisfaction [3, 15, 16]. However, as a primary instrument for improving financial literacy and financial behaviors, previous research also exhibits evidence that the enhancements of financial education on financial wellbeing are weak or even insignificant, especially for low-income and other marginalized cohorts [17]. Meanwhile, previous research has shown mixed evidence between financial education and financial wellbeing, and little research has been found to explore the roles of financial education from subjective and objective perspectives. To help fill the gap, this study measures consumer financial education through consumers' subjective evaluation of and objective input in financial education, respectively.

This study vitally contributes to the related literature on consumer stock market satisfaction by investigating the impacts of financial education, which differs from extant studies that only consider overall wellbeing or financial satisfaction. Meanwhile, this study also explores the effects of financial education from the perspectives of consumers' subjective evaluation and objective financial education input. The remainder of this study will proceed as follows: Section 2 reviews the literature on financial education, financial satisfaction, and how financial education affects consumer stock market satisfaction. Furthermore, the hypotheses of this study are developed in this section as well. Section 3 introduces the selected data, empirical strategy, variable measurement, and econometric method. Moreover, the empirical results are appropriately discussed, and the robustness, endogeneity, and heterogeneity are also considered in Section 4. In Section 5, this study summarizes conclusions and policy recommendations.

2. Literature Review and Hypotheses Development

2.1. Previous Studies on Consumer Financial Education. Consumer financial education typically refers to programs that provide consumer-related financial information in schools, colleges, communities, and workplaces [18]. Financial education is vital for consumers to improve their financial knowledge [19]. According to Chen et al. [20]; financial education can be carried by formal and informal ways. To be more specific, formal financial education reveals financial knowledge education programs at high schools and universities, such as long-term training programs and types of curriculum. Moreover, informal education on financial knowledge is offered in workplaces and communities, such as financial advisors providing suggestions about financial planning in the long term, options of investment or loan, and financial counseling on the issues of debt or retirement [21]. Formal financial education, especially conducted in schools or colleges, is considered a vast coverage of common people and also seems to be a promising way to facilitate the

acquirement of financial knowledge [22]. Previous studies provide evidence that it is more effective and sustainable to provide financial knowledge during adolescence rather than adulthood periods [23, 24]. Simultaneously, financial education carried out by governments, financial institutions, and non-profit organizations in workplaces or communities is considered to be informal [23]. With the augmented complexity of financial environments, more financial information for financial products has been provided, which brings substantial challenges for consumers with limited cognitive ability and financial knowledge to make correct financial decisions [25]. Although the effectiveness of informal education in financial knowledge is lower than formal financial education, it is conducive for consumers to be financially knowledgeable throughout their lifetime. Bernheim and Garrett [26] suggested that workers offered financial knowledge education at workplaces tend to pay more attention to retirement plans and subsequently augment savings for retirement. Meanwhile, several studies also prove that if firms offer more workplace financial seminars, employees are more inclined to save more for retirement and participate more in retirement plans [18, 27].

Most of the previous research has focused on whether financial education can ameliorate financial behaviors and thereby improve financial wellbeing, but little literature has shed light on the subjective attitude toward financial education and the resulting impact on financial satisfaction. Using a sample of 4th and 5th graders in Wisconsin, Batty et al. [28] investigated the efficacy of the financial curriculum of Financial Fitness for Life, and the results indicate that financial attitudes and behaviors are positively affected as well as financial knowledge sustained over time. Accordingly, the subjective measurement of financial education is vital to affect the efficacy of related educational programs. To be more specific, Chen and Heath [29] claimed that a teacher's belief of whether teaching financial knowledge is important significantly affects students' gains in financial knowledge. To appropriately address the next between consumer financial education and their stock market satisfaction, this study measures financial education from both subjective and objective perspectives.

2.2. Prior Research on Consumer Financial Satisfaction. According to the extant literature, the definitions and measures of financial satisfaction vary in a vast strand of extant literature. Earlier studies have examined the determinants of financial satisfaction from objective and subjective aspects and used material and nonmaterial indicators to reflect the state of financial wellbeing [30, 31]. However, more researchers believe that financial satisfaction typically refers to individuals' subjective evaluation and is a subjective measure of economic wellbeing [8, 32]. According to Zimmerman [33]; financial satisfaction is described as being happy, healthy, and without worries. Besides, Ng and Diener [34] argued that financial satisfaction should be considered a subjective psychological factor. As a measuring framework of financial wellbeing, consumer financial satisfaction is defined to be a subjective measure and is considered a desirable status wherein consumers can perfectly confront current and future financial affairs, feel

financially safe and satisfied, and is available to make favorable financial decisions that conduce to a high quality of life [35].

Numerous studies have investigated the determinants of consumer financial satisfaction specific to demographic and socioeconomic features, such as consumers' gender, age, income, and work status. Previous research has provided evidence that demographic features do play vital roles in consumer financial wellbeing. In terms of Lusardi and Mitchell [36]; females typically have lower levels of financial literacy and thus lack confidence in financial decisions about retirement planning, which has important implications on differential outcomes of financial satisfaction. Simultaneously, age is also considered a vital antecedent for financial satisfaction that will be improved with incremental financial knowledge as well as financial assets [37]. Binswanger and Carman [37] also found that higher income and education levels are conducive to accumulating wealth, which has a positive impact on financial satisfaction. However, although it is evident that consumers' income has positive effects on their overall subjective wellbeing, the related promoting role has been demonstrated to be diminished [38]. Additionally, Plagnol [39] suggested that although individuals' life course income displays an inverted U-pattern, life course financial satisfaction increases over time. Prior studies also highlighted the role of employment in improving consumer financial satisfaction. For instance, employment can effectively promote consumer financial satisfaction through employer-provided financial information or products [40].

Recent studies also have documented the roles of financial-related determinants in affecting consumer financial satisfaction, such as financial assets and liabilities, financial-specific affairs, and financial education. For instance, Plagnol [39] took the possible impact of assets and liabilities on financial satisfaction into consideration, and the result indicates that increasing financial satisfaction at an elder age is partially induced by increasing financial assets and decreasing liabilities. Several studies have documented financial satisfaction associated with financial-specific affairs, such as retirement planning [24], debt disposal [41], financial management [42], investment return of households' portfolio choice [14], and risky financial assets holding [13]. Considering investment return as an important antecedent, Chu et al. [14] indicated that more financially literate households tend to experience positive returns from financial investments, which may induce an improvement in financial satisfaction. Besides, Chen et al. [13] explored the nexus between risky asset investments and life satisfaction, and they concluded that risky asset holdings negatively contribute to individuals' quality of life, and conversely, holding more risk-free assets will be positively associated with individuals' life satisfaction.

Although the demographic, socioeconomic, and financial-related determinants of financial satisfaction have been carefully reviewed above, financial education has been highly highlighted as a decisive intervention means of consumers' financial satisfaction [43]. Besides, framing or nudging, and structural interventions are implemented by policymakers through some policy measures, such as expanding tax benefits, increasing saving limits, augmenting automatic savings, and automatically enrolling employees in employers' pension plans [44]. All of these policy measures or regulations are exogenous to consumers. Meanwhile, information through financial counseling and financial advice also can be provided through formal and informal financial education. Thus, according to Brüggen et al. [43]; financial education can be designated as the most decisive intervention way of motivating consumers' desirable financial behaviors and financial satisfaction. Hence, the purpose of this study is to examine the impacts of formal and informal financial education on facilitating consumer stock market satisfaction.

2.3. Financial Education and Consumer Stock Market Satisfaction. Over the past two decades, increasing concern has been focused on financial education and the extent to which it is associated with consumers' desirable financial behaviors and considerable financial status. The first vast strand of literature has provided substantial pieces of evidence that engaging more financial knowledge instructions in the formal education system is conducive to improving consumers' financial behaviors in their lifetime. Lusardi et al. [24] investigated young adults' status of financial literacy and suggested that college-educated young adults with parents having stocks and retirement savings are more likely to be financially knowledgeable about risk diversification. Targeted elementary schools, Michael Collins and Odders-White [45] developed a framework to facilitate the transformation of financial knowledge into the financial capability to make desirable decisions, and they also addressed the importance of financial education programs. To help improve students' ability to manage financial routines, a large number of financial institutions offer programs or services associated with financial education which are accessible for students in school or college classrooms, such as programs of Hands on Banking provided by Wells Fargo, and CashCourse offered by National Endowment for Financial Education [46]. Thus, formal financial education and related programs provided in schools or colleges positively contribute to smart financial behaviors and a favorable financial state. Meanwhile, participating in the stock market has been considered an increasingly prevalent investment, which has significantly affected consumer financial wellbeing [13]. As mentioned above, consumer financial education can be defined as formal education on financial knowledge in high schools and universities, and informal education on financial knowledge in workplaces and communities [21, 23]. Hence, the following hypotheses are proposed:

> H1: Consumers who received formal financial education feel more satisfied with stock market participation.

The second vast strand of literature discusses the decisive roles of informal financial education in helping consumers deal with financial affairs and improve financial satisfaction. Prior studies show that when young adults are in the formative stage of work and career decision-making, they often lack financial knowledge and always perform risky and poor financial decisions, which may have long-term effects on their quality of life [24]. With the augmented responsibility for workers' financial security and financial satisfaction, the need for informal financial education occurring in the workplace or online platforms has been increasing over time, but the financial

knowledge of basic concepts pivotal to sound financial portfolio choice declines with age [47, 48]. Furthermore, some researchers even find evidence to support that the importance of informal financial education, such as community-led programs of financial knowledge education, has been underscored [49]. It is evident that additional financial education provided by employers, especially for programs concerning pension enrollment and retirement plans, positively contributes to employees' financial wellbeing [50, 51]. Facing more complicated financial environments, consumers are more likely to be financially vulnerable and need financial education to improve their financial security and satisfaction. Besides, especially for low-income consumers, they have fewer options for employment in the labor market and are more inclined to lack health care and related insurance that plays increasingly critical roles in the quality of life [50, 52]. In terms of Xiao [8]; financial outcomes, incorporating augmented savings, decreased debts, and improved financial status, are considered primary indicators to reflect low-income consumers' financial satisfaction that can be promoted through improving money management behaviors. Simultaneously, mandatory financial education programs are often implemented for low-income consumers by governments to improve their financial satisfaction [53]. Meanwhile, little research has shed light on the effectiveness of financial education on special cohorts, such as military members [54]. Specifically, Lusardi et al. [55] believed that financial knowledge enables consumers to allocate life course economic resources more effectively, and they even claimed that better-educated consumers have the most to gain from the investment in financial education under the U.S. social insurance system. According to Coda Moscarola and Kalwij [23] and Xiao and O'Neill [21]; financial education such as financial advisors providing suggestions about financial planning in the long-term, options of investment or loan, and financial counseling on the issues of debt or retirement, and that is carried out by governments, financial institutions, and nonprofit organizations in workplaces or communities, is considered to be informal. Thus, this study puts forward a hypothesis as follows:

> H2: Consumers who invest more money and time in informal financial education tend to be more financially satisfied when participating in the stock market.

Simultaneously, according to Lusardi [48] and Chen and Heath [29]; consumers' need for financial education has been increasing over time, and both the teachers' and consumers' attitudes toward financial knowledge education substantially affect the effectiveness of related education programs. Hence, this study hypothesizes in terms of the consumers' subjective attitude toward financial education as follows:

> H3: Consumers who consider receiving informal financial education more important are more financially satisfied with participating in the stock market.

3. Methodology

3.1. Data.
The data utilized for the empirical analysis comes from the Survey on Consumer Finance of Chinese Urban Households (SCFCUH), conducted by Tsinghua University's China Financial Research Center in 2012, which has not been conducted since afterward [56]. The samples in the survey of SCFCUH are distributed across 24 cities, respectively, covering about four-fifths of China's provinces. Therefore, the data set can be regarded as a national representative. All respondents are over 25 years old and the main participants in family economic decision-making. Thus, the sample size is 3,106. The survey of SCFCUH provides self-reported measures of financial education and stock market satisfaction, some other indicators of respondents' financial status, as well as the respondents' demographic, attitudinal, and behavioral characteristics.

3.2. Model and Variable Specifications.
In this study, the roles of financial education in affecting consumer stock market satisfaction will be explored in detail. In terms of research hypotheses, the baseline econometric specification in this study is as follows:

$$\text{stock satisfaction}_i = \alpha_0 + \sum_{k=1}^{N} \varphi_k * \text{finedu}_{i,k} + \sum_{j=1}^{M} \vartheta_j * \text{CV}_{i,j} + \varepsilon_i. \tag{1}$$

In equation (1), the subscripts of i, k, and j are the subscript of sampling respondent, financial education (finedu) related variables, and control variables (CV), respectively. Additionally, ε represents the random error term. The dependent variable (stock satisfaction), namely, consumer stock market satisfaction, is measured as the response to the question "If your family participates in the stock market, does it make you happy?" The responses "no gain and happiness is decreased," and "lost money and happiness is decreased" are recoded 1, and the response "Does not matter to happiness" is recoded 2. Besides, the responses "I have learned a lot and am happier," "I have earned more money and am happier," and "because participating in the stock market is very interesting, I am happier" are recoded 3. Furthermore, if the question is not answered, the sample is dropped. Four related measures and one index are developed to measure consumer financial education. To be more specific, the four specific measures are whether household members have ever received formal financial education in schools or universities (having received formal financial education), the subjective evaluation concerning consumers' attitudes toward informal financial education in workplaces or communities (the importance of informal financial education), and objective (the money and time) input in informal financial education. To comprehensively address the impacts of financial education on consumer financial satisfaction, this study constructs a new measurement, namely, the comprehensive financial education index, to measure financial education more appropriately. The establishment of the comprehensive financial education index is based on both subjective and objective perspectives of informal financial education. Following the approach of Chu et al. [14]

and Chen et al. [19]; utilizing the method of principal component analysis (PCA), the comprehensive financial education index is calculated.

Following the specifications of Xiao and Porto [18] and Chen et al. [19]; this study designates demographic and socioeconomic characteristics as the control variables, such as age, gender, marital status, education levels, health status, household size, risk attitudes, monthly income, house and car ownerships, and private business ownerships. Besides, dummy variables of cities and respondents' occupations are included as well. All of the variables are specified in Table 1.

3.3. Econometric Method. Since the variable of consumer stock market satisfaction is not continuous but categorically ordered, ranging from 1 to 3, using the method of ordinary least squares (OLS) for categorically ordered dependent variable is difficult to produce accurate estimates. Due to the ordinal characteristics of the data of the dependent variable,

the approach of ordered logistic regression is utilized in this study. According to the method of ordered logistic regression, the underlying score of consumer stock market satisfaction (stock satisfaction$_i^*$) is estimated as a linear function of the independent and control variables. Let

$$\text{stock satisfaction}_i = q_i'\delta + z_i'\gamma + u_i. \tag{2}$$

In equation (2), the vector of independent variables $q_i = (\text{finedu}_{i,1}, \text{finedu}_{i,2}, \ldots, \text{finedu}_{i,k})'$, the vector of coefficients $\delta = (\beta_1, \beta_2, \ldots \beta_k)'$, which are the parameters associated with the financial education variables. The vector of control variables is z_i, and the vector γ is the coefficients of control variables. Also, $u_i = (\mu_{i,1}, \mu_{i,2}, \ldots \mu_{i,k})'$ is the vector of random errors. Besides, k is still the number of financial education variables, and in this study, k ranges from 1 to 4. Let $X = (q_i, z_i)$, and $\beta = (\delta, \gamma)$. In this study, the choices of consumer stock market satisfaction (stock satisfaction*) are assumed to be subject to the following rules:

$$\text{stock satisfaction}_i = \begin{cases} = 1, \text{if stock satisfaction}^* \leq m_1 \\ = 2, \text{if } m_1 < \text{stock satisfaction}^* \leq m_2 \\ \vdots \\ = n, \text{if stock satisfaction}^* > m_{n-1}. \end{cases} \tag{3}$$

In equation (3), $m_1 < m_2 < \cdots < m_n$ are the cutoff points, and also estimated parameters, which are also considered as the cutoff points. In equation (2), μ_i is assumed to be

logistically distributed. Thus, the probability of a given observation for ordered logistic regression is

$$\begin{aligned} \Pr\left(\text{stock satisfaction} = 0|X\right) &= \Pr\left(\text{stock satisfaction}^* \leq m_0|X\right) \\ &= \Pr\left(X'\beta + \varepsilon \leq m_0|X\right) \\ &= \Pr\left(\varepsilon \leq m_0 - X'\beta|X\right) = \wedge\left(m_0 - X'\beta\right), \\ \Pr\left(\text{stock satisfaction}^* = 1|X\right) &= \Pr\left(m_0 < \text{stock satisfaction}^* \leq m_1|X\right) \\ &= \Pr\left(X'\beta + \varepsilon \leq m_1|X\right) - \Pr\left(X'\beta + \varepsilon < m_0|X\right) \\ &= \wedge\left(m_1 - X'\beta\right) - \wedge\left(m_0 - X'\beta\right), \end{aligned} \tag{4}$$

$$\begin{aligned} \Pr\left(\text{stock satisfaction}^* = 2|X\right) &= \wedge\left(m_2 - X'\beta\right) - \wedge\left(m_1 - X'\beta\right), \\ \Pr\left(\text{stock satisfaction}^* = 3|X\right) &= \wedge\left(m_3 - X'\beta\right) - \wedge\left(m_2 - X'\beta\right) \\ &\vdots \\ \Pr\left(\text{stock satisfaction}^* = n|X\right) &= 1 - \wedge\left(m_{n-1} - X'\beta\right). \end{aligned} \tag{5}$$

In equations (4) and (5), β is estimated together with the cutpoints $m_1, m_2, \ldots, m_{n-1}$, where n is the possible scores of the variable of consumer stock market satisfaction (stock

satisfaction). In this study, n equals 3. Besides, m_0 is defined as $-\infty$, and m_n is defined as $+\infty$. Through the method of ordered logistic regression, the probability function to

TABLE 1: Variable definition.

Variables	Labels	Definitions
Stock market satisfaction	sms	"If your family participates in the stock market, does it make you happy?" The answers "No gain, and happiness is decreased," and "Lost money, and happiness is decreased" are recoded 1. The answer "Does not matter to happiness" is recoded 2. And the answers "I have learned a lot and am happier," "I have earned more money and am happier," and "because participating in the stock market is very interesting, I am happier" are recoded 3. Moreover, if the question is not answered, the variable is recoded 0.
Having received formal financial education	hffe	"Have you or your spouse ever received financial education about professional knowledge in national education?" 1 = yes, and 0 = no
The importance of financial education	imfe	"Do you consider whether it is important for your household to receive financial education?" From 1 (not necessary) to 4 (extremely necessary)
The money input in informal financial education	miife	"How much monthly income will your household input in financial education?" From 1 (no money input) to 5 (greater than 15%)
The time input in informal financial education	tiife	"How much time will you spend on learning financial knowledge every week?" From 1 (no time input) to 6 (greater than 5 hours)
The comprehensive financial education index	cfei	The comprehensive financial education index is calculated by PCA according to Chu et al. [14] and Chen et al. [19].
Age	Age	The sampling respondents' age
Male	Male	1 = male, and 0 = female
Marital status	Married	1 = Married, and 0 = not married
High school and below	edu1	1 = yes, and 0 = no
Some college to undergraduate	edu2	1 = Yes, and 0 = no
Master's degree and above	edu3	1 = yes, and 0 = no
Household size	hsize	The number of the household members
Health status	hstas	From 1 (not at all healthy) to 4 (very healthy)
Attitude toward risk	risatt	"How much risk are you willing to take when your family invests?" the answers "Not willing to take on any risk" and "Less risk and less return" are coded 1. The answer "Average risk and average return" is coded as 2. And the answers "More risk and more return," and "High risk and high return" are recoded as 3.
Monthly income	minc	From 1 (1001 to 1500 Yuan) to 13 (greater than 50,000 Yuan)
Having a house	hhse	1 = yes, and 0 = no
Having a car	hcar	1 = yes, and 0 = no
Having a private business	hpbs	1 = yes, and 0 = no

describe consumer stock market satisfaction is more in line with the data characteristics of the dependent variable, which enables the estimation results to be more accurate. In addition to controlling the heterogeneity of city regions and consumers' occupations, all estimations produce robust standard errors.

4. Empirical Results

4.1. Statistical Description. This study measures the dependent variable through consumers' subjective attitudes toward stock market participation. As for the respondents in the sample, 22.15% responded, "lost money and happiness is decreased," and 7.24% responded, "no gain and happiness is decreased." Meanwhile, 29.05%, 12.49%, and 8.56% feel happier due to earning more money, being interested in participating in stock markets, and learning more knowledge, respectively. Besides, 20.51% are neither happy nor unhappy.

Table 2 displays the results of the descriptive statistics. The mean value of the dependent variable, namely, consumer stock market satisfaction, is 2.204 out of 3, which indicates that consumers have a relatively high subjective evaluation of stock market satisfaction. The mean value of the variable of having received informal financial education is 0.532, suggesting that more than 50% of the sampling consumers have ever received financial knowledge education. For the variable of the importance of informal financial education, the average score is 3.249 out of 4, which reveals that most consumers rate financial education highly. In terms of the objective input of financial education, the average scores are 2.196 out of 5 and 2.883 out of 6, respectively. Moreover, the average household size is 3.105, the average score for attitude toward risk measured on a 3-point scale is 1.940, and the mean value for household members reporting health status is 3.672 out of 4. Also, the average score of monthly income is 8.177 out of 13, and the proportion rate of the respondents whose monthly income ranges from 5001 to 15000 Yuan is 57.69%.

As for the categorical and dummy variables, the frequency and percentage are also exhibited in Table 3. In detail, more than half of consumers are financially educated, and the household heads are more likely to be male. In terms of marital status, 84.00% are married. According to education, 75.98% are at the level of some college to undergraduate. In terms of household asset holdings, while most respondents (90.47%) possess their own house, a moderate number of households (56.89%) have a car. On the contrary, only 37.35% of the respondents own a private business.

4.2. Results of Correlation Analysis. In Table 4, the results of the correlations are reported. Most correlations are as hypothesized. consumers' formal financial education is significantly and positively associated with stock market satisfaction. Meanwhile, consumers who rate financial education highly and spend more money, as well as time on financial education, tend to be more satisfied when participating in the stock market. More specifically, the comprehensive financial education index is significantly positive to consumer stock market satisfaction. More specifically, the correlated coefficients between consumer stock market satisfaction and having received formal financial education, subjective evaluation of informal financial education, and objective (the money and time) input in informal financial education are 0.092, 0.066, 0.091, and 0.120, respectively. Thus, it implies that the time investment in informal financial education has the highest correlation with consumer stock market satisfaction. Also, having received formal financial education, and the money input in informal financial education are moderately associated with consumer stock market satisfaction.

4.3. Regression Results. The baseline regression results are shown in Table 5. To perform more robust estimates, robust stand errors are calculated in all estimations, and the effects of city regions and consumers' occupations are controlled. First, only control variables are incorporated, and OLS regression is utilized in Column (1). Second, the independent variable, having received formal financial education, is included, and the coefficient is positive and significant. Third, unlike Column (2), OLS regression is replaced by ordered logistic regression to improve the estimation in column (3). The coefficient of the variable of having received formal financial education is unchanged, suggesting a robust positive association with consumer stock market satisfaction, which is consistent with Chen et al. [20]. Additionally, the interaction terms of having received formal financial education and education levels are included in Column (4). The results suggest that consumers educated in high school or lower are considered the reference group. Similar to the investigation conducted by Wagner [57]; the results in this study show that compared with the education of high school or lower, consumers who are highly educated and have received formal financial education are more satisfied when participating in the stock market. Meanwhile, consumers who are financially literate and with a master's degree and above tend to have higher stock market satisfaction than those who have only received a degree from an undergraduate or some college, since the coefficients are 0.185 and 0.390, respectively. Together these results provide important evidence to support H1.

To further explore the roles of financial education in consumer stock market satisfaction, additional estimates with the approach of ordered logistic regression are performed. Similarly, the approach of robust standard errors is still employed to improve the estimation results. Besides, the effects of city regions and consumers' occupations are taken into account as well. The regression results are exhibited in Table 6. In Column (1), consumers' subjective evaluation is positively associated with stock market satisfaction, which is aligned with H3. The results are identical to the investigation conducted by Lusardi [48] and Chen et al. [19]. In Columns (2) and (3), consumers who spend more money and time on financial education feel more satisfied since both the coefficients are positive and significant, which is coherent with

TABLE 2: Descriptive statistics.

Variables	Mean	S. D.	Min	Max
sms	2.207	0.867	1	3
hffe	0.532	0.499	0	1
imfe	3.249	0.714	1	4
miife	2.196	0.825	1	5
tiife	2.883	1.197	1	6
cfei	0.005	0.632	−2.075	1.561
Age	34.233	7.617	25	78
Male	0.711	0.454	0	1
Married	0.840	0.367	0	1
edu1	0.123	0.328	0	1
edu2	0.760	0.427	0	1
edu3	0.117	0.322	0	1
hsize	3.105	1.305	1	15
hstas	3.672	0.513	1	4
risatt	1.940	0.772	1	3
minc	8.177	2.210	1	13
hhse	0.905	0.294	0	1
hcar	0.569	0.495	0	1
hpbs	0.373	0.484	0	1

Notes: the sample size is 3106.

TABLE 3: Frequency and percentage of categorical and dummy variables.

Categorical variable	Frequency	Percentage (%)
hffe		
Yes	1651	53.16
No	1455	46.84
Male		
Male	2207	71.06
Female	899	28.94
Married		
Being married	2609	84.00
Not married	497	16.00
edu1	382	12.30
edu2	2360	75.98
edu3	364	11.72
hhse		
Yes	2810	90.47
No	296	9.53
hcar		
Yes	1767	56.89
No	1339	43.11
hpbs		
Yes	1160	37.35
No	1946	62.65

Note: the sample size is equal to 3106.

TABLE 4: Correlations between financial education and consumer stock market satisfaction.

Variables	sms	hffe	imfe	miife	Tiife	cfei
sms	1.000					
hffe	0.092***	1.000				
imfe	0.066***	0.146***	1.000			
miife	0.091***	0.157***	0.134***	1.000		
tiife	0.120***	0.146***	0.216***	0.525***	1.000	
cfei	0.099***	0.195***	0.890***	0.568***	0.454***	1.000

Notes: the sample size is 3106. Moreover, ***, **, and * stand for statistical significance at 1%, 5%, and 10%, respectively.

TABLE 5: Results of regressions of having received formal financial education on consumer stock market satisfaction.

Variables	(1)	(2)	(3)	(4)
hffe		0.123***	0.283***	
		(0.031)	(0.072)	
edu2 × hffe				0.185**
				(0.075)
edu3 × hffe				0.390**
				(0.159)
Male	−0.005	−0.001	0.004	0.002
	(0.034)	(0.034)	(0.079)	(0.079)
Age	−0.028**	−0.025*	−0.058*	−0.060*
	(0.014)	(0.014)	(0.033)	(0.033)
Age ∗ age/100	0.029	0.026	0.061	0.065
	(0.018)	(0.018)	(0.041)	(0.041)
Married	−0.111**	−0.116**	−0.248**	−0.236**
	(0.045)	(0.045)	(0.106)	(0.105)
edu2	−0.127***	−0.134***	−0.288***	
	(0.049)	(0.048)	(0.108)	
edu3	−0.051	−0.062	−0.103	
	(0.065)	(0.065)	(0.154)	
hsize	0.011	0.011	0.024	0.027
	(0.015)	(0.015)	(0.035)	(0.035)
hstas	0.106***	0.101***	0.221***	0.235***
	(0.031)	(0.031)	(0.069)	(0.068)
risatt	0.019	0.016	0.056	0.055
	(0.020)	(0.020)	(0.047)	(0.046)
minc	0.021**	0.021**	0.049**	0.039*
	(0.009)	(0.009)	(0.022)	(0.021)
hhse	0.063	0.051	0.136	0.142
	(0.054)	(0.054)	(0.117)	(0.116)
hcar	0.050	0.052	0.125	0.110
	(0.040)	(0.040)	(0.089)	(0.088)
hpbs	0.217***	0.209***	0.492***	0.504***
	(0.035)	(0.035)	(0.082)	(0.082)
Constant	1.707***	1.657***		
	(0.371)	(0.368)		
City dummies	Yes	Yes	Yes	Yes
Occupation dummies	Yes	Yes	Yes	Yes
Observations	3106	3106	3106	3106
Adjusted R^2	0.043	0.047		
Pseudo R^2			0.032	0.030
LR Chi^2			208.980	194.310

Notes: the reference category is a high school and below. In addition, ***, **, and * represent 1%, 5%, and 10% significance levels, respectively, and the data in parentheses are robust standard errors. For OLS regression utilizing in Columns (1) and (2), the statistics of adjusted R^2 are reported. Moreover, the statistics of pseudo-R^2 are reported for ordered logistic regression.

TABLE 6: Results of regressions of financial education on consumer stock market satisfaction.

Variables	(1)	(2)	(3)	(4)
imfe	0.120**			
	(0.049)			
miife		0.107**		
		(0.046)		
tiife			0.121***	
			(0.033)	
cfei				0.184***
				(0.056)
Male	−0.004	−0.010	−0.015	−0.006
	(0.079)	(0.079)	(0.079)	(0.079)
Age	−0.060*	−0.064**	−0.061*	−0.060*
	(0.032)	(0.032)	(0.033)	(0.032)
Age ∗ age/100	0.063	0.068*	0.064	0.062
	(0.040)	(0.040)	(0.041)	(0.040)
Married	−0.237**	−0.234**	−0.246**	−0.236**
	(0.105)	(0.105)	(0.106)	(0.105)
edu2	−0.274**	−0.285***	−0.289***	−0.283***
	(0.108)	(0.108)	(0.107)	(0.108)
edu3	−0.087	−0.100	−0.125	−0.103
	(0.154)	(0.154)	(0.154)	(0.154)
hsize	0.027	0.024	0.024	0.026
	(0.036)	(0.036)	(0.036)	(0.035)
hstas	0.219***	0.230***	0.224***	0.217***
	(0.069)	(0.069)	(0.069)	(0.069)
risatt	0.060	0.051	0.035	0.051
	(0.046)	(0.047)	(0.047)	(0.047)
minc	0.047**	0.047**	0.042*	0.045**
	(0.022)	(0.022)	(0.022)	(0.022)
hhse	0.153	0.143	0.141	0.143
	(0.116)	(0.117)	(0.117)	(0.117)
hcar	0.112	0.100	0.087	0.101
	(0.089)	(0.089)	(0.089)	(0.089)
hpbs	0.501***	0.488***	0.468***	0.487***
	(0.082)	(0.082)	(0.083)	(0.082)
City dummies	Yes	Yes	Yes	Yes
Occupation dummies	Yes	Yes	Yes	Yes
Observations	3106	3106	3106	3106
Pseudo R^2	0.030	0.030	0.032	0.031
LR Chi^2	197.190	196.560	204.220	203.380

Notes: the reference category is a high school and below. Moreover, ***, **, and * represent 1%, 5%, and 10% significance levels, respectively, and the data in parentheses are robust standard errors.

the findings of Coda Moscarola and Kalwij [23] and Xiao and O'Neill [21]. Thus, the results are hypothesized as H2. Column (4) reports the regression results of the comprehensive financial education index on consumer stock market satisfaction, suggesting a significantly positive association. The estimation results of most of the control variables remain unchanged. Besides, the coefficients of the importance of informal financial education, and objective (the money and time) input in informal financial education are 0.120, 0.107, and 0.121, respectively. The results show that consumers who rate financial education higher tend to feel more satisfied when participating in the stock market than those who input more money into informal financial education. Simultaneously, without considering the endogeneity, the time input in informal financial education also suggests positively contributing to consumer stock market satisfaction. Additionally, the coefficient of the comprehensive financial education index is significantly positive in Column (4), which implies that financial education indeed prominently contributes to consumer stock market satisfaction.

4.4. Endogenous Problem and Robustness Check. In this study, the endogenous problem is also taken into account because there may be bidirectional causality between independent and dependent variables. For instance, some consumers may accept financial education since they have

TABLE 7: Results of the endogeneity test.

Variables	(1)	(2)	(3)	(4)
sestas	0.030***	0.044***	0.088***	0.039***
	(0.011)	(0.013)	(0.018)	(0.010)
imfe	1.272***			
	(0.162)			
miife		1.031***		
		(0.193)		
tiife			0.656***	
			(0.158)	
cfei				1.296***
				(0.286)
Male	0.003	0.001	−0.000	0.003
	(0.022)	(0.027)	(0.033)	(0.030)
Age	−0.018	−0.023	−0.027*	−0.024
	(0.013)	(0.015)	(0.016)	(0.015)
Age * age/100	0.019	0.025	0.028	0.025
	(0.015)	(0.017)	(0.019)	(0.018)
Married	−0.176***	−0.210***	−0.259***	−0.231***
	(0.061)	(0.055)	(0.054)	(0.054)
edu2	−0.100*	−0.126**	−0.153***	−0.138**
	(0.054)	(0.059)	(0.059)	(0.059)
edu3	−0.062	−0.078	−0.105	−0.087
	(0.048)	(0.057)	(0.067)	(0.062)
hsize	0.008	0.008	0.010	0.010
	(0.011)	(0.012)	(0.015)	(0.014)
hstas	0.064*	0.082*	0.097**	0.086**
	(0.038)	(0.043)	(0.042)	(0.042)
risatt	0.013	0.013	0.009	0.015
	(0.015)	(0.018)	(0.020)	(0.019)
minc	0.013	0.015	0.017	0.016
	(0.009)	(0.010)	(0.011)	(0.011)
hhse	0.043	0.049	0.058	0.054
	(0.041)	(0.048)	(0.055)	(0.052)
hcar	0.028	0.031	0.031	0.034
	(0.030)	(0.035)	(0.040)	(0.038)
hpbs	0.144*	0.171**	0.198***	0.190**
	(0.077)	(0.078)	(0.070)	(0.077)
Constant	3.178***	2.092***	2.675***	−0.086***
	(0.029)	(0.033)	(0.048)	(0.025)
City dummies	Yes	Yes	Yes	Yes
Occupation dummies	Yes	Yes	Yes	Yes
Observations	3106	3106	3106	3106

Notes: the reference category is a high school and below. Moreover, ***, **, and * represent 1%, 5%, and 10% significance levels, respectively, and the data in parentheses are robust standard errors.

high financial satisfaction and have earned high incomes from past investments in stock markets. Hence, it is necessary to carefully treat the potential endogeneity of financial education in this study. Accordingly, a consumer spouse's education level (sestas) is chosen as the instrumental variable (IV), since the education status of the consumer's spouse is related to the consumer's financial education and nearly exogenous to consumer stock market satisfaction. More specifically, consumer financial education includes the subjective evaluation of the importance of informal financial education and objective input in informal financial education. Furthermore, the method of IV-ordered probit estimation is utilized to eliminate the influence of the endogenous problem on the estimated results in this study.

To verify whether there is a weak instrumental variable, a regression of financial education on the IV. In light of the regression results, all coefficients of IV are positively significant. Also, the F statistics are 7.530, 12.460, 23.600, and 12.730, respectively. Except for the regression specific to the importance of informal financial education, all other statistics are greater than 10. Thus, the results reject the null hypothesis of weak IV.

Table 7 displays the results of the endogeneity test. Accordingly, IV-ordered probit regressions with the instrumental variable are performed, respectively. In Columns (1) to (4) in Table 7, the results indicate that the estimates of the coefficients are all positively significant. Meanwhile, the signs of other variables in Columns (1) to (4) are almost

TABLE 8: Results of robustness check.

Variables	(1)	(2)	(3)	(4)	(5)
khsh	0.187***				
	(0.039)				
cfei		0.081***	0.113***	0.244***	0.176***
		(0.025)	(0.035)	(0.064)	(0.057)
Male	−0.009	−0.003	−0.005	−0.005	−0.018
	(0.079)	(0.034)	(0.048)	(0.089)	(0.081)
Age	−0.057*	−0.026*	−0.037*	0.132	−0.047
	(0.033)	(0.014)	(0.020)	(0.122)	(0.033)
Age * age/100	0.058	0.027	0.038	−0.212	0.046
	(0.042)	(0.018)	(0.025)	(0.174)	(0.042)
Married	−0.223**	−0.112**	−0.152**	−0.240*	−0.246**
	(0.106)	(0.045)	(0.064)	(0.125)	(0.108)
edu2	−0.270**	−0.133***	−0.180***	−0.263**	−0.280**
	(0.109)	(0.048)	(0.067)	(0.127)	(0.109)
edu3	−0.091	−0.062	−0.070	−0.165	−0.113
	(0.155)	(0.065)	(0.094)	(0.176)	(0.157)
hsize	0.026	0.012	0.016	0.062	0.019
	(0.036)	(0.015)	(0.021)	(0.040)	(0.036)
hstas	0.208***	0.099***	0.136***	0.236***	0.221***
	(0.069)	(0.031)	(0.042)	(0.079)	(0.070)
risatt	0.047	0.013	0.026	0.049	0.047
	(0.047)	(0.020)	(0.028)	(0.053)	(0.047)
minc	0.045**	0.018*	0.027**	0.029	0.042*
	(0.022)	(0.009)	(0.013)	(0.025)	(0.023)
hhse	0.138	0.055	0.087	0.094	0.116
	(0.118)	(0.054)	(0.072)	(0.133)	(0.118)
hcar	0.080	0.043	0.062	0.086	0.113
	(0.089)	(0.040)	(0.054)	(0.102)	(0.089)
hpbs	0.486***	0.208***	0.296***	0.485***	0.480***
	(0.082)	(0.035)	(0.050)	(0.094)	(0.083)
Constant		1.751***			
		(0.367)			
City dummies	Yes	Yes	Yes	Yes	Yes
Occupation dummies	Yes	Yes	Yes	Yes	Yes
Observations	3106	3106	3106	2419	2989
Adjusted R^2		0.046			
Pseudo R^2	0.033		0.031	0.034	0.029
LR Chi^2	215.210		202.890	174.740	185.410

Notes: the reference category is a high school and below. Moreover, ***, **, and * represent 1%, 5%, and 10% significance levels, respectively, and the data in parentheses are robust standard errors. For OLS regression utilizing in Column (2), the statistics of adjusted R^2 are reported.

unchanged. To be more specific, the coefficients are greater than those in Columns (1) to (4) in Table 6. Besides, the coefficients of subjective evaluation on informal financial education, and objective (the money and time) input in informal financial education are 1.272, 1.031, and 0.656, respectively. It implies that the endogenous problem indeed matters, and the IV is vital to mitigate the estimation bias caused by the endogeneity. Thus, the results are still consistent with H2 and H3.

To further verify the estimation robustness, this study first uses an alternative variable of knowing how to seek help (khsh) to replace the independent variable. This variable is measured as the response to the question, "Do you know how to seek help when facing loss from the investment of financial products or damage from financial services." Responses range from 1 (Don't know at all) to 5 (Know exactly). Second, the approaches of OLS and order probit regressions are employed to replace the estimation method

of ordered logistic regression. Third, to alleviate estimation bias caused by age outliers, the samples in the bottom 10% and the top 10% of age are dropped in this study to perform re-estimation. Finally, this study also considers the estimation bias caused by income outliers, and consumers whose monthly incomes are greater than 50,000 Yuan or who have no monthly income are excluded.

The results of the robustness check are displayed in Table 8. In Column (1), the coefficient of knowing how to seek help is significantly positive. In Columns (2) and (3), after replacing estimation approaches, the coefficients of the comprehensive financial education index remain significantly positive. In Columns (4) and (5), after dropping outliers samples by age and income, financial education is still positively associated with consumer stock market satisfaction. Thus, the robustness of the estimation shows that financial education contributes to improving consumer financial satisfaction with stock market participation.

TABLE 9: Results of the heterogeneity test.

Variables	(1)	(2)	(3)	(4)	(5)
cfei	0.201**	0.172**	0.218*	0.196**	0.165**
	(0.101)	(0.084)	(0.129)	(0.078)	(0.083)
Male	0.032	0.013	−0.083	0.082	−0.115
	(0.149)	(0.117)	(0.173)	(0.110)	(0.117)
Age	−0.041	−0.114**	−0.044	−0.080*	−0.048
	(0.057)	(0.046)	(0.089)	(0.042)	(0.056)
Age ∗ age/100	0.041	0.131**	0.030	0.079	0.057
	(0.071)	(0.056)	(0.113)	(0.051)	(0.072)
Married	−0.167	−0.315**	−0.291	−0.166	−0.301*
	(0.204)	(0.152)	(0.263)	(0.145)	(0.156)
edu2	−0.210	−0.227	−0.085	−0.277*	−0.265*
	(0.163)	(0.176)	(0.367)	(0.149)	(0.161)
edu3	−0.201	−0.085	0.143	0.116	−0.288
	(0.336)	(0.230)	(0.408)	(0.222)	(0.219)
hsize	0.157	0.033	0.016	0.037	0.015
	(0.111)	(0.049)	(0.071)	(0.049)	(0.050)
hstas	0.142	0.205**	0.286	0.177*	0.257***
	(0.122)	(0.102)	(0.175)	(0.099)	(0.098)
risatt	0.011	0.132*	−0.060	0.105	−0.013
	(0.086)	(0.069)	(0.113)	(0.065)	(0.068)
minc	−0.069	−0.150	0.148*	0.043	0.048
	(0.059)	(0.110)	(0.087)	(0.030)	(0.033)
hhse	−0.098	0.327*	0.107	−0.073	0.402**
	(0.188)	(0.174)	(0.412)	(0.169)	(0.167)
hcar	−0.003	0.148	0.383	0.146	0.022
	(0.167)	(0.128)	(0.234)	(0.123)	(0.130)
hpbs	0.455***	0.411***	0.597***	0.451***	0.549***
	(0.151)	(0.127)	(0.187)	(0.116)	(0.121)
City dummies	Yes	Yes	Yes	Yes	Yes
Occupation dummies	Yes	Yes	Yes	Yes	Yes
Observations	948	1455	703	1607	1499
Pseudo R^2	0.030	0.033	0.061	0.040	0.028
LR Chi^2	57.220	108.120	74.650	131.900	84.640

Notes: the reference category is a high school and below. In addition, ***, **, and * represent 1%, 5%, and 10% significance levels, respectively, and the data in parentheses are robust standard errors.

4.5. Heterogeneity Test. Since consumers with different levels of income may affect their subjective evaluation of stock market satisfaction, this study divided the samples into three subgroups according to the lowest (0%–25%) income intervals, the medium (25%–75%) income intervals, and the highest (75%–100%) income intervals to investigate the potential heterogeneity about consumer income level. Meanwhile, consumers living in regions with various levels of economic development also may have different assessments of the financial satisfaction specific to stock investments. To address this question, this study divides the samples into two subgroups of developing and developed regions. For developed regions, the GDP per capita is greater than the average value of GDP per capita of all cities.

Table 9 reports the results of the heterogeneity test. In Columns (1) to (3), for different income subgroups, the coefficients of the comprehensive financial education index are positive and statistically significant, implying that financial education is positively associated with consumer stock market satisfaction regardless of income levels. Specifically, the coefficient in Column (3) is greater than the coefficients in Columns (1) and (2), and it provides evidence that the enhancing role of financial education for consumers

with higher incomes is greater than for those with lower incomes. Additionally, the coefficients specific to the comprehensive financial education index in Columns (4) and (5), are still unchanged, and for developed regions, the value of the coefficient is greater. Hence, consumers in developed regions are more satisfied with stock market participation than those in developing regions. In conclusion, the heterogeneity of income and regional economic development indeed affects consumers' subjective evaluation of financial satisfaction concerning stock investments, but the positive roles of financial education in enhancing consumer stock market satisfaction are still unchanged.

5. Conclusions and Implications

Using data from the survey data of SCFCUH, this study explores the associations between financial education and consumer stock market satisfaction. Consumer financial education is measured from the objective aspect incorporating formal and informal financial knowledge education, and the subjective aspect is reflected through consumers' attitudes toward financial education. To further comprehensively measure financial education, this study

also constructs an index of comprehensive financial education. To produce more accurate and robust results, this study utilizes ordered logistic regression to perform estimation as well as the approach of robust standard errors. Considering the impacts of endogeneity on regressed results, this study appropriately chooses an instrumental variable to perform IV-ordered probit estimation as well. Besides, this study also performs a comprehensive robustness check and heterogeneity test to verify the estimated results.

The results suggest that financial education positively contributes to enhancing consumer stock market satisfaction. In detail, consumers who have received formal financial education in schools or universities are more satisfied when participating in the stock market. More specifically, better-educated consumers who are financially literate enjoy higher financial satisfaction in participating in the stock market. Concerning the investment in informal financial education, the more money and time consumers input, the more satisfied they feel in participating in the stock market. Furthermore, the results suggest a positive association between consumers' subjective attitudes toward informal financial education and their financial satisfaction when investing in stocks. The result of the regression of the comprehensive financial education on consumer stock market satisfaction verifies this positive association as well.

The conclusions of this study spark rich policy implications. The first is to increase the supply of formal financial education in high schools and universities. This study suggests a positive role of formal financial education in improving consumer stock market satisfaction. More specifically, formal financial education is provided through a long-term training program and type of curriculum, which is important to improve consumers' financial knowledge and enables them to perform favorable financial behaviors. Second, encourage consumers to invest more in the informal education of financial knowledge. With the increasing complexity of financial environments, financial mistakes are more likely to be made by consumers with lower financial knowledge. Financial institutions and organizations should formulate more financial counseling programs and plans to help consumers make sound financial decisions. Third, policymakers are encouraged to formulate informative policies to make consumers aware of the importance of financial education. According to the results, consumers who rate financial education higher tend to be more satisfied when participating in the stock market. Therefore, policymakers should take more effective measures to highlight the importance of financial education and subsequently increase consumers' enthusiasm for investing in financial education.

The limitations of this study should be acknowledged, and directions for future research should be highlighted. First, the dataset used in this study is cross-sectional, which makes investigating the two-way causality more difficult. Also, there are few panel data concerning financial education and consumer stock market satisfaction. However, this study utilizes an instrumental variable to perform IV-ordered probit regressions to alleviate the estimation bias caused by the endogeneity. To verify and make appropriate results, a comprehensive robustness check and the heterogeneity test

are conducted in this study. Second, the survey dataset used in this study is only from China, and the related survey was conducted in 2012. Datasets from other developed and developing economies enable further research to verify the associations between financial education and consumer stock market satisfaction under different socioeconomic contexts. Besides, more updated surveys need to be conducted to help offer timely policy recommendations.

Data Availability

The datasets analyzed for this study can be found in Household Consumer Finance among China's Urban Residents. All data are available from the Tsinghua University's China Financial Research Center for researchers who meet the criteria for access to confidential data.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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