Original Research Article

The Impact of Financial Capability in Managing Income and Expenditure on Consumer Financial Satisfaction: Evidence from the USA

Abstract: Using the survey data of the National Financial Capability Study in 2018, this study aims to provide empirical insight into the impact of financial capability in managing income and expenditure (MIE) on consumer financial satisfaction. To produce more accurate results, the approach of the ordered logit regression is utilized. The results suggest a positive association between financial capability in MIE and consumer financial satisfaction, implying that consumers who can manage their spending within income tend to enjoy a higher level of satisfaction under current financial conditions. In addition, when an ordered probit regression is utilized, and the outliers of income and the heterogeneity of consumers' annual income are taken into account, the results remain unchanged. Moreover, this study also verifies the role of perceived mathematical capability as a moderator. Hence, the findings enable policymakers and consumer educators to formulate effective measures to enhance consumer financial capability in MIE.

Keywords: financial capability, managing income and expenditure, consumer financial satisfaction, perceived mathematical capability, ordered logit regression

1. INTRODUCTION

Nowadays, with rapid changes in the economic climate and the occurrence of unforeseen emergencies, consumers are exposed to a much more complicated financial environment than before. The vulnerability of financial status will rise if consumers are not equipped with the necessary ability to manage their finances. More specifically, due to the abrupt public health event, the COVID-19 pandemic in 2020, there are widespread lockdowns and restrictions confining consumers within their homes, cutting off economic gains and other resources, which has played a serious role in consumer financial satisfaction. Besides, it is even worse for those consumers in debt or without precautionary savings as the result of having spent more than their income. Therefore, considering the current economic dilemma worldwide, investigating the impact of financial capability in managing income and expenditure (MIE) on consumer financial satisfaction is informative for policymakers and consumer educators to formulate adequate measures in improving consumer financial capability and wellbeing.

Financial satisfaction and financial wellbeing are often used interchangeably in prior literature, while several studies have offered different definitions [1]. Hira and Mugenda [2] defined financial satisfaction as consumers' perception with six aspects of financial situation: (1) amount of savings; (2) debt level; (3) household's financial state; (4) the ability to achieve the financial goal on a long-term basis; (5) the capability of handling financial emergency; and (6) skill of managing money. In addition, Michael Collins and Urban [3] referred to financial wellbeing to capture subjective financial position and perceived financial situation in the future. More specifically, they argued that financial wellbeing is based on personal perceptions from four perspectives: (1) managing daily and monthly finances; (2) withstanding financial shocks; (3) realizing financial goals; and (4) making choices freely to increase life enjoyment. Also, financial satisfaction is considered to be a critical component of consumer life satisfaction and overall individual wellbeing [4]. Moreover, Norvilitis et al. [5] measured perceived financial wellbeing with the personal sensation of financial confidence and security, and the results show that this definition seems to be associated with psychological wellbeing. Previous literature on financial satisfaction has shed light on the impact of financial literacy with a moderating variable of financial behavior [6, 7], financial management behavior and attitude [8], financial capability [9, 10], and credit use [11]. Unlike previous studies, this study further investigates the branch of financial capability in MIE specifically.

Financial capability is increasingly regarded as a domain of crucial financial importance. Xiao et al. [9] suggested that financial capability means that people take advantage of informed financial knowledge to perform a series of desirable financial behaviors and consequently strengthen financial satisfaction. Besides, financial knowledge and financial behavior are considered as two significant aspects composing financial capability. However, the conceptual distinction between financial capability and financial literacy should be noted. Financial literacy refers to a series of fundamental concepts, risk diversification, calculation of compound interest, and the difference between the real and nominal value of currency [12]. It is conceptually defined as the ability to deal with economic information and then make sensible decisions of household finances accordingly [13]. Although there is a growing consensus that consumers equipped with financial literacy can manage finances effectively, it is ambiguous whether it can solve institutional barriers that low-income households face when capturing beneficial financial services. Financial capability is considered to be composed of the ability and the opportunity to take actions, namely

financial literacy and chances to critical resources, and is beneficial to enhance financial wellbeing. By contrast, it is difficult for financially incapable consumers to discern products and choose services that cater to their demand, they can not make sure how to access independent suggestions appropriately, they make unreasonable decisions, and they suffer from inappropriate financial practices. Therefore, being financially capable of making sensible judgments and informed decisions is necessary for consumers to live a better life.

Consumers' expenditure is not only affected by current income but also the expectation of future income. Since uncertainty exists in future income, consumers will adjust their consumption plans periodically when new information regarding future income is accessible [14]. However, researchers have been aware of the phenomenon that substantial consumers are under the financial strain of making ends meet. This was measured by how they manage daily financial matters and how well they cope with monthly income and expenditure to prevent overspending. Lusardi [15] claimed that nearly half of Americans have difficulty covering monthly expenses and paying bills, with 14% finding it very difficult. Those suffering from an unforeseen drop in income during an economic crisis appear to be harder to cover expenses. Overspending, namely expenditure exceeds income, is generally regarded as undesirable behavior. Although overspending could be considered as a possible rational approach to maximize the utility of consumption under some conditions or in terms of the family life cycle [16], for most consumers, financial goals can not be made when overspending continues, and bankruptcy is a serious problem as a result of overspending [17]. Besides, impulsive buying, another undesirable consumption behavior, is correlated with the misuse of credit cards [18, 19]. Also, it is pivotal to note that compulsive buying among consumers, especially college students, has led to a large number of credit card debt and consequences of personal bankruptcy [20]. Hence, financial vulnerability and troubles in the consumers' real-life highlight the necessity of equipping with financial capability in MIE.

This paper differs from previous studies as follows. First, this study explores financial capability in a more specific domain of being in charge of income and expenditure, a realistic and positive policy variable in guiding consumers to enjoy a better life. In addition, this study enriches current literature on consumer financial satisfaction by examining a particular branch of financial capability involved in MIE. Additionally, this study is informative for policymakers, consumer institutions, and educators to formulate practical guidance and promote consumer finance-related

programs to boost consumer wellbeing.

The remainder of this study is arranged as follows. Section 2 presents literature reviews about financial satisfaction and financial capability in MIE. This section also provides a hypothesis based on the role of financial capability in MIE in consumer financial satisfaction. Section 3 discusses the data source, model specification and variables, estimation method, and statistical description. Section 4 conducts empirical analysis, and the moderating role of perceived mathematical capability is addressed as well. Section 5 concludes.

2. LITERATURE REVIEW

2.1 Prior Research on Financial Capability

As a new and important concept, financial capability has been shed light on by substantial researchers and policymakers. However, no consensus of its definition has been reached. Johnson and Sherraden [21] suggested that financial capability means the competence of understanding, evaluating, and taking actions in the light of personal best financial interests. Taylor [22] considered financial capability as the ability to be in charge of personal finances, regarding two core aspects, managing money and making ends meet. Besides, Atkinson et al. [23] referred to financial capability to four main personal characteristics: (1) managing money; (2) planning ahead; (3) choosing financial products; and (4) keeping informed. In addition, utilizing datasets from the State-by-State Survey in the U.S. in 2009, Xiao et al. [9] evaluated consumer financial capability from the following three perspectives: (1) self-perceived financial capability; (2) desirable and risky financial behavior; and (3) subjective and objective financial literacy.

Many countries have carried out surveys concerning the financial capability to date. In particular, based on the Baseline Survey of Financial Capability in the United Kingdom, the first country to conduct an investigation of financial capability in 2005, the National Financial Capability Study (NFCS) in the United States improves the approach and provides richer information. More specifically, the NFCS led by Financial Industry Regulation Authority (FINRA) is composed of three surveys: National Survey, State-by-State Survey, and Military Survey, with nationally representative data of 1,488 respondents [15]. In terms of the NFCS, four aspects regarding financial capability are addressed as follows: (1) making ends meet, i.e., balancing income and expenditure; (2) planning ahead, i.e., preventing uncertainty in the future; (3) choosing and managing financial products, i.e., managing liquidity and borrowing reasonably; (4) financial literacy and self-assessed skills, i.e.,

understanding and processing information.

More specifically, several prior studies have shed light on investigating the determinants of financial capability. Taylor [22] indicated that older people with a full-time job and employed spouse are the most financially capable. On the contrary, the young adults without work and partners or living with other unemployed adults are found to be the lowest financially capable. Utilizing approaches of one-way ANOVAs and multiple regressions, Xiao et al. [24] suggested that age is a determining factor of financial capability. Meanwhile, the results also show that older consumers are expected to be more financially capable than their younger counterparts. Besides, using data from the 2012 NFCS, financial capability is considered to be positively associated with financial education by enhancing financial knowledge, cultivating favorable financial behaviors, and strengthening confidence in financial capability [25].

2.2 Previous Studies on Financial Satisfaction

Financial satisfaction can be viewed as a subjective measure of economic welfare, reflecting consumers' subjective assessment of their financial status [26, 27]. Therefore, the enhancement of financial satisfaction has played a vital role in improving consumer economic wellbeing. In recent decades, the primary attributes of financial satisfaction have been extensively investigated. The earlier discussion of financial satisfaction emerged in the 1990s. Porter [28] measured financial wellbeing with variables of personal characteristics, quantitative proxies of financial behaviors, subjective feelings of financial state, an assessment of life situation, and an appraisal of the financial position. In addition, Robb et al. [29] suggested the attributes influencing financial satisfaction with a conceptual model composed of demographic and socioeconomic characteristics, financial knowledge, financial attitudes, financial behaviors, and financial strain.

Specifically, with a sample size of 18,600 participants in the United States, Aboagye and Jung [1] concluded that both student loan debts and mortgage loans present a negative association with the overall level of financial satisfaction. Besides, using a sample distributed in 24 cities from 24 provinces across China, Chen et al. [30] reached an enlightening conclusion that the more money and time consumers are willing to invest in financial education, the more satisfied they will be in life. Similarly, a study based on sampling employees working for a nationwide insurance company in the USA shows that self-directed financial learning is beneficial in enhancing both career satisfaction and financial satisfaction [31]. In recent decades,

having a credit card is one of the most common financial behaviors. Healthy credit card use can serve as an effective tool to enhance financial satisfaction [32, 33]. In contrast, if credit cards are not properly used, it will involve problems like not paying balances in full, which lead to high-interest rates and fees. Utilizing datasets in the Health and Retirement Study and an ordered probit model, Payne et al. [34] indicated that lower-risk-tolerance consumers with poor credit card management tend to have a low level of financial satisfaction. The findings also reveal that it is credit card mismanagement rather than the actual loan itself that results in dissatisfaction associated with stress and anxiety.

Additionally, a vast body of literature has focused on examining the influences of various demographic and socioeconomic characteristics on financial satisfaction, including age, income, gender, and marital status. Hsieh [35] investigated the role of age differences in financial satisfaction and found that younger cohorts tend to be less financially satisfied. This phenomenon can be interpreted by the reasons that younger cohorts' financial aspirations are not under economic achievements, or they feel that they receive unfair financial resources. Besides, using data in a transition country, Albania, a study presents evidence that workers in informal sectors are reported financially dissatisfied compared with formal sectors due to the lack of social safety net [36]. There is a consensus among many studies that income level is significant and positively associated with consumer financial satisfaction. Grable et al. [37] explored the impact of perceived income adequacy on financial satisfaction and suggested that consumers who assess their income to be adequate appear to be more financially satisfied. Also, the complex concept of financial satisfaction is enriched by incorporating income aspirations into the utility function, which presents not only consumers' concerns for previous and future income levels but also peers' income [26]. Moreover, Diener and Biswas-Diener [38] regarded financial satisfaction as a critical mediator variable between income and subjective wellbeing. The results show that excessive earning hinders the chance to acquire higher subjective wellbeing sustainably for consumers with middle or upper-income as their material desires boost in the meantime.

2.3 Previous Research on Financial Capability in MIE and Consumer Financial Satisfaction

As early as 1936, Keynes put forward the theory of consumption in *The General Theory of Employment, Interest, and Money*, holding that current consumption expenditure heavily depended on current income. However, some studies, in reality,

contradicted the views of the Keynesian Principle. For instance, marginal propensity for consumption out of the disposable income is considered to be lower in the short term than that in the long term [39]. Modigliani and Brumberg proposed the life cycle model in 1954 [40, 41]. After that, Modigliani himself and many researchers took essential steps in developing this model. In the framework of the life cycle model, individuals are assumed to maximize utility through the intertemporal allocation of resources, and the decision of consumption is associated with current wealth and income, future income, preferences for commodities, and relative prices of assets.

In recent years, raising consumers' awareness of money management has been increasingly highlighted. Money management refers to being in charge of personal financial resources, keeping track of income, and recording some kinds of expenditure, which are fundamental to financial capability [42]. Xiao et al. [9] revealed that budgeting and controlling expenditure within regular income ensures consumers "keep their heads above water". This beneficial financial capability can further pave a path for improving consumer financial satisfaction. From the perspective of psychology, Taylor et al. [43] argued that financial capability in managing income is a critical driving factor in enjoying psychological health. This study also claims that consumers with this ability are more likely to maintain living standards and meet financial commitments when there is a drop in income. Also, Arifin [39] conducted a favorable comparison between capability in managing finance and financial satisfaction, which is indicated by the ability to save, earn income, control expenditure, set financial goals, and make financial plans for the future. Moreover, considering gender dynamics in managing family resources, Kulic et al. [44] documented that the couple's independent money management characterized by being in charge of their income and expenditure separately yields benefit in women's level of satisfaction. This study also suggests that money management regimes play a vitally additional role in generating advantages and making up for disadvantages between the couple. Therefore, everyday money management may be positively associated with financial satisfaction significantly [31]. Additionally, Berry and Williams [45] also claimed that money management practices contribute to enhancing the quality of life.

Furthermore, budgeting and planning ahead are beneficial approaches to MIE. Referring to the basic idea of budget constraint, the total amount of money spent on the combination of goods and services should be within consumers' limited income to maximize their satisfaction, namely utility. Also, Garcia-Santillan et al. [46] indicated

that making financial plans and budgeting in advance enables consumers to evaluate current conditions, turn to alternatives and make rational decisions concerning their objectives and chances. Those characteristics contribute to managing income, maintaining stability in the long term, and controlling financial resources. Based on the aforementioned discussions, this study aims to verify whether financial capability in MIE has a positive effect on consumer financial satisfaction. Hence, the hypothesis is proposed as follow:

H_1: Given economic resources and other control variables, financial capability in MIE is positively associated with consumer financial satisfaction.

3. METHODOLOGY AND DATA DESCRIPTION

3.1 Data

This study utilizes sampling datasets in the investigation of an ongoing study conducted a fourth wave, the National Financial Capability Study (NFCS) in 2018, which presents a national representative database incorporating more than 25,000 American adults, covering 500 individuals per state approximately. The NFCS is commissioned by the Financial Industry Regulatory Authority (FINRA) Investor Education Foundation, which invites many academic and policy researchers to measure American adults' financial capability as a whole. Moreover, it tracks and explores how these measures evolve accompanied by the business cycle as well as time goes on and how they change due to the vary of demographic, attitudinal, behavioral characteristics, and level of financial literacy [47]. After excluding some samples because of missing values, the sample size in this study is 22,610.

3.2 Model Specification and Variables

This study aims to evaluate the impact of financial capability in MIE on consumer financial satisfaction. Based on the hypothesis, the basic regression model is specified as follows:

$$finsat_i = \alpha_0 + \beta * fcmie + \sum_{k=1}^{M} \delta_k * cv_{k,i} + \varepsilon_i \quad (1)$$

In Equation (1), the subscript *i* denotes the sample of consumers, and similarly, the superscript *M* stands for the number of control variables. Besides, α_0 is the constant term, and ε_i stands for the random error term. Furthermore, β_i and δ_k are utilized to denote the coefficients of the variable of financial capability in MIE and control variables, respectively.

The variable specifications are reported in Table 1. In detail, $finsat_i$, the

dependent variable, is measured by consumer financial satisfaction level obtained with a 10-point scale. To generate this variable, this study refers to a related question which was worded, "Overall, thinking of your assets, debts, and savings, how satisfied are you with your current personal financial condition?". The corresponding scores range from 1 to 10, where 1 denotes "not at all satisfied", while 10 represents "extremely satisfied". Besides, *fcmie*, the primary independent variable, denotes the financial capability in MIE. Similarly, to construct measures of this variable, this study utilizes the relevant question which was worded, "Over the past year, would you say your spending was less than, more than, or about equal to your income?" Responses can be selected among "spending more than income", "spending about equal to income", and "spending less than income", which are encoded as 1, 2, and 3, respectively.

In addition to the independent variable of *fcmie*, this study incorporates control variables ($cv_{k,i}$) for characteristics that may affect consumer financial satisfaction. As mentioned above, the survey questions in the NFCS are also utilized to construct proxies for these variables. In this study, the control variables consist of the gender (1 indicates male, 0 otherwise), age (Five categories: Age 18 to 24, 25 to 34, 35 to 44, 45 to 54, and 55 to 64), highest level of education (The possible answers are "high school or lower", "some college to bachelor's degree", and "postgraduate degree or higher"), perceived mathematical capability (Ranging from 1 to 7, 1 — strongly disagree, 7 — strongly agree, and 4 — neither agree nor disagree), marital status (1 stands for married, 0 otherwise), white (Two categories: 1 stands for white, 0 otherwise), children (Four categories: 1 child, 2 children, 3 children, and 4 children or more), risk attitude (Ranging from 1 to 10, 1 — not at all willing, 10 — very willing), credit record rating (Five categories: Very bad, bad, about average, good, and very good), annual income (Eight categories: Less than $15,5000, $15,000-$25,000, $25,000-$35,000, $35,000-$50,000, $50,000-$75,000, $75,000-$100,000, $100,000-$150,000, and $150,000 or more), participating in financial markets (1 represents yes, 0 otherwise). To examine the relationship between desirable financial behaviors and consumer financial satisfaction, six related questions are included: (1) the balance of expense and income; (2) difficulty in covering expenses and paying bills given a typical month; (3) whether the income is stable in previous 12 months; (4) whether respondents have ever tried to calculate the amount saved for retirement; (5) whether respondents set aside money for emergencies; and (6) whether respondents set aside money for children's college education (See Table 1).

Table 1. Variable specification

Variable	Attribute
Consumer financial satisfaction	"Overall, thinking of your assets, debts, and savings, how satisfied are you with your current personal financial condition?" 1 – not at all satisfied, 10 – extremely satisfied
Financial capability in MIE	"Over the past year, would you say your spending was less than, more than, or about equal to your income? Please do not include the purchase of a new house or car or other big investments you may have made." 1 = spending more than income, 2 = spending about equal to income, 3 = spending less than income
Gender	1 = male, 0 = female
Age 18 to 24	1 = yes, 0 = no
Age 25 to 34	1 = yes, 0 = no
Age 35 to 44	1 = yes, 0 = no
Age 45 to 54	1 = yes, 0 = no
Age 55 to 64	1 = yes, 0 = no
High school or lower	1 = yes, 0 = no
Some college to bachelor's degree	1 = yes, 0 = no
Postgraduate degree or higher	1 = yes, 0 = no
Perceived mathematical capability	"How strongly do you agree or disagree with the following statements: I am pretty good at math?" 0 – no answer, 1 – strongly disagree, 7 – strongly agree
Marital status	1 = being married, 0 = not married
White	1 = white, 0 = not white
Number of financially dependent children	"How many children do you have who are financially dependent on you or your spouse/partner?" 0 = no answer, 1 = 1 child, 2 = 2 children, 3 = 3 children, 4 = 4 children or more
Risk attitude	"When thinking of your financial investments, how willing are you to take risks?" 0– no answer, 1 – not at all willing, 10 – very willing
Credit record rating	"How would you rate your current credit record?" 0 = no answer, 1 = very bad, 2 = bad, 3 = about average, 4 = good, 5 = very good
Annual income	1 = less than $15,000, 2 = $15,000 to $25,000, 3 = $25,000 to $35,000, 4 = $35,000 to $50,000, 5 = $50,000 to

	$75,000, 6 = $75,000 to $100,000, 7 = $100,000 to $150,000, and 8 = $150,000 or more
Participating in financial markets	"Not including retirement accounts, do you have any investments in stocks, bonds, mutual funds, or other securities?" 1 = yes, 0 = no
Desirable financial behaviors	"Over the past year, would you say your spending was less than, more than, or about equal to your income?" 1 = spending less than or equal to income, 0 = spending more than income
	"In a typical month, how difficult is it for you to cover your expenses and pay all your bills?" 1 = not at all difficult, 0 = somewhat difficult or very difficult
	"In the past 12 months, which one of the following best describes your income?" 1 = roughly the same amount each month or occasionally varies from month to month, 0 = varies quite often from month to month
	"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?" 1 = yes, 0 = no
	"Are you setting aside any money for your children's college education?" 1 = yes, 0 = no
	"Have you ever tried to figure out how much you need to save for retirement?" 1 = yes, 0 = no

3.3 Estimation Method

In this study, the dependent variable is an ordered discrete variable denoted on a scale of 1 – not at all satisfied to 10 – extremely satisfied, which is not continuous. Therefore, the approach of ordered logit regression rather than ordinary least squares (OLS) is utilized to eliminate estimation bias. However, both the results of the OLS and the ordered logit regressions are employed for generating robust and accurate estimation results.

3.4 Statistical Description

Table 2 elaborates on the descriptive statistics, covering mean, standard deviation, and the minimum and maximum values. The total observations in this study are 22,610. For consumer financial satisfaction, the mean value is 5.899 on the 10-point scale, implying that most consumers have a relatively high level of financial

satisfaction. The average value of financial capability in MIE is 2.260 with a standard deviation of 0.753, suggesting that most consumers appear to spend more than their income.

Table 2. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
Consumer financial satisfaction	5.899	2.830	1	10
Financial capability in MIE	2.260	0.753	1	3
Male	0.451	0.498	0	1
Age 18 to 24	0.090	0.287	0	1
Age 25 to 34	0.169	0.374	0	1
Age 35 to 44	0.164	0.370	0	1
Age 45 to 54	0.172	0.377	0	1
Age 55 to 64	0.189	0.392	0	1
High school or lower	0.241	0.428	0	1
Some college to Bachelor's degree	0.613	0.487	0	1
Postgraduate degree or higher	0.145	0.353	0	1
Perceived mathematical capability	5.700	1.576	0	7
Being married	0.560	0.496	0	1
Ethnicity	0.755	0.430	0	1
Number of financially dependent children	0.654	1.047	0	4
Risk attitude	4.976	2.676	0	10
Credit record rating	3.894	1.371	0	5
Annual income	4.710	1.998	1	8
Participating in financial markets	0.371	0.483	0	1
Desirable financial behaviors	3.310	1.351	0	6

Notes: The results are arranged by the authors, and the sample size is 22,610.

In addition, male consumers account for 45.1% of the total samples. Considering the age, consumers aged 18 to 24, 25 to 34, 25 to 34, and 55 to 64 account for 9.0%, 16.9%, 16.4%, 17.2%, and 18.9%, respectively. For the highest level of education, consumers acquiring a bachelor's degree make up the largest proportion of 61.3%, followed by consumers entering high school or lower account for 24.1%, and consumers attaining a postgraduate degree or higher take up 14.5%. Moreover, the mean score of perceived mathematical capability is 5.700 out of 7, showing a comparatively high capability in mathematics. Concerning marital status, more than one-half of consumers are married with a mean value of 56.0%. Besides, consumers are predominantly white occupying 75.5% of the total samples. Regarding the number of financially dependent children, the average value is 0.654, which is a

comparatively low level. Furthermore, measured on a 10-point scale, the mean value for risk attitude is 4.976. The average score of credit record rating is 3.894, which means that most consumers rate their credit record between "About average" and "Good". Besides, the mean value of the annual income variable is 4.710 with a standard deviation of 1.998, showing that most consumers' annual incomes are approximately between "At least $35,000 but less than $50,000" and "At least $50,000 but less than $75,000". In terms of participating in financial markets, the mean value is 0.371, implying a comparatively low level of investments in securities. Also, the mean value of desirable financial behaviors is 3.310, indicating that half of the consumers are exposed to desirable financial behaviors.

4. EMPIRICAL RESULTS AND DISCUSSION

4.1 Results of Correlation Analysis

Table 2 shows the correlations among consumer financial satisfaction, financial capability in MIE, perceived mathematical capability, risk attitude, credit record rating, annual income, participation in financial markets, and desirable financial behaviors. The results indicate that most correlations are as expected. In detail, the correlation coefficient between financial capability in MIE and consumer financial satisfaction is 0.317 at a significance of 1%, indicating a positive relationship. Furthermore, there is a positive correlation between perceived mathematical capability and consumer financial satisfaction at a significance of 1%, as well as financial capability in MIE. Besides, the relationships among the variable of risk attitude and consumer financial satisfaction, financial capability in MIE, coupled with perceived mathematical capability are all statistically significant and positive. Also, the results demonstrate that consumer financial satisfaction has a positive correlation with credit record rating, annual income, participation in the financial markets, as well as desirable financial behaviors, and the coefficients are 0.477, 0.380, 0.375, and 0.571, respectively. Meanwhile, credit record rating is found to be positively related to perceived mathematical capability and risk attitude. The results also suggest that consumers earning more annual income appear to have higher risk tolerance and better credit record rating. Additionally, participating in financial markets is anticipated to be positively correlated with perceived mathematical capability, risk attitude, credit record rating, and annual income. Additionally, consumers who perform desirable financial behaviors appear to be positively associated with all of the other variables at a significance of 1%.

Table 3. The results of correlations

Variables	Consumer financial satisfaction	Financial capability in MIE	Perceived mathematical capability	Risk attitude	Credit record rating	Annual income	Participating in financial markets
Financial capability in MIE	0.317***						
Perceived mathematical capability	0.221***	0.099***					
Risk attitude	0.341***	0.049***	0.157***				
Credit record rating	0.477***	0.244***	0.199***	0.165***			
Annual income	0.380***	0.211***	0.178***	0.277***	0.396***		
Participating in the financial markets	0.375***	0.153***	0.141***	0.327***	0.312***	0.349***	
Desirable financial behaviors	0.571***	0.538***	0.210***	0.291***	0.459***	0.468***	0.375***

Notes: The sample size is 22,610. In addtion, ***, **, and * stand for statistical significance at 1%, 5%, and 10%, respectively.

The results of correlation analysis briefly indicate a positive relationship between financial capability in MIE and consumer financial satisfaction. In the rest of the study, a multivariate method is utilized, and many other potential determinants of consumer financial satisfaction are controlled to produce more accurate estimates. First, this study employs OLS regression and ordered logit regression to examine the effect of financial capability in MIE on consumer financial satisfaction. Furthermore, this study verifies the robustness of the estimations. Additionally, the moderating role of perceived mathematical capability is explored as well.

4.2 Financial Capability in MIE and Consumer Financial Satisfaction

Table 4 shows the results of baseline regressions of financial capability in MIE on consumer financial satisfaction. In Column (1), the control variables are estimated by using the approach of OLS regression. In Column (2), the independent variable, financial capability in MIE, is incorporated. To improve estimated accuracy, in Columns (3) and (4), the approach of ordered logit regression is used, and the constant term is not reported. In addition, the robust standard errors are reported in parentheses. Besides, since the state-fixed effect is controlled in all estimations, the estimation bias from the heterogeneity of the U.S. states is eliminated.

Table 4. The results of baseline regressions

Variables	(1)	(2)	(3)	(4)
	Consumer	Consumer	Consumer	Consumer

	financial satisfaction	financial satisfaction	financial satisfaction	financial satisfaction
Financial capability in MIE		0.098***		0.076***
		(0.026)		(0.024)
Constant	1.347***	1.197***		
	(0.061)	(0.067)		
Male	0.122***	0.126***	0.099***	0.102***
	(0.035)	(0.035)	(0.029)	(0.029)
Age 25 to 34	-0.722***	-0.712***	-0.617***	-0.612***
	(0.059)	(0.058)	(0.055)	(0.054)
Age 35 to 44	-1.057***	-1.051***	-0.952***	-0.948***
	(0.051)	(0.051)	(0.044)	(0.044)
Age 45 to 54	-1.172***	-1.168***	-1.049***	-1.047***
	(0.042)	(0.042)	(0.037)	(0.037)
Age 55 to 64	-0.598***	-0.596***	-0.549***	-0.548***
	(0.038)	(0.037)	(0.032)	(0.032)
Some college to bachelor's degree	-0.424***	-0.420***	-0.375***	-0.372***
	(0.035)	(0.034)	(0.031)	(0.031)
Postgraduate degree or higher	-0.464***	-0.459***	-0.411***	-0.407***
	(0.051)	(0.051)	(0.048)	(0.047)
Being married	0.230***	0.235***	0.181***	0.185***
	(0.036)	(0.036)	(0.032)	(0.032)
White	-0.084**	-0.085**	-0.065*	-0.066*
	(0.039)	(0.039)	(0.036)	(0.036)
Number of children	-0.126***	-0.118***	-0.096***	-0.090***
	(0.017)	(0.017)	(0.015)	(0.015)
Risk attitude	0.186***	0.188***	0.170***	0.171***
	(0.008)	(0.008)	(0.007)	(0.007)
Credit record rating	0.410***	0.411***	0.352***	0.353***
	(0.015)	(0.015)	(0.014)	(0.014)
Annual income	0.110***	0.110***	0.099***	0.098***
	(0.011)	(0.011)	(0.009)	(0.009)
Participating in financial markets	0.454***	0.460***	0.407***	0.411***
	(0.040)	(0.039)	(0.033)	(0.033)
Desirable financial behaviors	0.775***	0.742***	0.604***	0.580***
	(0.014)	(0.018)	(0.012)	(0.016)
State-fixed effect	Yes	Yes	Yes	Yes
Observations	22,610	22,610	22,610	22,610
Adjusted R^2	0.461	0.461		

Pseudo R^2			0.131	0.132

Notes: In Columns (1) and (2), adjusted R^2 is reported, since the OLS regression is used. In Columns (3) and (4), pseudo R^2 is presented, as the ordered logit regression is utilized. Robust standard errors are calculated in parentheses. Besides, ***, **, and * stand for statistical significance at 1%, 5%, and 10%, respectively.

As shown in Table 4, most coefficients are as expected. In Column (1), the coefficients of all control variables are statistically significant. Accordingly, the coefficient of the male is 0.122, which is positive and significant at a significance of 1%, implying that male consumers tend to be more financially satisfied than female consumers. This result may be explained by the fact that men seem to earn more and prefer to participate in financial markets compared with women. Hence, men can accumulate more practical financial experience to better cope with daily financial affairs, which is beneficial to enhance financial satisfaction. In addition, for different age groups, the coefficients are always statistically significant but negative at a significance of 1%. To be more specific, the coefficient of the group of aged 45-54 is the largest, followed by the group of aged 35-44, 25-34, and the group of aged 55-64 is the last, showing that age seems to have a U-shaped relationship with consumer financial satisfaction. Besides, the coefficients of the variables of some college to Bachelor's degree, and postgraduate degree or higher are -0.424 and -0.464, respectively, indicating that compared with the group of high school or lower, other levels of education groups all have a significantly negative relationship with consumer financial satisfaction. Interestingly, consumers with a higher level of education background turn out to be less financially satisfied compared with consumers with a Bachelor's degree. Moreover, considering the race variable, the results show that white consumers appear to be less financially satisfied than non-white consumers at a significance of 5%. Concerning marital status, the coefficient of married consumers is 0.230, which is statistically significant at a significance of 1%. One explanation may be that consumers being married have a double income guarantee, which decreases uncertainty in income. Additionally, the number of financially dependent children negatively contributes to consumer financial satisfaction. The possible interpretation is that the more children households have, the higher expenditure they will consume for a given income, which results in increased financial burden and thereby abating their financial satisfaction. Besides, the results indicate strong impacts on consumer financial satisfaction for variables as risk attitude, credit record rating, annual income, participation in financial markets, and desirable financial behaviors, which is in line with previous studies [9, 30]. For instance, risk

attitude, an economically important concept, is positive as anticipated. The coefficient of credit record rating appears to be positive and significant, so does the annual income. Furthermore, considering the variable of participation in financial markets, its coefficient is 0.454, which reveals that engaging in financial markets is vital for consumers to improve sensitivity and judgment to the capital market and money market.

In Columns (2) and (4), the coefficients of financial capability in MIE are 0.098 and 0.076, respectively. They are both statistically positive at a significance of 1%, which is as hypothesized in H_1. Therefore, financial capability in MIE has a substantial impact on consumer satisfaction as expected. Consumers whose income covers spending can refrain from getting into debt and rolling debts forward through refinancing, which requires high-interest rates and fees. Besides, consumers can utilize the surplus cash to set aside rainy day money as precautionary savings, which improve their ability to withstand risks and uncertainties, such as adverse variation of income, unexpected big-ticket expenditures, and economic recessions. Moreover, the money consumers have saved also can be used for future investment to capture gains when favorable opportunities arise, which positively contributes to enhancing consumer financial satisfaction.

4.3 Robustness Check

To improve the accuracy and robustness of the results, comprehensive methods of robustness check are conducted. First, this study utilizes the estimation approach of ordered probit regression to replace the method of OLS and ordered logit regression in Column (1). Second, to eliminate the estimation bias caused by outliers by income, the annual income less than 15,000 dollars or more than 150,000 dollars is dropped in Column (2). Third, this study takes the heterogeneity of consumers' annual income into account. Hence, this study keeps samples of annual income that are no less than 4 in Column (3), and in Column (4), the samples with annual income less than 4 are retained. The results of the robustness check are documented in Table 5.

Table 5. Results of robustness check

Variables	(1)	(2)	(3)	(4)
	Consumer financial satisfaction	Consumer financial satisfaction	Consumer financial satisfaction	Consumer financial satisfaction
Financial capability in MIE	0.043***	0.076***	0.065**	0.077**
	(0.013)	(0.024)	(0.027)	(0.039)
Male	0.063***	0.102***	0.127***	0.022
	(0.017)	(0.029)	(0.034)	(0.057)
Age 25 to 34	-0.337***	-0.612***	-0.694***	-0.490***

	(0.031)	(0.054)	(0.063)	(0.068)
Age 35 to 44	-0.526***	-0.948***	-1.128***	-0.515***
	(0.026)	(0.044)	(0.047)	(0.095)
Age 45 to 54	-0.588***	-1.047***	-1.209***	-0.662***
	(0.022)	(0.037)	(0.045)	(0.054)
Age 55 to 64	-0.300***	-0.548***	-0.659***	-0.314***
	(0.019)	(0.032)	(0.038)	(0.054)
Some college to Bachelor's degree	-0.224***	-0.372***	-0.384***	-0.311***
	(0.017)	(0.031)	(0.038)	(0.048)
Postgraduate degree or higher	-0.243***	-0.407***	-0.410***	-0.632***
	(0.027)	(0.047)	(0.052)	(0.099)
Being married	0.103***	0.185***	0.139***	0.276***
	(0.018)	(0.032)	(0.038)	(0.058)
White	-0.049**	-0.066*	-0.119**	0.052
	(0.020)	(0.036)	(0.046)	(0.064)
Number of children	-0.051***	-0.090***	-0.086***	-0.051
	(0.009)	(0.015)	(0.016)	(0.033)
Risk attitude	0.097***	0.171***	0.176***	0.161***
	(0.004)	(0.007)	(0.009)	(0.012)
Credit record rating	0.194***	0.353***	0.426***	0.258***
	(0.008)	(0.014)	(0.019)	(0.017)
Annual income	0.054***	0.098***	0.127***	0.047
	(0.005)	(0.009)	(0.012)	(0.037)
Participating in financial markets	0.239***	0.411***	0.437***	0.247***
	(0.019)	(0.033)	(0.037)	(0.074)
Desirable financial behaviors	0.341***	0.580***	0.546***	0.685***
	(0.008)	(0.016)	(0.016)	(0.032)
State-fixed effect	Yes	Yes	Yes	Yes
Observations	22,610	22,610	16,375	6,235
Pseudo R^2	0.128	0.132	0.122	0.101

Notes: In Column (1), the approach of ordered probit regression is utilized. In Columns (2) to (4), the method of ordered logit regression is used, so the constant items are not reported. Robust standard errors are calculated in parentheses. Since the approaches of ordered probit and ordered logit regression are employed, pseudo R^2 are reported. Also, ***, **, and * stand for statistical significance at 1%, 5%, and 10%, respectively.

In Column (1), the coefficient of financial capability in MIE is 0.043, which is positive and significant, varying little compared with those in OLS and ordered logit regressions. Besides, in Column (2), after dropping outliers of annual income, the relationship of financial capability in MIE specific to consumer financial satisfaction remains significantly positive. Furthermore, in Columns (3) and (4), the coefficients of financial capability in MIE are still unchanged, which is significant and positive. According to the robust results presented in Table 5, this study can conclude a robust

relationship between financial capability in MIE and consumer financial satisfaction. Therefore, financial capability in MIE contributes to consumer financial satisfaction positively, which is consistent with H_1.

4.4 Results of Moderating Role of Perceived Mathematical Capability

To further examine the indirect effect of financial capability in MIE on consumer financial satisfaction, this study takes the moderating variable of perceived mathematical capability into account. The mastery and application of mathematical knowledge help enhance individual analytical thinking and skill of decision-making, and what is most closely associated with mathematical skills in consumer daily life is the management of money-related matters, which may have a potential connection to financial wellbeing. Therefore, this study investigates the moderating role of perceived mathematical capability in the impact of financial capability in MIE on consumer financial satisfaction. In this study, the differences in perceived mathematical capability are addressed in detail.

The results of the indirect effect of financial capability in MIE on consumer financial satisfaction from the moderating role of perceived mathematical capability are illustrated in Table 6. In Column (1), all samples regardless of perceived mathematical capability higher or lower than its average level are incorporated. In Column (2), only samples with lower perceived mathematical capability than its average level are taken into account. Additionally, in Column (3), only samples that have a higher than average level of perceived mathematical capability are included. In Column (2), the coefficient of financial capability in MIE becomes to be insignificant, which indicates that, for lower perceived mathematical capability consumers, there is no statistical nexus between financial capability in MIE and consumer financial satisfaction. Meanwhile, in Column (3), the coefficient of financial capability in MIE is 0.045, which is statistically positive at a significance of 1%. The results imply that for higher perceived mathematical capability consumers, financial capability in MIE is still associated with consumer financial satisfaction. Therefore, it can be concluded that perceived mathematical capability moderates the relationship between financial capability in MIE and consumer financial satisfaction. This conclusion clarifies the association between financial capability in MIE and consumer financial satisfaction will be enhanced if the moderating variable (perceived mathematical capability) is accompanied by the financial capability in MIE. Thus, the moderating role of perceived mathematical capability is verified, that is, it positively contributes to the impact of financial capability in MIE on consumer financial satisfaction.

Table 6. Results of the moderating effect

Variables	(1)	(2)	(3)
	Consumer financial satisfaction	Consumer financial satisfaction	Consumer financial satisfaction
Financial capability in MIE	0.076***	0.024	0.045***
	(0.024)	(0.054)	(0.015)
Male	0.102***	0.130	0.054***
	(0.029)	(0.082)	(0.017)
Age 25 to 34	-0.612***	-0.472***	-0.343***
	(0.054)	(0.127)	(0.036)
Age 35 to 44	-0.948***	-0.461***	-0.556***
	(0.044)	(0.130)	(0.029)
Age 45 to 54	-1.047***	-0.898***	-0.598***
	(0.037)	(0.142)	(0.023)
Age 55 to 64	-0.548***	-0.267**	-0.316***
	(0.032)	(0.118)	(0.022)
Some college to Bachelor's degree	-0.372***	-0.247**	-0.235***
	(0.031)	(0.100)	(0.019)
Postgraduate degree or higher	-0.407***	-0.048	-0.262***
	(0.047)	(0.168)	(0.028)
Being married	0.185***	0.161*	0.102***
	(0.032)	(0.096)	(0.018)
White	-0.066*	-0.051	-0.056***
	(0.036)	(0.097)	(0.021)
Number of children	-0.090***	-0.043	-0.054***
	(0.015)	(0.049)	(0.009)
Risk attitude	0.171***	0.146***	0.099***
	(0.007)	(0.026)	(0.004)
Credit record rating	0.353***	0.282***	0.198***
	(0.014)	(0.039)	(0.009)
Annual income	0.098***	0.121***	0.053***
	(0.009)	(0.028)	(0.006)
Participating in financial markets	0.411***	0.194*	0.250***
	(0.033)	(0.107)	(0.020)
Desirable financial behaviors	0.580***	0.577***	0.342***
	0.076***	(0.041)	(0.009)
State-fixed effect	Yes	Yes	Yes
Observations	22,610	2,155	20,455

Pseudo R^2	0.132	0.115	0.128

Notes: In Columns (1) to (3), the approach of ordered logit regression is utilized, so the constant items are not reported. Robust standard errors are calculated in parentheses. Since the approach of ordered logit regression is employed, pseudo R^2 is presented. Also, ***, **, and * stand for statistical significance at 1%, 5%, and 10%, respectively.

5. CONCLUSIONS

In recent years, financial satisfaction has received increasing interest since consumers find themselves in financial dilemmas, particularly amidst the economic recession. Although financial wellbeing is affected by external factors, for instance, governments introduce certain economic policies, it ultimately depends on consumers' decisions and actions. Hence, higher requirements for personal financial capability have been put forward. Besides, the ability to manage income and expenditure plays a critical role in the function of financial capability in the maintenance of consumer financial satisfaction. Especially during the economic downturn, a large number of consumers experience huge financial pressure and feel anxious about their financial wellbeing. The findings from this study shed light on the importance of equipping consumers with the necessary numeracy and knowledge to make sound financial decisions.

The objective of this study is to verify the impact of financial capability in MIE on consumer financial satisfaction using data from the U.S. NFCS in 2018. In this study, the method of ordered logit regression is employed to eliminate estimation bias. In addition, to examine the robustness of empirical results, comprehensive approaches are utilized. More specifically, ordered probit regression is employed, and the outliers of income and the heterogeneity of consumers' annual income are taken into account. Furthermore, this study also considers the moderating role of perceived mathematical capability in the indirect effects of financial capability in MIE on consumer financial satisfaction.

In this study, the results suggest that consumers with higher financial capability in MIE are likely to be more financially satisfied, which is as hypothesized in H_1. The results could be explained that financially capable consumers who can reasonably control their consumption within income are more likely to avoid getting into debt troubles. Besides, consumers can set aside rainy day money as precautionary savings in case of unexpected expenditure, adverse variation of income, economic recessions, and other emergencies, given that they can cope with income and expenses sensitively. Hence, this beneficial financial capability is positive for consumers to make informed

financial decisions, which contributes to enhancing financial satisfaction. In this study, the results also indicate that perceived mathematical capability moderates the relationship between financial capability in MIE and consumer financial satisfaction.

In addition, this paper presents novel findings that how much financial satisfaction consumers achieve largely depends on how well they have contributed to financial capability regarding the management of income and expenditure. Future studies are encouraged to extend other specific or emerging domains in financial capability and investigate their impacts on consumer financial satisfaction. Moreover, since this study aims to the situation in the USA, future studies may take consumers in other countries as a sample, comparing the differentials across different cultures and socio-economic contexts.

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