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How does financial literacy affect financial behavior over the life cycle? Evidence from Filipino households

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Abstract

How does financial literacy affect financial behavior over the life cycle? Evidence from Filipino households

Faith Christian Q. Cacnio and Marie Edelweiss G. Romarate[1/]

Our study looks at the effect of financial literacy on the short-term and long-term financial decisions and behaviors of individuals who are of different ages and life stages, i.e., 18 to 39 years old (Young adult); 40 to 59 years old (Middle-aged); and 60+ (Senior). Using the results from the 2018 Bangko Sentral ng Pilipinas Consumer Finance Survey, we constructed a financial literacy index based on two (2) components - financial attitude and financial aptitude. We then used ordinary least squares regression and logistic regression to determine the factors that affect financial literacy and to assess its impact on the financial behaviors of individuals. We find that, among the age groups, young adults display higher financial literacy than the middle-aged and senior cohorts. Moreover, income and education as well as having children and receiving domestic or foreign remittances are positively related to financial literacy. Regarding financial behavior, those with higher financial literacy, middle-aged and seniors are less likely to spend less than or equal to their income. Middle-aged persons are also less likely to have a loan-to-income ratio of less than one (1) while those with higher financial attitude scores are more likely to pay their loans on time. Individuals with higher financial aptitude and who are middle-aged and seniors tend to have retirement or pension plans. Additionally, they are more likely to have insurance and other plans.

JEL classification	:	G5, G50, G51, G52, G53, D14
Keywords	:	financial literacy, financial behavior, financial skills, financial knowledge, life cycle, savings, loans, cash management, insurance, retirement plans
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I. **Introduction**

Financial literacy has increasingly gained attention from both public and private entities – e.g., educators, policymakers, financial institutions, and community groups. A key motivating factor for this awareness is the perceived benefits of having a financially literate populace. Equipping individuals and households with the necessary knowledge, skills, and ability to make informed financial decisions is crucial in ensuring their financial resilience and well-being. These, in turn, would lead to higher overall welfare. At the macro level, financial literacy can contribute to a more efficient allocation of financial resources in the economy and to greater financial stability. Financial literacy is also considered an essential component of financial inclusion.

The thinking that financial literacy is beneficial for the financial health of individuals is based on the implicit assumption that financial knowledge leads to desirable changes in financial attitudes and behaviors. The literature that looked at this relationship generally observed a positive association between financial literacy and financial behavior. However, the significance of the effect varies across these studies. Various possible reasons have been cited for the differences, including the measurements used and target participants. Some studies have also pointed out that certain factors (e.g., education, age, experience) influence the financial behavior of individuals.

Age is potentially a key factor that could influence short-term financial behavior (i.e., spending, cash management, emergency saving, insurance) and long-term financial behavior of individuals (i.e., investment and retirement saving). This is expected given that individuals at different ages and stages of their lives would have different priorities, preferences, and perspectives. So, how does financial literacy affect the short-term and long-term financial decisions and behaviors of individuals who are of different ages and life stages?

Our study contributes to the existing literature by offering insights into the effect of financial literacy and age on the financial behavior of individuals in a developing country with a relatively lower level of financial literacy like the Philippines.[1] Previous studies often gave results from developed countries with higher financial literacy levels. Perspectives from a developing country could provide a richer and deeper understanding of financial literacy and financial behavior across different contexts. Moreover, other similarly situated countries like the Philippines could gain insights from our study to help them in the design and implementation of effective financial education programs and interventions.

Using the results from the 2018 Bangko Sentral ng Pilipinas (BSP) Consumer Finance Survey (CFS), we constructed a financial literacy index (FLI) based on two (2) components - financial attitude and financial aptitude. We then used ordinary least squares (OLS) regression to determine the factors that affect financial literacy. We also conducted logistic regressions to assess the effects of financial literacy on both the short-term and long-term financial behaviors of individuals who are at

[1] According to the 2014 Standard and Poor's Financial Literacy Survey, only 25 percent of Filipino adults are financially literate. The Philippines ranks at the bottom 30 percent of the countries surveyed in terms of financial literacy. In the 2021 Bangko Sentral ng Pilipinas (BSP) Financial Inclusion Survey, results show that only two (2) percent of Filipino adults correctly answered all the six (6) basic financial literacy questions. Majority (i.e., 69 percent) managed to correctly answer at least half of the financial literacy questions.

different ages and life stages – i.e., 18 to 39 years old (Young adult); 40 to 59 years old (Middle-aged); and 60+ (Senior).

We find that, among the age groups, young adults display higher financial literacy than the middle-aged and senior cohorts. Females tend to have slightly lower financial aptitude and overall financial literacy compared to males. Income and education are both positively related to financial literacy with the latter having a higher coefficient indicating that respondents with at least high school education have higher financial knowledge and skills. Moreover, households that have children and receive remittances or assistance from either foreign or domestic sources undertake more financial activities. Meanwhile, results of the logit regressions show that those with higher financial literacy may be less likely to spend less than or equal to their income. The same result is also observed for middle-aged and senior age individuals. Middle-aged persons are also less likely to have a loan-to-income ratio of less than one (1) compared to the young adult group. In terms of loan payment, individuals with higher financial attitude scores are more likely to pay on time. Individuals with higher financial aptitude and who are middle-aged and seniors tend to have retirement or pension plans. Additionally, they are more likely to have insurance and other plans.

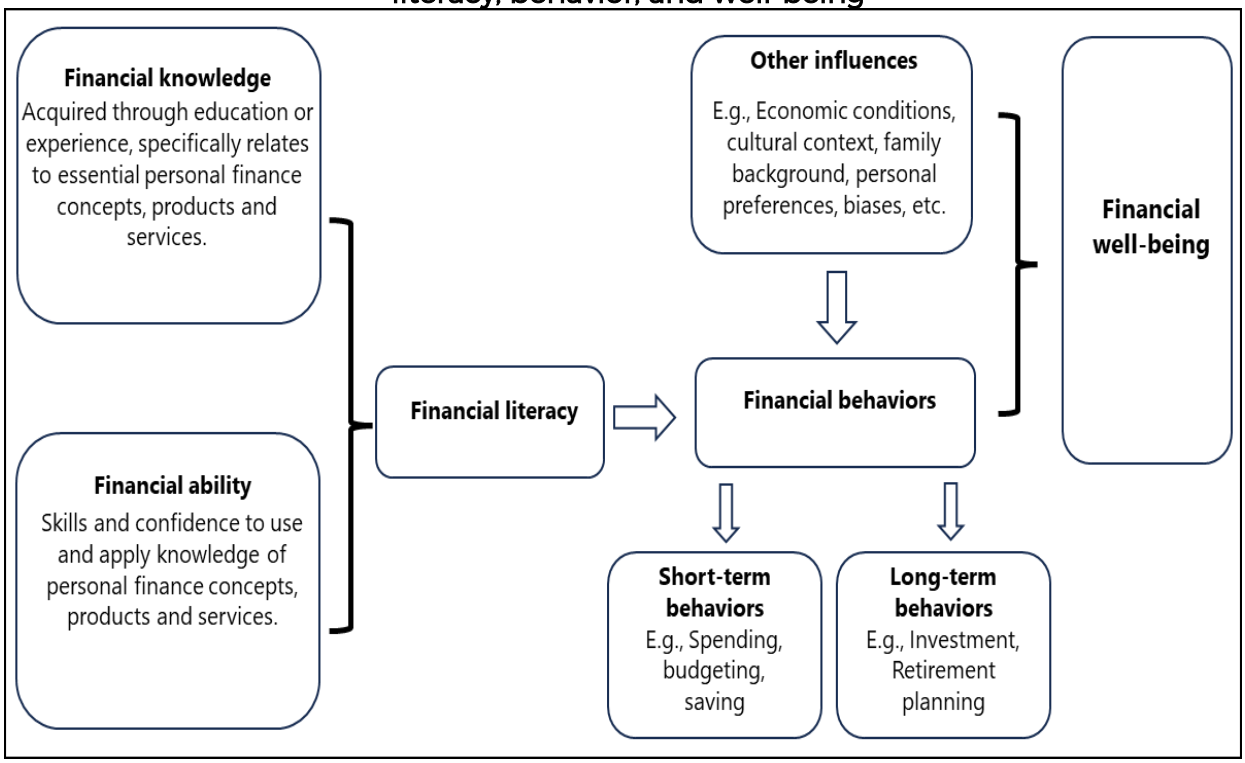
The study proceeds as follows. The next section provides a literature review. The third section discusses the data and methodology used. The fourth section presents the empirical results and analysis. The fifth section offers policy implications. The sixth section lists some of the limitations of the study. The last section concludes.

II. Literature Review

II. A. Financial Literacy and Financial Behavior

Financial literacy programs often focus on providing individuals with the knowledge to make sound financial decisions. However, financial literacy is not merely acquiring financial knowledge. It has the added dimension of application which implies that an individual must have the skills and confidence to use his or her financial knowledge to make financial decisions (Huston, 2010). Knowledge and skills are the basic aspects of financial literacy. Beyond these, financial literacy involves developing desirable financial attitudes and behavior. Attitude and behavior are the facets of financial literacy that gradually develop over time. Financial literacy is expected to result in financial well-being for individuals and households (Figure 1).

Figure 1: The linkages between financial knowledge, literacy, behavior, and well-being



Source: *Adapted from Huston (2010)*

Previous studies found that financial literacy is a good predictor and significant contributor to the financial behavior of individuals (Pham et al., 2023; Gibson et al., 2022; Lusardi and Mitchell, 2014; Hilgert and Hogart, 2003). Higher levels of financial literacy result in better financial decisions and increase the likelihood of engaging in asset-building and wealth accumulation activities (Asaad, 2015; Behrman et al., 2012). Those with higher levels of financial literacy have a higher propensity to participate in financial markets (Klapper et al., 2013), create portfolio assets or purchase equity (Aren and Zengin, 2016), and invest in the stock market (van Rooij et al., 2011). Financial literacy is also a key determinant of retirement planning (Clark et al., 2017; Lusardi and Mitchell 2011a, 2007a, 2007b). Hauff et al. (2020) find that financial literacy significantly affects different retirement activities, e.g., planning on an income stream after retirement, decisions on retirement savings and investments in a retirement portfolio. The most notable effect is on investment management, including the choice of financial instruments. These financial decisions help preserve or build wealth during retirement age for individuals (Lusardi and Mitchell, 2007a).

Chaulagain (2015) traced the impact of financial literacy on financial behavior with a transmission mechanism. He showed that financial literacy contributes to improved financial behavior which consequently contributes to financial well-being, other things remaining the same. Practicing positive financial behavior is important but so is making sound decisions when choosing and using financial services and products. Agarwal et al. (2009) and Calvet et al. (2007) find that financial literacy mitigates financial mistakes. Financial knowledge aids in better investment choices and financial decisions resulting in positive economic outcomes. Financial literacy has also been found to lead to lower financial stress

and anxiety and increased resilience to macroeconomic shocks (Klapper et al., 2013; Zhang and Chatterjee, 2023; Hasler et al., 2021).

Nonetheless, some studies found a weak link between financial literacy and financial behavior (Tisdell et al., 2013; Forte, 2012; Carpena et al., 2011; Mandell and Klein, 2009). They observed that financial literacy, attitude, and competencies do not necessarily lead to the expected behavior. The variations in the findings from studies that explore the link between financial literacy and financial behavior have been attributed to the differences in the measurement of financial literacy and the financial behaviors considered.

Kawamura et al. (2021) offer a counterintuitive finding to the relationship between financial literacy and financial behaviors and attitudes of households. Using 2018 Japanese survey data, the authors find that, while financial literacy plays a significant role in financial decision-making, its effect on actual behavior is opposite to what is commonly observed. People with high levels of financial literacy are inclined to take too many risks, overborrow, and hold naive financial attitudes. Though, financially literate people are better at retirement planning and are indifferent to gambling.

II.B. Financial Literacy and Behavior Over the Life Cycle

The conventional economic thinking about consumption and saving is that people seek to smoothen their consumption throughout their lifetimes (Modigliani and Brumberg, 1954; Friedman, 1957). They take on debt and run down assets during the early and latter part of their lives when their incomes are low and save during their earning years when income is high. People adapt their consumption patterns to their needs at different ages, independently of their incomes at each age (Deaton, 2005). This framework implies that people can design and formulate their consumption and saving plans, make informed decisions about investments, financial products, and services, evaluate economic conditions, and undertake retirement planning. However, very few people would possess such extensive financial knowledge and skill to make and implement such vital, and at times, complex plans. Thus, the need to acquire financial literacy and examine how it affects financial behavior over people's lifetimes.

Individuals and households make important financial decisions over their lives. Financial decisions made at any stage in life can have lifelong effects on the consumer and household (Henager and Cude, 2016). To better shape the financial behavior of individuals, financial literacy should start at a young age. It is said that as early as the age of seven years, several basic concepts that are broadly related to financial behavior will have developed in children (Whitebread and Bingham, 2013). Moreover, financial literacy in younger years leads to better decisions and higher quality of life in later years (James et al., 2012).

Age has been cited as one of the key determinants of financial literacy. Financial literacy is observed to be higher for certain age groups. Middle-aged individuals tend to have higher financial literacy levels relative to the young and elderly (Atkinson and Messy, 2012; Agarwal et al., 2009; Hilgert et al., 2003). Lusardi and Mitchell (2011a) find that those from the ages of 25 to 65 are more likely to correctly answer finance-related questions compared to those under 25 years old and over 65 years old. There is also higher use of financial instruments for those who are 25 to 34 years of age (de Bassa Scheresberg, 2013).

Moreover, age has been found to affect the financial behavior of people. Younger age groups engage more in short-term financial behaviors such as spending, budgeting, and saving and less in paying, borrowing, and investing which are skills that may yet be fully developed for this cohort (Shim et al., 2013). The focus toward more long-term behaviors, like retirement planning, occurs as individuals age and acquire more financial knowledge and experience. Also, younger people show positive financial behaviors when they have confidence and perceived financial capability while older adults rely more on their objective financial knowledge in making decisions (Henager and Cude, 2016).

Using a proprietary database, Agarwal et al. (2009) document a link between age and the quality of financial decision-making in debt markets. They find that middle-aged adults borrow at lower interest rates and pay less in fees than do either younger or older adults. The main explanation for these observations is that experience and acquired knowledge increase with age resulting in better financial decisions.

III. Data and Methodology

In this section, we describe our main data source, how we constructed our financial literacy index (FLI), and our methodology.

III. A. Data

We use the 2018 BSP CFS as our main source of data. The CFS is a nationwide triennial survey that covers the financial state of households. It asks questions on households' financial and nonfinancial assets (e.g., savings, investment, debts, real property, income, and expenditures). The 2018 CFS surveyed 14,860 households. However, for our purposes, we only considered households with at least PhP10,000 annual income and at least PhP1,000 annual expenditure. Thus, our final sample is comprised of 7,084 households.

Table 1 presents some statistics of the sample used. The average age of survey respondents in our sample is 45 years old. There is considerable variation in the age of respondents with the youngest at 18 years old and the oldest at 95 years old. By age group, most of the respondents (45 percent) are middle-aged (i.e., ages 40 to 59) while 39 percent are young adults (i.e., ages 18 to 39). The remaining 16 percent are seniors (i.e., ages 60 and above). The majority of the respondents are female (i.e., 64 percent) while the rest is comprised of males. In terms of marital status, only 7 percent of respondents are single with 93 percent being either married, widowed, divorced/separated/annulled, or with a partner. Around 8 out of every 10 households (i.e., 81 percent) have at least one child while 19 percent have no children. On average, households have 2 children. Only a small percentage of households indicated that they received remittances or assistance from abroad (i.e., 12 percent). Meanwhile, about 16 percent of households receive remittances or assistance from domestic sources. When considering if a household received any form of assistance from either abroad or domestic sources, the percentage increases to around 26 percent or, equivalently, 1 out of every 4 households.

Table 1. 2018 BSP Consumer Finance Survey: Some descriptive statistics

	No. of respondents	Percent to total respondents
Age group		

Young adult (ages 18 – 39)	2,755	38.9
Middle-aged (ages 40 – 59)	3,199	45.2
Senior (ages 60 and above)	1,130	16.0
Gender		
Male	2,524	35.6
Female	4,560	64.4
Marital status		
Single	519	7.3
All others (married, widowed, divorced/separate/annulled, with partner)	6,565	92.7
With child/children		
With child/children	5,733	80.9
Without child/children	1,351	19.1
*Receiving remittances/assistance**		
From abroad		
Recipient	837	11.9
Non-recipient	6,214	88.1
From domestic sources		
Recipient	1,134	16.1
Non-recipient	5,906	83.9
Any form of assistance		
Recipient	1,822	25.8
Non-recipient	5,252	74.2

**Note: Excluding respondents who did not answer questions on receiving remittances/assistance*
Source: 2018 BSP CFS

III.B. **Construction of the Financial Literacy Index**

Financial literacy is a latent variable. Thus, its definition could vary depending on what aspect is being considered (e.g., knowledge, financial skills, good financial behavior). Consequently, the methods used to measure financial literacy also diverge significantly depending on the different conceptual definitions adopted. Performance tests (e.g., multiple-choice questionnaires) and self-report methods have been used in several studies to measure financial literacy (Bongini et al., 2018). The performance tests assess the level of knowledge while self-reports evaluate perceived knowledge. Recent tests appraise both objective knowledge and perceived knowledge.

The measure for financial literacy could cover a wide scope of financial concepts, including borrowing, spending, budgeting, inflation, investments, interest rates, and retirement savings. Hence, the number of questions used to assess financial literacy levels could considerably differ, ranging from three (3) (Lusardi and Mitchell, 2008, 2011a, 2014) to 28 items (Yakoboski et al., 2022). A financial literacy index is often generated from these questionnaires by adding the scores of the respondents.

We follow the common approach of creating an index or score that captures the latent characteristics of financial literacy to generate a measure for it. To do this, we follow the methodology in Magante et al., (2023). In the said paper, the authors created two indices of financial literacy and used three datasets, including the 2018 CFS. The first financial literacy index that they created aggregates the components of financial attitude, financial behavior, and financial knowledge. Depending on the dataset used, two or three components would be included in the index. As the 2018 CFS does not include questions on financial knowledge, the index created from said survey had two components, financial attitude, and financial behavior.

For this paper, we construct a similar financial literacy index with two major components, financial attitude and financial aptitude, using data from the CFS. We created a financial aptitude component instead of financial behavior given that our main research objective is to assess the relationship between financial literacy and financial behavior over the life cycle of individuals. Each component has sub-components which are based on a set of questions. The financial attitude (*FA*) component has three sub-components with questions that pertain to:

1. Attitude towards money, spending, and planning for the future;
2. Risk attitude; and
3. Time discounting.

For the questions related to attitude towards money, spending, and planning, more positive attitudes are given a score of one (1) while more negative attitudes are given a score of zero (0). On the risk attitude, a score from 0 to 1 is given with 1 indicating higher risk appetite. For the time discounting question, a score from 0 to 1 is given with 1 indicating higher time discounting, that is, choosing the present or immediate time. Each question is weighted equally under each sub-component depending on the number of questions. For example, the first sub-component on attitude has nine (9) questions and each question has a weight of 1/9. The other two sub-components have only one question each, with a weight of 1. We then apply equal weights of 1/3 to the three sub-components to obtain the *FA* component of the index.

Meanwhile, the financial aptitude (*FAp*) component has three (3) sub-components: 1) loan score; 2) deposit score; and 3) surplus score. The loan score is based on whether households have outstanding loans across four (4) loan categories - real property, vehicle, credit card, and other loans. Similarly, the deposit score is based on whether households have accounts across four (4) types of financial accounts. These are savings, current, time deposit, and e-money or other virtual money. The surplus score is based on answers to a question where respondents indicate where they will spend surplus money across ten activities. Again, questions under each sub-component have equal weights depending on the number of questions. For example, the loan score sub-component has four (4) questions, and each question has a weight of ¼. Similar to the *FA* component, we apply equal weights of 1/3 to the three sub-components to obtain the *FAp* component of the index.

The financial attitude and financial aptitude components are given equal weights of ½, and the financial literacy index is the sum of all the products of the weights and sub-component scores. The index is summarized in the following equation adapted from Magante et al. (2023):

$$FLI_i = \frac{1}{2}\sum_{j}^{n} x_{ij}\gamma_{j1} \quad + \frac{1}{2}\sum_{j}^{n} x_{ij}\gamma_{j2} \quad \in \quad [0,1]$$

where FLI_i is the financial literacy index per respondent i and x_{ij} is the score per sub-component j. $\gamma_{j1} = 1/n$ and $\gamma_2 = 1/n$ are the weights assigned for each sub-component and n is the number of sub-components under a major component (*FA* and *FAp*). Details on the components, sub-components, and weights used for the index can be found in Appendix 1.

Table 2 summarizes the scores for FLI and its sub-components. For FLI, the financial aptitude component is lower relative to the financial attitude part. This could be attributed to the composition of the two components. Responses for the financial attitude items are more complete compared to those for financial aptitude. Given that the two components are equally weighted, the lower score of financial aptitude pulls down the overall FLI. Financial attitude varies more and has a wider range than financial aptitude. This implies that the individuals' attitudes towards money, spending, risk as well as time discounting show more divergence than their earning, saving, investing, and borrowing activities.

Table 2. Summary of Financial Literacy (FLI) scores

Scores/indices	Mean	Std. Dev.	Min	Max
Financial Literacy (FLI)	0.386	0.076	0.037	0.742
Financial attitude	0.673	0.129	0.074	1
Attitude towards money, spending, and planning for the future	0.472	0.171	0	1
Risk attitude	0.753	0.265	0	1
Time discounting	0.795	0.253	0	1
Financial aptitude	0.099	0.075	0	0.617
Loan score	0.115	0.164	0	1
Deposit score	0.019	0.069	0	0.5
Surplus money score	0.163	0.126	0	1
Total no. of obs.	7,084			

Source: Authors' computation

We looked at the FLI scores for different demographic and economic factors and categories (Table 3). Across the three age categories considered, young adults registered the highest mean FLI score followed by the middle-aged group and the 60 years old and above bracket. This observation could be attributed to the higher financial attitude score of young adults relative to the other two age groups.

Respondents who are either married, divorced, separated, or annulled have higher financial literacy scores than those who are single. Moreover, households with children registered higher average FLI scores than households that do not have children. People who are non-single could be more conscious of their financial obligations, budgets, consumption, and spending choices than single persons. Also, the financial literacy of their spouses or partners could influence their financial decisions. Having children could increase households' propensity to save for future expenses like college education. They may also want to invest in inter-generational transfers.

Households that received remittances or assistance from abroad have, on average, higher financial literacy than those who do not receive remittances from abroad. Remittance-receiving households may be more exposed to financial services and products given that they regularly transact with remittance channels, including banks. By contrast, households that receive remittances from domestic sources have lower financial literacy scores than those that do not receive such transfers. It may be that these households receive remittances through different channels that have limited financial services (e.g., pawnshops and money transfer operators).

Table 3. Financial Literacy Index, by categories

Categories/indices	Mean	Std. Dev.	Min	Max

Age Category				
Young adult				
Financial Literacy (FLI)	0.392	0.076	0.091	0.742
Financial attitude	0.684	0.127	0.148	1
Financial aptitude	0.1	0.076	0	0.617
Middle-aged				
Financial Literacy (FLI)	0.387	0.076	0.037	0.656
Financial attitude	0.671	0.129	0.074	1
Financial aptitude	0.102	0.076	0	0.5
Senior				
Financial Literacy (FLI)	0.37	0.076	0.056	0.623
Financial attitude	0.652	0.131	0.111	0.963
Financial aptitude	0.088	0.067	0	0.4
Marital Status				
Single				
Financial Literacy (FLI)	0.384	0.079	0.091	0.648
Financial attitude	0.674	0.135	0.148	1
Financial aptitude	0.095	0.078	0	0.5
All others (Not single)				
Financial Literacy (FLI)	0.386	0.076	0.037	0.742
Financial attitude	0.673	0.128	0.074	1
Financial aptitude	0.1	0.075	0	0.617
Sex				
Male				
Financial Literacy (FLI)	0.387	0.079	0.037	0.742
Financial attitude	0.674	0.132	0.074	1
Financial aptitude	0.099	0.076	0	0.5
Female				
Financial Literacy (FLI)	0.386	0.075	0.072	0.656
Financial attitude	0.673	0.127	0.111	1
Financial aptitude	0.099	0.074	0	0.617
Children				
No children				
Financial Literacy (FLI)	0.376	0.077	0.056	0.648
Financial attitude	0.665	0.135	0.111	1
Financial aptitude	0.088	0.071	0	0.567
With children				
Financial Literacy (FLI)	0.389	0.076	0.037	0.742
Financial attitude	0.675	0.127	0.074	1
Financial aptitude	0.102	0.076	0	0.617
Remittances/assistance				
None from Abroad				
Financial Literacy (FLI)	0.386	0.076	0.037	0.742
Financial attitude	0.673	0.128	0.074	1
Financial aptitude	0.099	0.075	0	0.617
Received from Abroad				
Financial Literacy (FLI)	0.39	0.078	0.072	0.628
Financial attitude	0.677	0.135	0.111	1
Financial aptitude	0.102	0.076	0	0.5
None from domestic				
Financial Literacy (FLI)	0.386	0.076	0.056	0.742
Financial attitude	0.675	0.129	0.111	1
Financial aptitude	0.098	0.075	0	0.617
Received from domestic				
Financial Literacy (FLI)	0.385	0.077	0.037	0.656
Financial attitude	0.665	0.129	0.074	1
Financial aptitude	0.105	0.075	0	0.45
None from any source				

Financial Literacy (FLI)	0.386	0.076	0.056	0.742
Financial attitude	0.674	0.128	0.111	1
Financial aptitude	0.098	0.075	0	0.617
Received from any source				
Financial Literacy (FLI)	0.387	0.078	0.037	0.656
Financial attitude	0.67	0.132	0.074	1
Financial aptitude	0.103	0.075	0	0.5

Source: Authors' computation

III.C. **Methodology**

The commonly used regression methods in the literature on this topic are 1) ordinary least squares (OLS) and (2) logistic regression. Van Rooij et al. (2012), Hermansson and Jonsson (2021), and Kawamura et al. (2021) use OLS to study how financial literacy is related to net worth, risk tolerance, and financial behavior. Meanwhile, Asaad (2015), Henager and Cude (2016), and Hastings and Mitchell (2020) used logit regression to examine the role of financial literacy on various kinds of financial behaviors.

We first conduct OLS regressions to look at the determinants of financial literacy with household characteristics as the independent variables (Table 4). We then use the two components of the financial literacy index as independent variables in logit regression to examine how these are related to specific financial behaviors as our dependent variable.

Table 4. Regression variables

Dependent variables	
Variable	Description
OLS regression only	
Financial Attitude	Component of FLI measuring financial attitude
Financial Aptitude	Component of FLI measuring financial aptitude
Logit regression	
Spending less than or equal to income	1 if expenditure is less than or equal to income 0 if expenditure is more than income
Paying loans on time	1 if they pay loans ahead or on schedule 0 if they pay loans behind schedule
Loan to income ratio	1 if the ratio of the amount of outstanding loans to income is equal to or less than 1 0 if the ratio of the amount of outstanding loans to income is equal to or less than 1
Having insurance or other plans	1 = has at least one insurance or other plans (government or private) 0 = does not have any insurance or other plan
Having a pension or retirement plan	1 = has at least one pension or retirement plan (government or private) 0 = does not have any pension or retirement plan
Independent variables	
Variable	Description
Logit regression only	
Financial Attitude	Component of FLI measuring financial attitude
Financial Aptitude	Component of FLI measuring financial aptitude
OLS and logit regression	
Age group: Young adult (18-39) Middle-aged (40-59)	Age group of the respondent *Young adult group is the reference category

Senior (60 and above)	
Gender	1 if the respondent is female 0 if the respondent is male
Education	1 if the respondent's highest educational attainment is at least some high school education 0 if the respondent's highest educational attainment is below high school education
Children	1 if the household has at least one child 0 if the household has no children
Remittances	1 if the household received remittances/assistance from either foreign or domestic sources 0 if the household did not receive remittances/assistance

IV. **Regressions Results and Analysis**

We generated results using OLS regression and logit regression.

IV.A OLS regression

We regressed the independent variables on the two components of the financial literacy index, financial attitude and financial aptitude. Middle-aged and senior are significant and negative which implies that respondents in these age cohorts have slightly lower financial literacy levels than young adults (Table 5). Gender, which takes a value of 1 if the respondent is female, is significant and negative. This signifies that females have a slightly lower financial aptitude and overall financial literacy compared to males. Income is significant and positive (although the coefficient is small) indicating that those with higher incomes have slightly higher financial literacy levels. Education is positive and significant indicating that respondents with at least high school education have higher financial knowledge and skills. Households that have children and receive remittances or assistance from either foreign or domestic sources appear to engage more in financial activities.

Table 5: Determinants of financial literacy

Dependent variable:	Financial Literacy Index	Financial Attitude	Financial Aptitude
Age group: (reference group: Young adult (18-39))			
Middle-aged (40-59)	-0.004**	-0.013***	0.004**
	(0.002)	(0.003)	(0.002)
Senior (60 and above)	-0.018***	-0.030***	-0.005*
	(0.003)	(0.005)	(0.003)
Gender (1 = Female)	-0.005**	-0.004	-0.006***
	(0.002)	(0.003)	(0.002)
Marital status (1 = not single)	0.000	0.002	-0.001
	(0.004)	(0.007)	(0.004)
Income	0.002***	0.001*	0.003***
	(0.001)	(0.001)	(0.001)
Education (1 = at least high school)	0.015***	0.006*	0.024***

	(0.002)	(0.003)	(0.002)
Children (1 = has children)	0.009***	0.006	0.012***
	(0.003)	(0.005)	(0.002)
Remittances (1 = receives remittances/assistance)	0.004**	-0.000	0.009***
	(0.002)	(0.004)	(0.002)
Constant	0.374***	0.675***	0.073***
	(0.004)	(0.007)	(0.004)
Observations	7,074	7,074	7,074
R-squared	0.027	0.009	0.044

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

IV.B Logit regression

We use logit regressions to assess the effect of financial literacy on specific short-term and long-term financial behaviors. The financial behaviors that we considered include budgeting (i.e., spending less than or equal to income), cash-flow management (i.e., ability to pay loans/debts on time), borrowing (loan to income ratio), retirement planning, and insurance (i.e., protection against possible shocks). Table 6 shows the results of the logit regressions for five (5) different financial behaviors coded as binary variables.

Table 6: Logistic regression models for financial behavior

Dependent variable	Spending less than or equal to income	Paying loans on time	Loan to income ratio	Pension, retirement	Insurance, other plans
Financial Attitude	0.435***	4.011**	3.766	1.486	1.055
	(0.112)	(2.517)	(5.803)	(0.608)	(0.238)
Financial Aptitude	0.051***	0.834	0.102	85.478***	46.808***
	(0.025)	(0.934)	(0.257)	(50.824)	(19.923)
Middle-aged (40-59)	0.610***	1.094	0.280**	1.281**	0.972
	(0.045)	(0.190)	(0.161)	(0.148)	(0.061)
Senior (60 and above)	0.667***	1.353	0.372	3.663***	2.113***
	(0.071)	(0.408)	(0.301)	(0.624)	(0.214)
Gender (1 = Female)	1.101	0.819	1.766	1.031	0.914
	(0.079)	(0.144)	(0.783)	(0.115)	(0.057)
Marital status	1.677***	1.124	2.438	0.224***	1.475***
(1 = not single)	(0.238)	(0.446)	(1.793)	(0.059)	(0.178)
Income	5.880***	0.992	36.009***	1.076***	1.028
	(0.300)	(0.027)	(41.207)	(0.021)	(0.018)
Education	0.757***	1.272	0.310**	3.629***	1.452***
(1 = at least high school)	(0.054)	(0.223)	(0.176)	(0.514)	(0.091)
Children	0.509***	0.857	1.642	0.964	1.400***
(1 = has children)	(0.046)	(0.234)	(0.911)	(0.154)	(0.113)
Remittances (1 = receives	0.839**	1.097	1.629	1.109	1.272***
remittances/assistance)	(0.067)	(0.205)	(0.915)	(0.130)	(0.088)
Constant	0.264***	3.317*	10.874	0.065***	0.693*
	(0.059)	(2.052)	(16.436)	(0.028)	(0.139)
Observations	7,074	1,743	1,738	3,992	6,552

Note: Odds ratio
seEform in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Budgeting (spending vs income)

The dependent variable is 1 when the household's annual expenditure is less than or equal to their annual income and 0 when they spend more than their annual income. Financial attitude and financial aptitude are both statistically significant and have odds ratios less than 1 signifying that those with higher financial literacy may be less likely to spend less than or equal to their income. This could be due to higher consumption levels. Dinkova and Alessie (2021) found a positive association between financial literacy and non-durable consumption. Middle-aged persons and senior people seem less likely to spend less than or equal to their income compared to the young adult group. It is possible that the older age groups have larger expenses, such as food, education of children, medicines, and other consumption needs of the household. Marital status and income have significant odds ratios that are greater than one indicating that non-singles and those with higher incomes are more likely to spend within their income. For the non-singles, they may have better budgeting skills as they need to consider the expenses of their spouse/partner and family. Similarly, higher-income individuals are more likely to have bigger spending budgets and be able to cover their expenses. Those with at least high school education, with children, and who receive remittances are more likely to spend more than their income as the odds ratios are less than one. Higher-educated individuals could earn more and have higher consumption and, in turn, spend more than their income. Respondents who receive remittances or other assistance may be more likely to spend more than their budget given the transfers that augment their income.

Cash-flow Management (paying loans on time)

For the dependent variable, 1 indicates that they generally pay their loans on schedule or ahead of time, while 0 signifies that they generally pay behind schedule. The sample used for these regressions is limited to those respondents who answered questions on the timeliness of their loan payments. Financial attitude has a significant odds ratio that is greater than one, implying that those with higher financial attitude scores are more likely to pay their loans on time. The other independent variables did not appear to be significant. This may be due to a much smaller sample size due to data availability. In the sample used, the majority of those who answered the questions expressed that they generally pay their loans on schedule or ahead of time.

Borrowing (loan-to-income ratio)

The dependent variable takes a value of 1 if the ratio of the amount of outstanding loans to the income of the household is less than or equal to 1, and 0 when the ratio is more than 1. The amount of outstanding loans and annual income have both been divided by 12 (months). If the loan-to-income ratio is greater than 1, this means that a household will need more than its monthly income to pay off its outstanding loans and debts every month. The sample used covers those respondents who reported their outstanding loan amounts. The middle-aged group is significant with an odds ratio of less than one. This indicates those in the middle-aged group are less likely to have a loan-to-income ratio of less than 1 compared to the young adult group. Income is also significant and with an odds ratio of greater

than 1, implying that those with higher income levels are more likely to have a loan-to-income ratio of less than 1. In the life cycle, it is during the middle age that many people take out loans for big-ticket items like a house or real property. Thus, they may have a higher loan-to-income ratio compared to the young adult cohort. Those with higher incomes are also able to avail of higher loanable amounts given their perceived ability to repay.

Retirement Planning and Saving

Using whether a household has a pension or retirement plan (i.e., government pension contributions or private pension plans) as the dependent variable, financial aptitude is found to be significant and with an odds ratio greater than one. This indicates that those with higher financial aptitude scores are more likely to have a retirement or pension plan. Middle-aged and senior-aged individuals are also more likely to have retirement or pension plans. Marital status is significant with an odds ratio of less than one implying that non-singles are less likely to have a retirement or pension plan compared to those who are single. Income and education both have a significant odds ratio that is greater than one which suggests that those with higher income and at least a high school education tend to have pension or retirement plans.

Insurance (protection against possible shocks)

For insurance or other plans (i.e., government or private plans), financial aptitude appears to be significant and greater than one denoting that those with higher financial aptitude are more likely to have insurance or similar plans. Those in the senior age group also tend to have insurance. In addition, households, where the respondent has at least a high school education, those with children, and those who receive remittances or assistance, are more likely to be insured. The variable indicating that the respondent for the household is female has an odds ratio of less than one signifying that they are less likely to have insurance or similar plans.

Savings and cash for emergencies

We recognize that some survey respondents may have set aside savings for retirement or cash for emergencies. These could be included in the recorded savings of the households. Thus, we also looked at the amount of savings that respondents have in their deposit accounts and held as cash for emergencies. Households' savings and holdings of cash for emergencies together with retirement and pension plans and insurance could give a broad picture of their financial protection.

Among the respondents in the sample, only 686 indicated that they have any type of deposit account with banks and/or non-bank institutions [2]. Meanwhile, 2,290 indicated that they have emergency cash. When asked about the details, only 66 percent of these respondents provided information on the amount in their deposit accounts and 79 percent on the amount of emergency cash they hold. We combined the amount of savings in deposit accounts and emergency cash and disaggregated this by age category. Most of those who provided information on the

[2] Based on the responses of the respondent and the spouse/partner.

amounts are in the middle-aged group (774 respondents) followed by the young adult group (759 respondents) and the senior group (270 respondents) (Table 7).

We observed that in terms of the average amount of savings, the senior age group has the highest average amount of savings, followed by the middle-aged and young adult groups. The savings of the senior age cohort could include the lump-sum payment that they received when they retired, retirement benefits, and savings made over the years. We note that the amount of savings may not be accurately reported by the respondents, thus, the figures may be underestimated. Moreover, the number of respondents who provided information on the amount of their savings in the senior group is considerably smaller than the other two age groups.

Table 7: Total household savings

Total amount of savings (deposit + cash)	Total no. of respondents	Average amount of savings (PhP)
All respondents	1,803	17,982
By age group		
Young adult (18 – 39)	759	13,402
Middle-aged (40-59)	774	15,935
Senior (60 and above)	270	36,722

Source: BSP 2018 CFS

IV.C Alternative methodology

Some of the studies that assessed the link between financial literacy and financial behavior used probit regressions (e.g., Yoshino et al., 2017; Lyons et al., 2019) for their empirical analysis. Thus, we also run probit regressions as an alternative empirical methodology to the logit regressions.

We present the results from the probit regressions based on average marginal effects in Appendix 2. The results are broadly similar to the logit regressions. On spending versus income, marital status has a positive marginal effect while the age groups middle-aged and senior and having children have negative effects on the probability of spending within their income. Financial attitude has a positive effect on the probability of paying loans on time while other independent variables are not significant. Being in the middle-aged group and having education negatively affect the loan-to-income ratio's probability of being less than or equal to 1, while income has a positive effect. On the probability of having pension or retirement plans, financial aptitude, middle-aged, senior, income, and education have positive effects while marital status has a negative effect. Finally, on the probability of having insurance and other plans, financial aptitude, senior, marital status, education, children, and remittances have positive effects.

V. Policy Implications

Designing financial programs and interventions that aim at increasing financial literacy is important for developing and reinforcing positive financial behaviors. In the Philippines, significant strides have been made towards increasing and improving financial education. For example, in 2021, the Department of Education (DepEd) institutionalized and intensified the integration of financial education in the K to 12 Basic Education Curriculum.[3] The policy targets to enhance the financial

[3] Department of Education (DepEd) Order No. 22, s 2021.

literacy and financial capability of students, teachers, and DepEd personnel to make sound financial decisions that result in financial health and financial inclusion. Students and teachers have not only been the recipients of financial education programs. Various financial education modules have also been developed for the different sectors of society. However, the effectiveness of these programs is yet to be assessed and quantified.

Our findings offer some possible enhancements for these financial education programs. We found that age and the life cycle matter in people's financial behavior. Depending on the life stage they are in, people tend to exhibit more short-term or long-term behaviors. Lusardi et al. (2015) find that short-term financial education programs are not likely to significantly alter savings behavior, particularly if offered to young people. These are more effective when they are given during the peak saving years (i.e., post-40 years old). The same study observed that financial education programs become more effective if they provide follow-up to sustain the knowledge acquired by participants in the program. According to the study, financial education provided to employees around the age of 40 can increase retirement savings by around 10 percent if the knowledge gained can be maintained. Thus, financial education programs must ensure that the knowledge will be retained by their target group.

We observe that many Filipino adults engage in savings, borrowing, and investment activities, but only a small number have pension plans and savings. These are also mostly the mandatory retirement plans for public and private sector employees. Given that the Philippines' demographic is shifting toward an aging population (Cacnio and Lomibao, 2024), there is a need to increase and intensify financial education programs emphasizing retirement planning and saving. These programs could help Filipino adults remain financially resilient even in their retirement years.

The priorities, preferences, economic, and financial status of individuals change over time, and these factors could impact their financial decisions. Such changes in financial behaviors across age groups should be considered in the design of financial education programs.

VI. Some Limitations and Considerations

While we observed some interesting insights on the link between financial literacy and behavior, we would like to note some limitations and caveats of our study. We also discuss some challenges that must be considered when doing research in this area. We highlight four of these issues.

First, measuring financial literacy can be challenging. There have been different metrics proposed to measure objective and subjective financial literacy. However, no matter how encompassing these measures may be, they may still not fully capture an individual's true level of financial awareness and understanding. Moreover, their level of financial literacy may not correspond to their observed behavior. This may be due to other factors (e.g., personal circumstances, cognitive biases, preferences, family and peer influence) that are difficult to quantify. Future research may consider surveys that include questions that could identify such factors.

Second, our main source of data is the 2018 BSP CFS. The focus of the survey is on the financial status and conditions of Filipino households. While it provided us

with enough information for our research objectives, it lacks details on some aspects of financial literacy and behavior (e.g., numeracy indicators) and financial knowledge. Thus, there may be a need to have a survey that focuses on obtaining such indicators or measuring financial knowledge.

Third, implicit in our analysis is the assumption of a causal relationship that runs from financial literacy to financial behavior – that is, financial literacy affects financial behavior. Nonetheless, the causality may run in reverse with financial behavior affecting financial literacy. For example, people experiencing an increase in their income streams may want to learn more about savings and investment products. Thus, they are, in effect, acquiring financial knowledge and literacy. There may be a mutually reinforcing relationship between financial literacy and behavior, where as individuals practice specific financial behavior, they increase their financial literacy and further engage in other financial behavior This is an issue that could be further explored in future research.

Fourth, we recognize potential endogeneity problems given our main variables of interest (i.e., financial literacy and financial behavior). We tried to address these in the construction of our indices and by using control variables.

Recognizing these limitations and constraints allows us to have a fuller and more pragmatic understanding of our findings. Moreover, these points us towards potential future research work. Addressing these issues and undertaking further research can lead to a better understanding of the contribution of financial literacy in shaping short- and long-term financial behaviors over the life cycle of individuals.

VII. Conclusion

Using the 2018 BSP CFS, our study examines the effects of financial literacy on the financial behaviors of Filipinos who are at different life stages – i.e., 18 to 39 years old (Young adult); 40 to 59 years old (Middle-aged); and 60+ (Senior). We constructed a financial literacy index for our analysis with two (2) components - financial attitude and financial aptitude. Looking at the FLI scores for different demographic and economic factors and categories, we find that among the age cohorts, the young adult group recorded the highest financial literacy. Those who are either married, divorced, separated, or annulled also have higher financial literacy scores than single persons. Also, households that received remittances or assistance from abroad and those with children registered higher average financial literacy scores.

We use logit regressions to assess the effect of financial literacy and age on specific financial behaviors such as budgeting (i.e., spending less than or equal to income), cash-flow management (i.e., ability to pay loans/debts on time), borrowing (loan-to-income ratio), insurance and retirement plans. We find that people with higher financial attitude scores are more likely to pay their loans on time. The middle-aged group is less likely to have a loan-to-income ratio of less than 1 compared to the young adult group. Moreover, those with higher financial aptitude scores are more likely to have a retirement or pension plan and insurance. Relative to age groups, middle-aged and senior age individuals are more likely to have retirement or pension plans and insurance. However, we observe that people with higher financial literacy are less likely to spend less than or equal to their income.

Middle-aged individuals and senior age persons likewise appear to be less likely to spend within their income compared to young adults.

Based on our findings, we offer some possible enhancements for financial education programs. We also note the low importance given to retirement planning and saving. Financial programs and interventions could help address this issue by designing and implementing modules that focus on the value of planning for retirement.

The priorities, preferences, economic and financial status of individuals could change as they age and go through the life cycle. Consequently, these changes could have an impact on people's financial decisions and financial behavior. Thus, such factors should be considered in the design of financial education programs to make them more effective and responsive to the needs of their target participants and learners.

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Appendix

Appendix 1: Construction of the financial literacy index

The financial literacy index (FLI) is composed of the following items and their corresponding weights:

	Components		Computation of weight				Weight
1.	**Financial Attitude**		**(1/2)**			**=**	**0.5**
	1.1 Attitude towards money, spending, and planning for the future		(1/2)*	(1/3)		=	0.167
		9 items	(1/2)*	(1/3)*	(1/9)	=	0.019
	1.2 Risk attitude	1 item	(1/2)*	(1/3)		=	0.167
	1.3 Time discounting	1 item	(1/2)*	(1/3)		=	0.167
2.	**Financial Aptitude**		**(1/2)**			**=**	**0.5**
	2.1 Loan score		(1/2)*	(1/3)		=	0.167
		4 items	(1/2)*	(1/3)*	(1/4)	=	0.042
	2.2 Deposit score		(1/2)*	(1/3)		=	0.167
		4 items	(1/2)*	(1/3)*	(1/4)	=	0.042
	2.3 Surplus score		(1/2)*	(1/3)		=	0.167
		10 items	(1/2)*	(1/3)*	(1/10)	=	0.017

Items under the loan score, deposit score, surplus score, and attitude towards money, spending, and planning for the future have a score of 0 or 1, while items under risk attitude and time discounting have scores from 0 to 1. Financial attitude and financial aptitude are the two major components and are equally weighted at 0.5. Under financial attitude, there are three sub-components which are equally weighted at 1/3, and under financial aptitude, there are also three sub-components weighted equally. The numbers in the column "weight" refer to the overall weight relative to the entire index (including the weight of the larger component or sub-component it falls under). For example, the overall weight of an item under loan score is 1/24 or 0.042, which includes the weights of the loan score sub-component (1/3) and financial aptitude component (1/2).

Under each sub-component, the items are weighted equally depending on the number per sub-component (e.g., items under the surplus score sub-component are weighted at 1/10 each). The sub-component score is computed as the sum of the products of each item score multiplied by the corresponding weights. The financial literacy index of an individual is the sum of all the products of the weights and sub-component scores. The equation below adapted from Magante et al. (2023) summarizes the computation of the FLI per respondent i with two major components of financial attitude and aptitude:

$$FLI_i = \frac{1}{2}\sum_{j}^{n} x_{ij}\gamma_{j1} \quad + \quad \frac{1}{2}\sum_{j}^{n} x_{ij}\gamma_{j2} \quad \in \quad [0,1]$$

where x_{ij} is the allocated score per sub-component j. $\gamma_{j1} = 1/n$ and $\gamma_2 = 1/n$ are the weights assigned for each sub-component and n is the number of sub-components under a major component. An individual is considered more financially literate as the index approaches 1 and less financially literate as it approaches 0.

Appendix 2: Probit regression models for financial behavior (average marginal effects)

Dependent variable	Spending less than or equal to income	Paying loans on time	Loan to income ratio	Pension, retirement	Insurance, other plans
Financial attitude	-0.024	0.127*	0.017	0.040	0.012
	(0.041)	(0.057)	(0.021)	(0.038)	(0.042)
Financial aptitude	0.096	-0.016	-0.035	0.432***	0.698***
	(0.071)	(0.101)	(0.035)	(0.057)	(0.075)
Middle-aged (40-59)	-0.071***	0.008	-0.013*	0.023*	-0.006
	(0.012)	(0.016)	(0.006)	(0.010)	(0.012)
Senior (60 and above)	-0.061***	0.025	-0.010	0.159***	0.122***
	(0.017)	(0.024)	(0.010)	(0.024)	(0.015)
Gender	0.000	-0.018	0.010	0.002	-0.016
(1 = Female)	(0.011)	(0.015)	(0.007)	(0.010)	(0.011)
Marital status	0.074***	0.012	0.018	-0.226***	0.080**
(1 = not single)	(0.019)	(0.038)	(0.019)	(0.052)	(0.026)
Income	-	-0.001	0.043**	0.007***	0.004
		(0.003)	(0.015)	(0.002)	(0.003)
Education	0.017	0.023	-0.012*	0.102***	0.071***
(1 = at least high school)	(0.011)	(0.017)	(0.005)	(0.009)	(0.012)
Children	-0.071***	-0.014	0.008	-0.000	0.064***
(1 = has children)	(0.016)	(0.022)	(0.010)	(0.015)	(0.016)
Remittances	-0.020	0.008	0.006	0.009	0.043***
(1 = receives remittances/ assistance)	(0.012)	(0.016)	(0.006)	(0.011)	(0.012)
Observations	7074	1743	1738	3992	6552

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1