The Role of Financial Literacy in Retirement Planning and Wealth Accumulation Among Self-employed Thai Workers

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Abstract

This paper explores the effect of financial literacy on retirement planning and wealth accumulation among self-employed Thai workers. Self-employment is expected to show a significantly increasing trend soon, raising concerns about saving for retirement due to a lack of social security and pension provision. Therefore, planning and saving for retirement becomes the responsibility of the self-employed themselves to maintain their well-being in retirement. Financial literacy has been found to improve such financial decisions and wealth accumulation. This paper adopts the financial literacy criteria of the Organisation for Economic Co-operation and Development with a dataset provided by the National Statistical Office. This study employed Ordinary Least Squares and Probit regression. Financial literacy analysis results show that the three components of financial literacy are influential factors in enhancing the probability of planning for retirement among self-employed workers. Moreover, although financial knowledge and financial behavior are also reported to have a positive impact on increasing net worth across all levels of employment status, financial attitude is insignificant. Finally, this study suggests that policymakers should formulate various financial education programs and financial seminars to comply with the needs of people with different characteristics and living conditions.

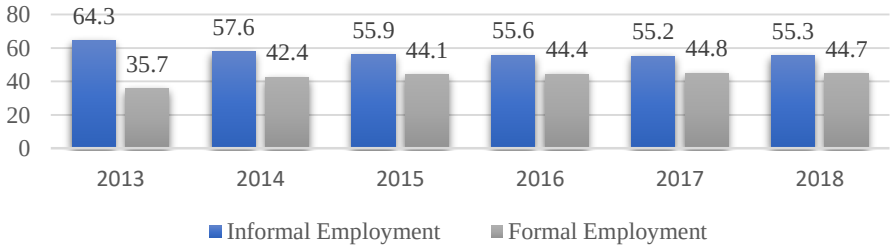
Keywords

Financial literacy; retirement planning; self-employed worker; wealth accumulation

Introduction

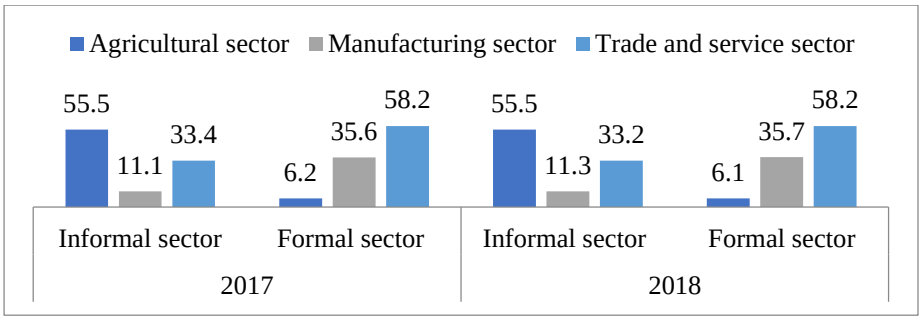
In many developing countries, the labor force is concentrated in the informal sector and is considered a major economic driver. Thailand also has a high informal labor force, which has been contributing to the economy for many decades (Figure 1). Most informal labor is found in the agricultural, manufacturing, and trade and services sectors, respectively (Figure 2). A high proportion of individuals in this employment status category work for themselves or contribute to the family business (Figure 3). Both groups are categorized as self-employed workers and are referred to by the International Labour Organization (ILO) as vulnerable employment.

Figure 1: Percentage of Formal and Informal Employment from 2013–2018



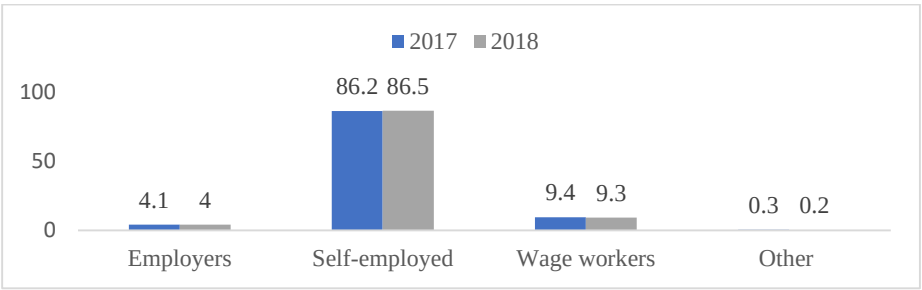
Note: National Statistical Office of Thailand, 2013–2018

Figure 2: Comparison of Formal and Informal Employment by Industry Sector



Note: National Statistical Office of Thailand, 2017 and 2018

Figure 3: Share of Informal Labor by Employment Status



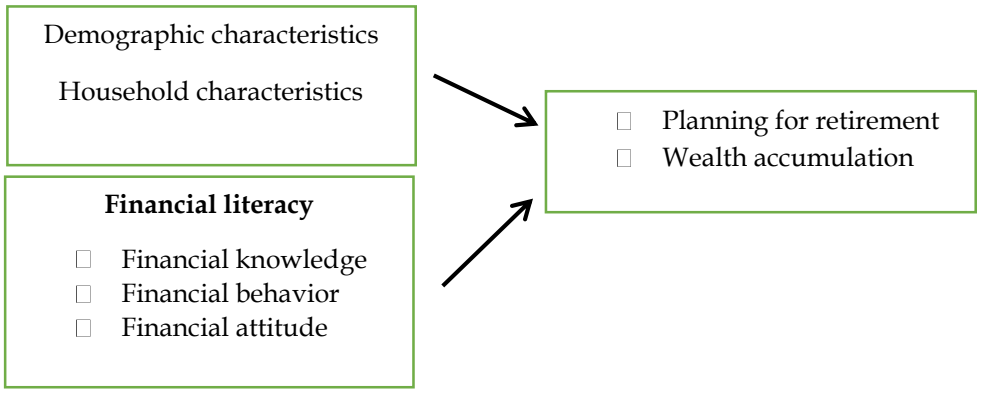
Note: National Statistical Office of Thailand, 2017 and 2018

According to a study by Arayavechkit et al. (2015), private employees tend to change their job status from wage workers to self-employed. They also predict that by 2035, more than 60 percent of wage workers aged 50–60 will become self-employed. This group of transitional workers tends to earn less income due to lower productivity, creating a slowdown in economic growth and income per capita. However, the findings of Arayavechkit et al. (2015) imply that a growing number of self-employed workers may experience financial inadequacy during old age due to their potential inability to save because of low productivity and unpredictable incomes. Moreover, such heterogeneous skills among self-employed workers are also related to income level and net worth, which affect the level of subsistence in old age. Self-employed workers tend to delay saving and may fail to plan appropriately for retirement due to a lack of financial capability and an unstable career path.

This raises an interesting question. With the labor force structure predicted to change soon, how can self-employed workers arrange retirement security without a formal pension system and social security? This is a matter of concern for policymakers to address, as saving for retirement is a problem, especially among vulnerable self-employed workers. Besides, Thailand is expected to become an aged society in a few years. The elderly dependency ratio will increase rapidly as a consequence of the demographic transition. This means that there will be fewer people of working age to support the elderly population. This brings about the need for workers planning for retirement and saving enough for their old age. Preparing for retirement is especially relevant for self-employed workers who tend to be risk-takers due to the absence of proper social security. In considering old age well-being among self-employed workers, it is important to strongly encourage this group to spend, invest, plan, and save smartly over their lifetime.

Recently, scholars have become increasingly interested in financial education and financial literacy in order to address the issue of lack of savings. This interest is because it is widely believed that financial literacy is key to helping people make wise decisions in this age of technology and the overwhelming amount of information. Numerous research studies have also documented how the lack of financial literacy leads to inefficient financial management in the household. A lack of fiscal management also occurs in developed countries with good financial institution development and high education levels. Therefore, a person equipped with adequate financial literacy can handle a massive amount of information and still make proper planning decisions. A higher level of financial literacy will help people manage their financial activities efficiently and adequately, contributing to a sustainable national economy. Lately, financial literacy has been discussed internationally since it improves retirement saving and wealth accumulation. Financial literacy is crucial for retirement security worldwide (Lusardi & Mitchell, 2011). Although previous studies exist on household retirement saving in Thailand (Butbumrung, 2012; Patmasiriwat & Hengpatana, 2016; Pootrakool et al., 2005), they do not focus on self-employed workers, their retirement savings behavior, and the role of financial literacy in saving for retirement. This brings about the research question: How does financial literacy affect retirement planning and wealth accumulation among Thai self-employed workers? Therefore, the objective of this study is to examine the role of financial literacy in planning for retirement and wealth accumulation among self-employed Thai workers.

Conceptual framework



Literature review

Definition of financial literacy, its measurement, and patterns around the world

Nowadays, scholars and policymakers are paying more attention to financial literacy. Despite this focus, the concept of financial literacy and its measurement remains ambiguous, mainly due to a lack of clarity of its definition and the different financial conceptual frameworks used in each study. Several studies use the term financial literacy and financial knowledge interchangeably. However, the interchangeable use of these terms may lead to a problem if their concepts are different (Huston, 2010). Moreover, several studies lack a well-defined financial literacy definition. This may lead to the creation of other financial conceptual frameworks, making a direct comparison of the financial literacy results impossible. Thus, a proper definition of financial literacy will help create harmonious financial conceptual frameworks and help construct straightforward measurement tools.

Lusardi and Mitchell (2011) proposed a new concise set of financial literacy questions, following the four fundamental principles: simplicity, relevance, brevity, and capacity to differentiate. These questions relate to the understanding of compound interest rates, inflation, and risk diversification, and have been widely adopted in many studies across countries: Beherman et al. (2010), Lusardi and Mitchell (2011), and Clark et al. (2012) conducted surveys in the United States; Bucher-Koenen and Lusardi (2011) in Germany; Sekita (2011) in Japan; Crossan et al. (2011) in New Zealand; Fornero and Monticone (2011) in Italy; Almenberg and Save-Soderbergh (2011) in Sweden; Alessie et al. (2011) in the Netherlands; Klapper and Panos (2011) in Russia; Kalmi and Ruuskanen (2018) in Finland; and more recently, Boisclair et al. (2017) in Canada.

The Organisation for Economic Co-operation and Development (OECD) introduced three measurement components to define financial literacy: knowledge, attitude, and behavior. A harmonized set of financial literacy questions were created by Atkinson and Messy (2012) and distributed to 14 countries across four continents (e.g., Albania, Armenia, Czech Republic,

Estonia, Germany, Hungary, Ireland, Malaysia, Norway, Peru, Poland, South Africa, the United Kingdom, and the British Virgin Islands). The observed data was returned to the OECD for analysis. In Thailand, the Bank of Thailand (BOT) adopted these financial literacy criteria in 2013 and planned to conduct surveys every three years. Although the set of questions follow those recommended by the OECD, some components have been modified to make them more suitable for the Thai context. In Thailand, besides the Bank of Thailand's survey, Pootrakool et al. (2005) also measured financial literacy using the ability of a household to compare monthly and yearly interest rates as a proxy. However, Pootrakool et al. (2005) did not provide a clear definition and conceptual framework for financial literacy.

A lack of financial literacy is widespread even in developed countries in which financial markets are competent and act efficiently. Demographically, the financial literacy pattern follows an 'inverted U shape,' with a higher level of financial literacy observed in middle-aged people. In contrast, the young and elderly are observed to have the lowest financial literacy. In addition, females had less financial literacy than males. People with a lower education level displayed lower financial illiteracy, while income was found to be positively related (Lusardi & Mitchell, 2011; Xu & Zia, 2012).

Relationship between financial literacy, planning for retirement, and wealth accumulation

Regarding education attainment, Behrman et al. (2010) reported that financial literacy has a more powerful effect on wealth accumulation than educational achievement. This implies that primary education may not be enough to help individuals improve the quality of their financial decisions and accumulate wealth. Thus, financial literacy becomes an essential component of human capital for all individuals. Lusardi (2003) explained that various levels of wealth accumulation depended on personal planning since this was costly due to the process of information collection. Levels of financial literacy could play a prominent role in reducing the cost of collecting information. Therefore, individuals equipped with a higher level of financial literacy are likely to benefit from reduced information collection costs, eventually accumulating greater wealth. This relationship can help to develop the link between financial literacy and retirement planning. In practice, retirement planning is a complex process, and financial knowledge and numeracy skills are needed in order to make informed financial decisions.

However, in the context of retirement planning and wealth accumulation, a few studies attempted to investigate the role of financial literacy. Most studies focusing on high-income countries revealed contrasting results regarding the significance of the role of financial literacy in retirement planning (Boisclair et al., 2017; Bucher-Koenen & Lusardi, 2011; Clark et al., 2017; Clark et al., 2012; Klapper & Panos, 2011; Lusardi & Mitchell, 2008, 2011; Lusardi et al., 2009; Pahnke & Honekamp, 2010; Sekita, 2011; van Rooij et al., 2011). Sekita (2011) also found that people who saved regularly when they were young tended to develop a retirement plan. Clark et al. (2012) included pension knowledge in the financial literacy measurement. However, the results still revealed that financial literacy was positively related to retirement planning. Pahnke and Honekamp (2010) reported that in German households with above-average incomes, financial literacy plays a greater role in retirement planning.

Financial literacy, planning for retirement, and wealth accumulation in Thailand

One popular aspect of financial literacy relates to savings behavior. Considering the situation in Thailand, Patmasiriwat and Hengpatana (2016) used the Household Socio-Economic Survey (SES) in 2009 to investigate savings, wealth accumulation, and old age pension among Thai households. They found that the household savings rate had decreased continuously over two decades due to changes in consumption patterns or an environment of 'easy credit' (i.e., affordable loans that provide low-interest rates for borrowers and relaxed leading practices by lenders). Various savings patterns were found among households. An overview revealed that 26 percent of total households had no savings, and both rich and poor households were likely to be faced with insufficient savings during their lifetime, with the poor having a higher likelihood of insufficient savings. Regarding the motivation to save, leaving an inheritance was the most common reason, second was health care in retirement, and third was daily spending in old age.

According to the Bank of Thailand (2014), the primary purpose of savings is long-term reserves; however, most Thai households had savings insufficient for retirement.

Approximately 40 percent of respondents revealed they had no retirement planning in place and had not yet started to save for retirement. More than half of the respondents saving for retirement expressed uncertainty about their current savings situation. They were concerned about having inadequate savings for retirement even though they had been saving for a while. Moreover, respondents aged 51 or over had recently started saving, meaning that they were likely to have insufficient savings on retirement.

Moving on to financial literacy in Thailand, this has been investigated in-depth by various groups. Numerous schemes have been developed to achieve financial literary with varying effects. Previous research studies focused on different group characteristics. Regarding the agriculture sector, Paukmongkol (2017) observed the financial literacy level among farmers in Pathumthani Province and found financial literacy among farmers to be at a moderate level. In comparison, Gongkhonkwa (2018) investigated the cause of debt default among farmers in Phayao Province. The results indicated that a misunderstanding of interest rate calculation also affected debt default. In addition, both studies found comparable results among farmers experiencing problems with compound interest rate calculation.

Angsuchoti and Kangwanpornsiri (2015) employed experimental analysis to establish the effectiveness of a financial training program on saving among the elderly. After training, financial behavior improved, and savings increased among the elderly. Likewise, an experimental analysis was employed in the studies by Seelajaroen et al. (2016) and Auepiyachut (2017), with the former proposing financial education training for members of Thailand's Government Pension Fund (GPF). The training program showed that appropriate financial education helped promote financial literacy and a positive attitude toward investing for retirement. Auepiyachut (2017) applied a quasi-experimental method to observe changes in financial literacy among contract university workers. The results revealed that financial knowledge and financial attitude improved significantly in the control group, although financial behavior did not. Likewise, financial literacy was also observed in teenagers. Sathirakul (2016) measured the financial literacy

of undergraduate students in business study programs. The outcome revealed a moderate financial literacy level. In addition, a positive relationship between financial knowledge and financial attitude was found to improve financial behavior. Therefore, appropriate education is needed to ultimately improve financial knowledge, financial attitude, and financial behavior.

Moving on to the household survey, the Bank of Thailand (2014) also reported the level of financial literacy in Thai households. The survey results revealed that Thai households had an average financial literacy score of 58.5 percent of the total scores (22 points). However, this was below the average score of 62.3 percent found in the other 14 countries participating in the OECD project. The lowest score was for financial knowledge, whereas the highest scores were for financial attitude and financial behavior. Households with a low level of education and in poor paying occupations tended to have lower financial literacy. Such households were mostly concentrated in the northeastern region of Thailand. In addition, financial education helps to improve financial behavior. Although previous studies allow us to see the moderate level of financial literacy among various groups, there has not been much discussion on self-employed workers.

Methodology

Source of the dataset

The National Statistical Office of Thailand permitted the data sets to be used for analysis in this study. The Household Socio-Economic Survey (SES) of the first quarter of 2013 was employed, along with the financial access survey created by the Bank of Thailand (2014). There has been a collaboration between the Bank of Thailand and the National Statistical Office of Thailand since 2002 to collect data about financial access and financial literacy. The data set was collected every quarter based on the SES survey. There were five surveys: 2002-2003, 2006, 2010, 2013, and 2016. However, financial literacy measurement was based on the OECD's criteria beginning in 2013.

This study uses data based on the SES rather than the Labor Force Survey (LFS). This is because the SES provides a dataset covering income, expenditure, asset accumulation, debt, housing characteristics, and financial access, which are the key variables of this study. The SES represents a national household cross-sectional survey, with the primary objective of collecting household socioeconomic information. However, this study aims to focus on data at the individual level rather than the household level since planning for retirement and financial literacy are personal. Therefore, it is more appropriate to analyze at an individual level rather than at a household level.

Scope of the study

This study focuses on self-employed workers in the labor force, for most self-employed workers are in the informal sector, with no social security or coverage under labor law. The definition of self-employed worker is based on the classification contained in the study by Arayavechkit et al. (2015), who considered three occupational choices: wage workers, employers, and self-employed. Self-employed consists of two types of workers: those who work for themselves and unpaid

family workers. After organizing the dataset, only members of the labor force reporting individual income were considered in this analysis, consisting of 7,847 observations comprising 335 employers, 4,355 self-employed, and 3,157 wage workers.

Measuring retirement planning and wealth accumulation

This study aims to explain the role of financial literacy in retirement planning among self-employed workers. Retirement planning is considered to be a matter of self-access action. Therefore, to measure retirement planning, this study asks the question, 'How much have you thought about retirement or planned for it?' The level of action is categorized into two types: planners and non-planners. A planner refers to someone who answers, 'I am thinking about planning and trying to make a plan,' or 'I have been thinking about a plan and have finished it already.' For non-planners, the level of action refers to those who claim, 'I have not thought about it' or 'I have thought about it but have not started a plan yet.' A planner's level is also associated with wealth accumulation (Ameriks et al., 2003; van Rooij et al., 2012). Therefore, this study employs wealth accumulation as another dependent variable in order to capture the long-term savings aspect. The measurement of wealth accumulation adapted from Ameriks et al. (2003) is calculated as follows:

Net worth per head = ([Real asset value + financial asset value] – debt amount)/household members

Empirical model and methods

The following equation is estimated as a form of a cross-sectional model.

$$Y^i_j = \alpha_0 + \beta_1 X_i + \beta_2 FL_i + \varepsilon_i$$

Y^i_j is the dependent variable, i is the number of observations, and j is the type of dependent variable.

Y^i_1 is the dummy variable; if equal to 1, a person is a planner (having a retirement plan), and 0 otherwise. This study employs bivariate Probit analysis, which is appropriate for use with a binary dependent variable.

Y^i_2 is net worth per head of observation i. Net worth per head reflects a long-term saving pattern. This amount can have a negative value when the debt level is greater than the wealth accumulated. Therefore, Ordinary Least Squares regression (OLS) is employed.

X_i refers to the determinant variables, including demographic and household characteristics.

FL_i refers to financial literacy components as the variables of interest. In this study, financial literacy components consist of financial knowledge, financial behavior, and financial attitude. Whereas α_0 is a vector of intercept; β_i is a vector of coefficient; ε_i is an error term.

Then again, there is a possibility to emerge a reverse causality and common unobserved factors (Nolan & Doorley, 2019; van Rooij et al., 2012). Several researchers have used different analyses,

such as instrumental variables, to solve these issues (Lusardi and Mitchell, 2011; van Rooij et al., 2012). Reassuringly, the results from those researches revealed consistent results with the OLS method, which this study applied. Finally, finding an appropriate instrument for this study was limited due to the lack of suitable instrumental variables in the given data set.

Financial literacy and its measurement

The OECD set up financial literacy components in three dimensions: financial knowledge, financial behavior, and financial attitude. This definition of financial literacy is extended from the version used by Lusardi and Mitchell (2011). The BOT has been adopting these criteria since 2013, and this study employs the relevant dataset for analysis. This study defines financial literacy in Table 1 to ensure the data is appropriate and up to date.

Table 1: Financial Literacy Questions

Financial Knowledge	Financial Behavior	Financial Attitude
Division	Considerations of purchase	Attitude toward financial decision-making
Time value of money (Inflation)	Timely bill payment	
Interest paid on loans	Paying attention to financial affairs	
Calculation of interest plus principal	Long-term financial goal setting	
Compound interest rate	Responsible management of the household budget	
Knowing about credit bureau	Active saving	
Knowing about protection under savings law	Product choice (Choosing products)	
	Borrowing to make ends meet	

According to the financial literacy definition, its components can be created as three main dimensional components. The first dimension is financial knowledge, the second is financial behavior, and the third is financial attitude. Financial knowledge reflects how an individual comprehends basic financial concepts in everyday life and involves basic numeracy skills. Next, financial behavior demonstrates the ability to use or perform when dealing with financial management. Lastly, financial attitude reflects a personal thought toward the financial situation and confidence to deal with money in the future.

The control and explanation variables involved in the empirical model to analyze the role of financial literacy in planning for retirement and wealth accumulation are briefly described in Table 2.

Table 2: Control and Variables Used in this Study

Variable	Symbol	Meanings
Dependents		
	Planner	Dummy variable equals 1 if the respondent is a planner, 0 otherwise
	Net worth per head	(Total asset value – total debt amount) / number of household members
Control variables		
	Gender	Dummy variable: 1 if the respondent is female, 0 if the respondent is male
	Age, Age^2	Age of respondents Age-square of respondents
Education attainment	Years of schooling	Continuous variable
Marital status	Married	Dummy variable: 1 = married, 0 otherwise
Regions	BKK	Dummy variable: 1 if the respondent is living in Bangkok, 0 otherwise
	Central	Dummy variable: 1 if the respondent is living in the central area, 0 otherwise
	North	Dummy variable: 1 if the respondent is living in the north, 0 otherwise
	NE	Dummy variable: 1 if the respondent is living in the northeast, 0 otherwise
	South	Dummy variable: 1 if the respondent is living in the south, 0 otherwise
Area	Municipal	Dummy variable: 1 if the respondent is living in the municipal area, 0 otherwise
Homeownership	Owner	Dummy variable: 1 = homeownership, 0 otherwise
Debt situation	Debt concerns	Dummy variable: 1 = feels uncomfortable with the debt situation, 0 otherwise
Level of risk-taker	Low risk-taking	Dummy variable = 1 if accepts low investment risk, 0 otherwise
Source of income	Personal labor income	Individual income/profits gained by the respondent through work
	Income from other sources	Dummy variable: 1 = receives non-profit income or non-labor income, 0 otherwise
	Income from assets	Dummy variable: 1 if the source of income comes from assets, 0 otherwise
Variables of interest		
Financial literacy	Financial knowledge	Financial knowledge scores of the respondents. According to financial knowledge, questions from Table 1 respondents get 1 point for correct answer and 0 in all other cases. The total score is 8 points
	Financial behavior	Financial behavior scores of the respondents. According to financial behavior questions from Table 1, respondents get a score from 1 - 5 points for rating scale choices and 0 or 1 point for a binary choice. * Total score is 1-24 points

Variable	Symbol	Meanings
	Financial attitude	Financial attitude scores of the respondents. According to financial attitude, questions from Table 1 respondents get score from 1 - 5 points for rating scale choices. The total score is 1-5 points

*Note: *Regarding Table 1, financial behavior questions are about the responsible management of the household budget, with active saving, product choice, and borrowing to 'make ends meet' considered as a binary choice. The age square variable (age^2) is included in the model in order to observe the non-linear term*

Empirical results and discussion

Table 3: Description of the Respondents According to Employment Status

Variables	Total observations	Employers	Self-employed	Wage worker
	In Percent/Mean (S.D.)			
Observations	7,847	335	4,355	3,157
***Planners (in percent)**	57.20	64.84	59.21	53.40
Wealth accumulation (Thai Baht)	483,520	878,064	500,727	417,916
Net worth	(613,665)	(809,550)	(577,684)	(620,661)
Financial assets (Thai Baht)	62,456	108,694	46,294	79,845
	(146,107)	(178,081)	(109,121)	(179,992)
	(4,755)	(5,795)	(3,551)	(5,857)
Demographic characteristics				
Female (in percent)	57.79	45.37	61.58	53.88
Married (in percent)	72.04	74.93	76.92	65.00
Age (Years)	46.44	50.98	49.65	41.51
Years of schooling (Years)	7.87	7.98	6.33	9.98
Living in Bangkok (in percent)	4.60	6.87	2.25	7.60
Central (in percent)	28.44	31.94	21.28	37.95
North (in percent)	24.57	15.22	28.52	20.11
Northeast (in percent)	27.42	21.19	34.72	18.02
South (in percent)	14.96	24.78	13.23	16.31
Municipal area (in percent)	58.63	58.21	53.27	66.08
Average monthly income from personal labor/profit (Thai Baht)	11,636	20,231	8,970	14,384
	(23,093)	(53,350)	(22,746)	(16,201)
	(752)	(1,736)	(740)	(527)
Amount of debt per head (Thai Baht)	79,722	136,250	50,479	114,063
	(257,885)	(411,518)	(181,422)	(315,129)
	(8,391)	(13,391)	(5,904)	(10,255)
Low risk-taking (in percent)	39.91	33.43	37.61	36.30
Homeownership (in percent)	79.33	87.76	88.77	65.41
Dependency ratio (in percent)	54.91	64.84	60.69	46.09
	(64.85)	(71.53)	(61.84)	(67.10)
Debt concerns (in percent)	15.99	17.31	18.44	12.48
Financial knowledge (max score = 8 points)	3.57	4.00	3.36	3.82
	(1.76)	(1.16)	(1.69)	(1.83)

Variables	Total observations	Employers	Self-employed	Wage worker
	In Percent/Mean (S.D.)			
Financial behavior	18.42	18.90	18.47	18.31
(max score = 24 points)	(2.25)	(2.19)	(2.16)	(2.36)
****Financial attitude**	3.22	3.27	3.25	3.18
(max score = 5 points)	(1.12)	(1.09)	(1.15)	(1.10)

*Note: National Statistics Office of Thailand, 2013, author's calculation. * The retirement planning question was answered by 6.668 respondents. ** High score denotes a positive attitude towards the future. Standard deviation (S.D.) in paratheses. Based on the Bank of Thailand (2020), in 2013, at the time of SES survey data collection, the average reference exchange rate was 30.73 THB / 1 USD*

The descriptive statistics are represented in Table 3. The total observations and employment status are reported separately. Regarding retirement planning and wealth accumulation, 59.21 percent of self-employed workers plan for retirement, whereas wealth accumulation per head is about 500,727 THB [16,294 USD] (Based on the Bank of Thailand (2020), the 2013 average reference exchange rate was 30.73 THB/1 USD). Employers revealed the highest proposition of retirement planning and wealth accumulation, whereas wage workers revealed the lowest. As for demographic characteristics, more than 60 percent of self-employed workers are female.

Additionally, three-quarters of self-employed workers are married. Self-employed workers are, on average, 49.65 years old. Education among self-employed workers is observed to be lower than in other categories. Most self-employed workers are concentrated in Thailand's northeast region, whereas most wage workers are found in the central region. Average labor income is approximately 8,970 THB [292 USD] per month (Bank of Thailand, 2020), which is considered low compared to other employment categories.

Moreover, the self-employed tend to have a low risk-taking personality. More than 80 percent of the self-employed have their own house, and this category expresses the greatest concerns about debt. Focusing on the score for financial knowledge, the results indicated that the self-employed show the lowest performance compared to the average scores of the other employment categories. The financial behavior score across employment status is revealed to be above average, although there is not much difference between subgroups. At the same time, the results for the financial attitude toward the future by the self-employed showed a moderate score. Similar scores were also found for both employers and the wage workers.

Employment status may have influenced the motivation to plan for retirement in separate ways. This is due to the level of earnings, household characteristics, demographics, and financial literacy. This study divides employment status into three subgroups to compare the employers, self-employed workers, and wage workers. The first two subgroups are mostly found in the informal sector, which is widely known to be vulnerable, especially the self-employed. The regression analysis is presented in Table 4 to answer the objective of this study. The first three models employ Probit regression to analyze the role of financial literacy components in retirement planning. The results in models 1-3 indicate that labor income and an extra income source, owning a home, and a low-risk taking personality increase the probability to plan for retirement. In contrast, debt concern has a negative impact on retirement planning across work

statuses. The results also reveal that there is no association between demographical characteristics and retirement planning.

Table 4: Marginal Effects of Financial Literacy on Retirement Planning and the Regression Analysis of Financial Literacy on Wealth Accumulation Across Employment Status

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Regressors		**Planner Probit regression**			**Net worth per head Linear regression**	
Employment status	**Employers**	**Self-employed**	**Wage workers**	**Employers**	**Self-employed**	**Wage workers**
Female	-0.0457	0.0166	-0.0030	27,522	-17,779	-5,785
	(0.0604)	(0.0178)	(0.0214)	(82,157)	(16,796)	(18,468)
Age	0.0095	0.0001	0.0087	-2,086	11,889**	2,278
	(0.0168)	(0.0055)	(0.0066)	(22,401)	(4,699)	(3,940)
Age²	0.00002	0.00008	0.00002	227.6	-31.88	91.22*
	(0.0002)	(0.0001)	(0.00008)	(220.7)	(46.90)	(47.61)
Years of schooling	-0.0023	0.00280	0.0086***	21,626*	28,560***	30,676***
	(0.0073)	(0.0028)	(0.0031)	(11,528)	(3,269)	(2,550)
Married	-0.0598	0.0345	0.0201	-134,933	-35,791*	-35,577*
	(0.0652)	(0.0213)	(0.0228)	(107,079)	(19,495)	(19,899)
Central	-0.0530	0.0153	-0.1053**	36,444	28,281	-42,810
	(0.1191)	(0.0607)	(0.0431)	(196,247)	(65,956)	(42,676)
North	-0.1691	-0.0535	-0.0958**	-61,134	-57,437	-3,253
	(0.1374)	(0.0616)	(0.0457)	(209,552)	(65,823)	(46,531)
Northeast	-0.1143	-0.0408	-0.1339***	-13,909	-587.6	-46,304
	(0.1257)	(0.0615)	(0.0470)	(205,179)	(65,096)	(48,825)
South	-0.1034	-0.00738	-0.0565	134,968	81,109	-18,149
	(0.1221)	(0.0628)	(0.0492)	(191,609)	(68,490)	(46,992)
Municipal	0.0881	-0.0017	-0.0260	92,703	4,272	32,627*
	(0.0638)	(0.0176)	(0.0237)	(82,628)	(16,640)	(18,898)
Median Income	0.0377	0.0408**	0.1034***	181,964**	160,259***	188,060***
	(0.0621)	(0.0189)	(0.0269)	(90,880)	(17,632)	(17,823)
Income from other sources	0.2393***	0.0586***	-0.0087	-132,241	7,138	-43,268**
	(0.0664)	(0.0200)	(0.0234)	(96,668)	(18,958)	(20,940)
Income from assets	0.1318**	0.1085***	0.1104***	45,884	75,073***	101,867***
	(0.0561)	(0.0176)	(0.0228)	(82,795)	(18,571)	(23,079)
Dependency ratio	-0.0002	0.00016	-0.00001	-1,842***	-1,180***	-1,179***
	(0.0005)	(0.0002)	(0.0002)	(527.8)	(134.6)	(134.2)
Debt concerns	0.0006	-0.0676***	-0.0594*	-249,409**	-110,317***	-82,657***
	(0.0770)	(0.0232)	(0.0337)	(100,553)	(18,342)	(21,760)
Home ownership	0.0931	0.0671**	0.1033***	526,468***	446,854***	385,686***
	(0.1020)	(0.0304)	(0.0266)	(119,190)	(19,491)	(20,381)
Low risk-taking	0.1418**	0.0845***	0.0433**	119,269	20,211	40,102**
	(0.0599)	(0.0175)	(0.0221)	(87,477)	(17,035)	(19,702)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Regressors		**Planner Probit regression**			**Net worth per head Linear regression**	
Employment status	**Employers**	**Self-employed**	**Wage workers**	**Employers**	**Self-employed**	**Wage workers**
Financial knowledge	-0.0055	0.0338***	0.0195***	51,820*	17,475***	17,758***
	(0.0206)	(0.0056)	(0.0074)	(27,489)	(5,114)	(5,408)
Financial behavior	0.0562***	0.0487***	0.0549***	53,917***	31,294***	18,124***
	(0.0148)	(0.0044)	(0.0054)	(20,396)	(3,787)	(4,469)
Financial attitude	0.0115	0.0207***	0.0009	32,394	8,965	-19,085**
	(0.0264)	(0.0075)	(0.0098)	(38,719)	(7,153)	(8,704)
Constant	-	-	-	-1,498,865**	-1,235,322***	-765,444***
				(670,174)	(158,639)	(120,348)
Pseudo R^2	0.1996	0.0961	0.1642	-	-	-
R^2	-	-	-	0.2708	0.1899	0.367
Observations	329	3,727	2,627	335	4,335	3,157

*Note: Author's calculation. ***, ** and * denote coefficients significant at 1%, 5% and 10% statistical levels, respectively. Heteroskedasticity is controlled. The Huber-White's Robust Standard Errors are given in parentheses. Multicollinearity was checked due to the possibility of independent variables in regression being correlated, especially financial literacy components and education. The correlation matrix is performed to detect the multicollinearity between the financial literacy component and education and other independent variables. They show a weak correlation.*

In financial literacy analysis, the outcomes indicate that financial knowledge, financial behavior, and financial attitude are strongly positively significant in explaining the increase in retirement planning probability among self-employed workers. A similar result is also found in wage workers, while financial attitude is insignificant and financial behavior only increases retirement planning probability for employers. The effect of financial knowledge on retirement planning is also consistent with the findings by Alessie et al. (2011), Boisclair et al. (2017), Bucher-Koenen and Lusardi (2011), Fornero and Monticone (2011), Lusardi and Mitchell (2011), Pahnke and Honekamp (2010), Sekita (2011), and van Rooij et al. (2011). However, these studies excluded financial behavior and financial attitude as financial literacy components due to differences in its definition. In contrast, this study shows that financial knowledge, financial behavior, and financial attitude are all essential and have been shown to have a significant impact on retirement planning.

Moving on to the analysis of wealth accumulation, year of schooling, labor income, and additional income sources are associated with net wealth per head, while dependency ratio and debt concerns are found negatively associated with net wealth per head. The outcome of financial knowledge is the key to increasing net worth among all employment categories. These findings are similar to those in the studies by Ameriks et al. (2003), Behrman et al. (2010), and van Rooij et al. (2012). Financial behavior is also a significant factor in lifting wealth accumulation, whereas financial attitude seems significant only for wage workers and has the reverse effect. This is possible to explain that even though wage workers have the right financial attitude towards the future, they are protected under social security. This may lead to a lack of motivation to accumulate wealth.

To summarize, since this study focuses on self-employed workers, the regression results show that this subgroup tends to benefit from financial literacy in retirement planning and wealth accumulation. This study also indicates that financial knowledge is not only necessary for retirement planning and wealth accumulation but also for financial behavior and financial attitude. Policymakers should bear this information in mind when setting effective savings policies.

Conclusion and policy implications

Many countries are expected to soon become aging societies, and changing social patterns are being observed. For example, families are becoming smaller, and people are living longer, surrounded by high technology with access to a massive amount of information and fast-developing, diverse financial services. Financial literacy is an essential factor, and finding the most appropriate way to help people deal with difficult financial situations is being widely discussed in many countries worldwide. Thailand is soon expected to also face an aging society, and the demographic transition will lead to a labor shortage. There is evidence to suggest that wage workers are before long likely to switch to being self-employed. According to a microeconomic overview, concerns are being raised regarding welfare security among the self-employed, particularly retirement well-being. This is because fragile characteristics such as income volatility, low skills, and productivity will have a direct effect on the ability of the self-employed to save and access welfare. This is an important issue for policymakers who must try to find a way of dealing with this situation. The point of saving for retirement intrigues scholars and is being discussed intensively nowadays. Financial literacy is a key factor. Scholars are attempting to link it to saving and planning for retirement since high financial literacy is believed to increase savings and better financial decision-making. This belief has been broadly supported by previous research.

As discussed earlier in the empirical results section, the analysis of financial literacy in retirement planning and wealth accumulation shows that, in particular, financial knowledge, financial behavior, and financial attitude, are significant factors for increasing the probability that self-employed workers will plan for retirement and wealth accumulation. Therefore, it is vital to educate people about retirement savings plans, implement such strategies, and make better financial decisions.

Consequently, it is necessary to consider the basics of the education system. Financial knowledge and necessary financial numeracy skills such as knowing how to calculate interest rates should be regarded as core subjects in school. And at the very least, students must be encouraged to learn how to manage their finances, with particular emphasis on the acquisition of financial knowledge as well as its implications. Learning about the fundamentals of finance early on in life will help increase awareness among the youth toward the importance of their behavior and attitude toward financial matters. Moreover, financial knowledge programs and seminars for adults must be provided on various financial issues to match the willingness of target groups and their individual characteristics and living circumstances. In addition, this knowledge should be made easily accessible to everyone. All groups must have equal access to comprehensive financial information to better understand retirement planning and wealth accumulation.

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