THE ROLE OF FINANCIAL LITERACY ON EARNINGS AND OLD AGED SAVING AMONG SELF-EMPLOYED WORKERS

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THE ROLE OF FINANCIAL LITERACY ON EARNINGS AND OLD AGED SAVING AMONG SELF-EMPLOYED WORKERS

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ABSTRACT

Title of Dissertation	THE ROLE OF FINANCIAL LITERACY ON EARNINGS AND OLD AGED SAVING AMONG SELF-EMPLOYED WORKERS
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Regrading a rapid ageing population in Thailand, its effect will impact to labor participation by creating labor shortage and harming economic growth respectively. As a trend of being self-employed tends to increase significantly in near future (Arayavechkit, et.al. 2015), it raises a concerning of saving for retirement due to lacking of social security and pension funds. Therefore, it becomes a self-employed responsibility to decide their planning and save for retirement by themselves in order to meet retirement well-being. Since financial literacy has been found widely to improve financial decisions and wealth accumulation.

This study conducted two analysis. First, it aims to explore the effect of financial literacy on retirement planning and wealth accumulation among Thai self-employed workers. Second, to investigate the role of financial literacy and entrepreneurial skills on earnings. The data used both primary data and secondary data. Conducting primary data is necessary because entrepreneurial skills is not provided. This study adopts financial literacy criteria from two sources. First, the OECD data set is provided by the National Statistics Office (NSO) namely the BOT/FA-Q12013. Second, the ANZ-2014 criteria which collect from a filed survey. The three main components of financial literacy consist of financial knowledge, financial behavior and financial attitude. Probit regression by and multiple linear regression are employed to analyze in order to meet the objectives of this study. Using a secondary data, the results from financial literacy analysis shows that financial knowledge become an important factor to enhance probability of retirement saving plan, wealth accumulation and earnings among self-employed workers. While financial behavior components play the role differently. First, keep watching financial affairs give benefit to both saving and planning for retirement and earnings.

Moreover, long-term financial goal setting also play significant role on both retirements saving plan and wealth accumulation. In addition, behavior of responding and having household budget, and never borrowing to make ends meet reported a positive effect to lift up net worth and earnings for self-employed workers. However, financial attitude only plays significant effect on retirement saving plan.

Using a primary data, the findings show that a retirement saving plan is a problem among self-employed workers as most of them do not have a retirement saving plan yet. While, those who have saving still have too little. Moreover, financial knowledge score reports as a weakness of non-retirement planners since the score is lowest in compared to retirement planners. Considering financial behavior components individually. Retirement planners have a slightly better financial behavior in each component than non-retirement planners except keeping track of finances. In terms of financial attitude, the scores of each component of financial attitude show score differently across retirement planer types. Self-efficacy and financial aspirations are almost the same among retirement planners and non-retirement planners whereas financial stress and impulsivity, both groups reported indifferently.

Moving on to the earnings analysis, financial knowledge score increases along with income levels. Therefore, high income group tends to have a good financial behavior more than other sub groups. In addition, across different income levels also show different score on financial attitude. Besides, each entrepreneurial skill score observed increases along with income levels meaning that they are important factors for lifting up earnings among self-employed workers.

Finally, this study suggests to policy maker to pay attention on deciding a variety of financial education program and financial seminar in order to comply with the needs of people with different characteristics and life conditions. This will help to intrigue and aware of saving and planning for retirement and being financially healthy habits. In addition, through a field survey, the findings explored that entrepreneurial skills are also important factor for self-employed workers, to promote learning center which provide essential skills to self-employed workers will help them to operate their business efficiently.

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Praewpailin Janposri

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CHAPTER 1

INTRODUCTION

1.1 Statement of Problem

Saving for old age has become an important issue in this era of aged society. Modigliani and Brumberg (1954) introduced the concept of life cycle hypothesis, explaining that a rational, well-informed person will consume less than his/her incomes during their high earning period and save for future spending when his/her income declines. Because old people tend to earn less than their spending, and thus have to convert their wealth to smooth consumption and maintain their living standard. Therefore, saving for old age is important for people to maintain their wellbeing after retirement.

Thailand has been considered as an aging society since 2005 according to the United Nations (The United Nations, 2015). The NESDC (2019) reported that Thailand will become completed aged society when the ratio of people aged 60 years and over is greater than 20 percent of the total population in 2023. And by 2033, the elderly is expected to account for 28 percent of Thai population, meaning that Thailand will become a super ~~a~~ged society in the next 12 years. The old age dependency ratio has sharply increased from 15.54 percent in 2005~~,~~ to 21.21 percent in 2015, and predicted to jump to 40.93 percent in 2030 (Suwanrada & Chandoevwit, 2010) As a consequence of this demographic transition, the elderly dependency ratio will increase rapidly, due to fewer working people (aged 15–59 years) to support the elderly. Although Thailand has a basic social security system in which elderly people receive some old aged payment from the government, the amount itself is not sufficient for living (Phananiramai, 2008).

Both old age subsistence allowance and universal health care subsidies are provided by Thai government for all older persons. This ensures that poor elderly will have some social protection. But when the aged population in Thailand increases exponentially, public spending on the elderly, such as social security programs, health care, and social pensions will have to increase as the result. In figure 1.1, note that the number of non-savers elderly has increased over the past decade. The situation can lead to an unbearable burden on the government's expenditure. Recently, at least two governmental funds have been at risk and may face financial bankrupt in the near future due to an aged society (The Fiscal Policy Office, 2015) Furthermore, even though the personal savings has increased continuously since 2008 (Figure 1.2), most of the savings belong to the high-income group while the low-income class earn less than sufficient for living.

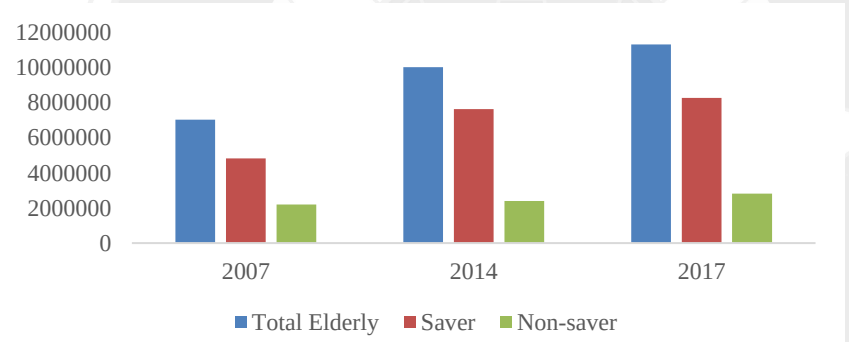

Figure 1.1 Thai Elderly Saving in 2007, 2014, and 2017

Source: Office of the National Economic and Social Development Council, 2018.

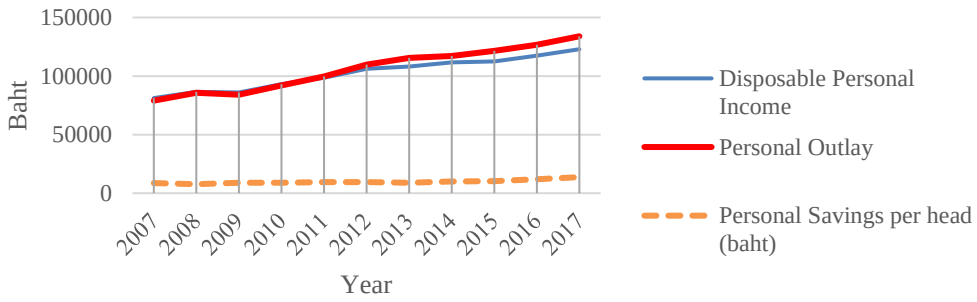

Figure 1.2 Personal Savings Per Head in Thailand from 2007–2017
Source: Office of the National Economic and Social Development Council, 2018.

Retirement planning, in particular saving for retirement, is essential to ensure that people will have income security in their old age. It is important to promote saving among working population to accumulate wealth for retirement, especially those in the informal sector who account for the highest proportion of the Thai workforce (Figure 1.3).

In many developing countries and Thailand, the labor market is mainly concentrated in the informal sector and is the main growth engine for the economy. Figure 3 shows that informal workers have contributed to Thai economy for many decades. Most of the informal labor force located in the agricultural, trade and services, and manufacturing sectors, respectively (Figure 1.4). Furthermore, majority of Thai informal workers work for themselves or in the family business (Figure 1.5). They hence are categorized as self-employed workers, and considered by the International Labor Organization (ILO) as vulnerable employment due to the lack of social protection for uncertainty and no income security for their retirement

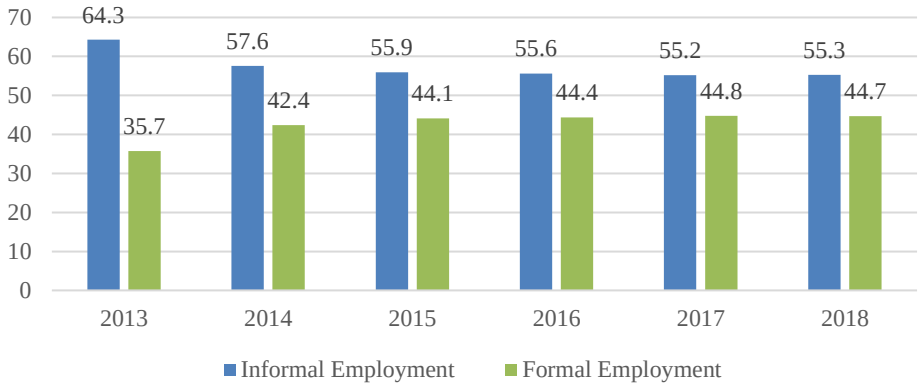

Figure 1.3 Percentage of Formal and Informal Employment from 2013–2018
Source: National Statistical Office, 2013–2018.

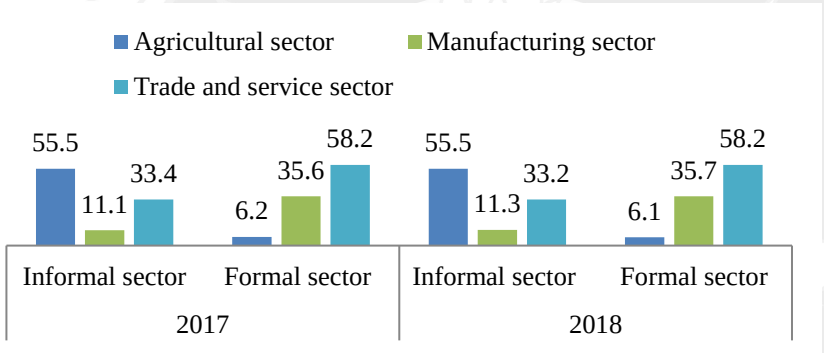

Figure 1.4 Comparison between Formal and Informal Employment by Industry Sector
Source: National Statistical Office, 2017 and 2018.

In addition, by the study of Arayavechkit, Manprasert, and Pinthong (2015), private employees tend to change their working status from wage workers to self-employed workers in their 50-60 years old. The study predicted that by 2035, more than 60 percent of workers aged 50–60 years old will choose to be self-employed. They tend to earn less due to their lower productivity, and consequently could slow down the economic growth and income per capita of Thailand. In addition, the findings also imply that a growing number of self-employed workers may experience financial inadequacy at their old age due to their low productivity and volatile incomes. Moreover, self-employed workers have a tendency to delay saving and may

fail to plan for their retirement saving due to a lack of financial literacy and an unstable career path.

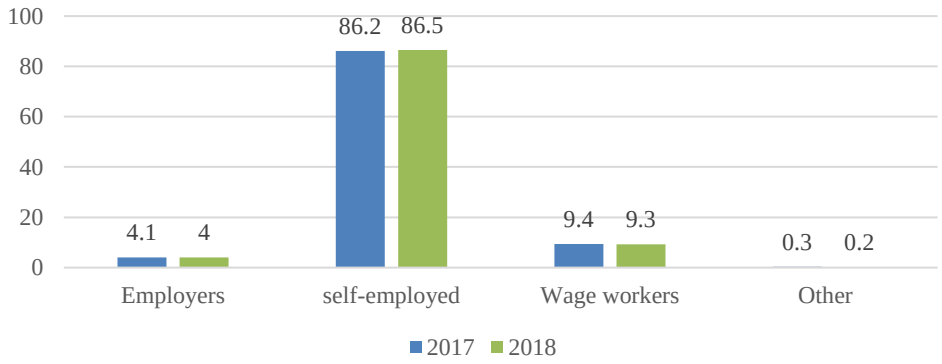

Figure 1.5 Share of Informal Labor by Employment Status
Source: National Statistical Office, 2017 and 2018.

The situation leads to an important research question. With the labor market structure predicted to change in the near future, how self-employed workers without any formal pension plan will have enough savings for their retirement. This is a matter of concern for policymakers, since saving for retirement is a challenge for self-employed workers whose incomes are unstable. And Thailand is expected to become a completed aged society in the next couple of years, there will be less and less working people to support elderly population in the near future. It thus is important to promote saving for retirement among self-employed workers

Since a person who is well equipped with financial literacy is likely to make better financial decisions. It hence is necessary for individuals to enhance their financial literacy in order to make appropriate financial decisions for both earnings and savings. Lately, the role of financial literacy is the subject of much discussion internationally since it has proved to help improve retirement saving and wealth accumulation. Financial literacy is found to be crucial to promote saving around the world (Lusardi & Mitchell, 2011c). In addition, it also improves earnings, as it helps to reduce business failure (Bruhn & Zia, 2011; Nunoo & Andoh, 2011; Wise, 2013; Kotzé & Smit, 2008; Fatoki, 2014; Drexler, Fischer, & Schoar, 2014) . Therefore, financial literacy may help to increase both earnings and savings of self-employed workers. Furthermore, financial literacy simultaneously benefits both consumers and

producers alike. Many scholars observed that improving financial literacy provide advantages for the whole economy.

Although previous studies exist in relation to household retirement saving in Thailand (e.g. Pootrakool, Ariyapruchya, & Sodsrichai, 2005; Butbumrung, 2012; Patmasiriwat & Hengpatana, 2016), previous studies do not focus specifically on informal workers. There is a shortage of research in relation to the role of financial literacy on earnings, retirement planning and savings of informal workers who are at a greater risk of financial instability. Recent studies focus on the financial stability of social security schemes, community savings groups and old age income security. (e.g., Chandoevwit et al., 2008; Suwanrada & Chandoevwit, 2010) There exist some studies on the earnings of self-employed workers. (e.g., Teilhet-Waldorf & Waldorf, 1983; Chiswick, 1977, 1983). This shows a research gap among previous studies which do not link self-employed' s earnings to their saving ability. Therefore, to pursue the issue further, this study focuses on self-employed' s earnings and savings and the role played by financial literacy on their earnings, retirement planning, and amount of savings, which to date has not yet been addressed. The results of this study will benefit policy makers to improve the well-being of self-employed workers when they retire from work.

1.2 Research Questions

1.2.1 Does financial literacy promote planning and saving for retirement among self-employed workers?

1.2.2 Does financial literacy improve earnings and business performance among self-employed workers?

1.2.3 What other skills, besides financial literacy, can help improve the earnings and business performance of self-employed workers?

1.3 Objectives of This Study

1.3.1 To investigate the role of financial literacy in planning and saving for retirement among self-employed workers.

1.3.2 To explore the effect of financial literacy and entrepreneurial skills on the earnings of self-employed workers.

1.4 Scope of the Study

This study focuses on the self-employed labor force. The definition of self-employed is based on the classification by Arayavechkit et al. (2015). There are two types of self-employed: those who work on their own business or work for family as unpaid workers. Entrepreneurs are considered to be either employers or self-employed. The latter are distinguished from the former by having no employees of their own. However, this study refers to the self-employed as entrepreneurs without employees and employers with not than five employees (which refers to as a microenterprise) (see Figure 6 for details; number 1 and 2 are the sample of interest for this study). Moreover, a field survey is conducted in this study to collect an additional dataset not provided in the Socio-Economic Survey (SES-BOT/FA-Q12013) of the NSO. The field survey takes place in Mahasarakham Province, located in the northeastern region of Thailand, as a study case.

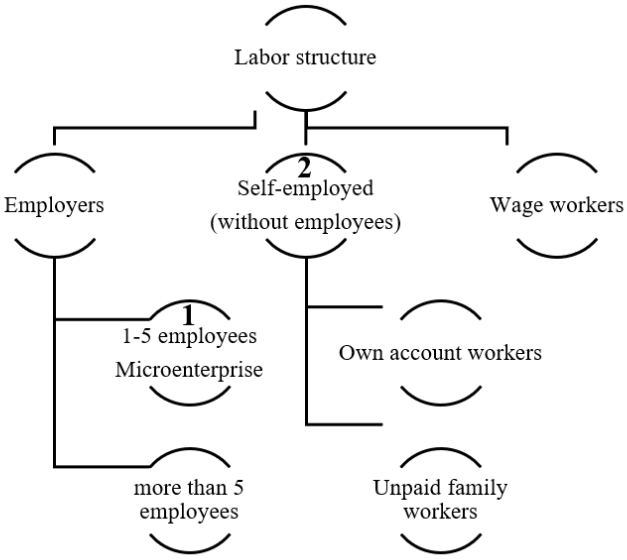

Figure 1.6 Work Status

Source: Created by the author for this study.

1.5 Contribution of This Study

This study makes two contributions to the current research. Firstly, it offers suggestions and recommendations for promoting savings for old age and secondly, a measurement of financial literacy is presented in this paper to help increase the effectiveness of policy implementation. Once, the important characteristics of financial literacy could be identified, it would help policymakers to design on an education program or a learning platform that will be suitable for the self-employed workers so as to improve their savings, earnings, and entrepreneurial skills. Furthermore, the field survey was conducted in this study to identify entrepreneurial skills and to analyze their role in earnings and extend financial literacy components. This will help to improve the well-being of self-employed people.

1.6 Conceptual Framework

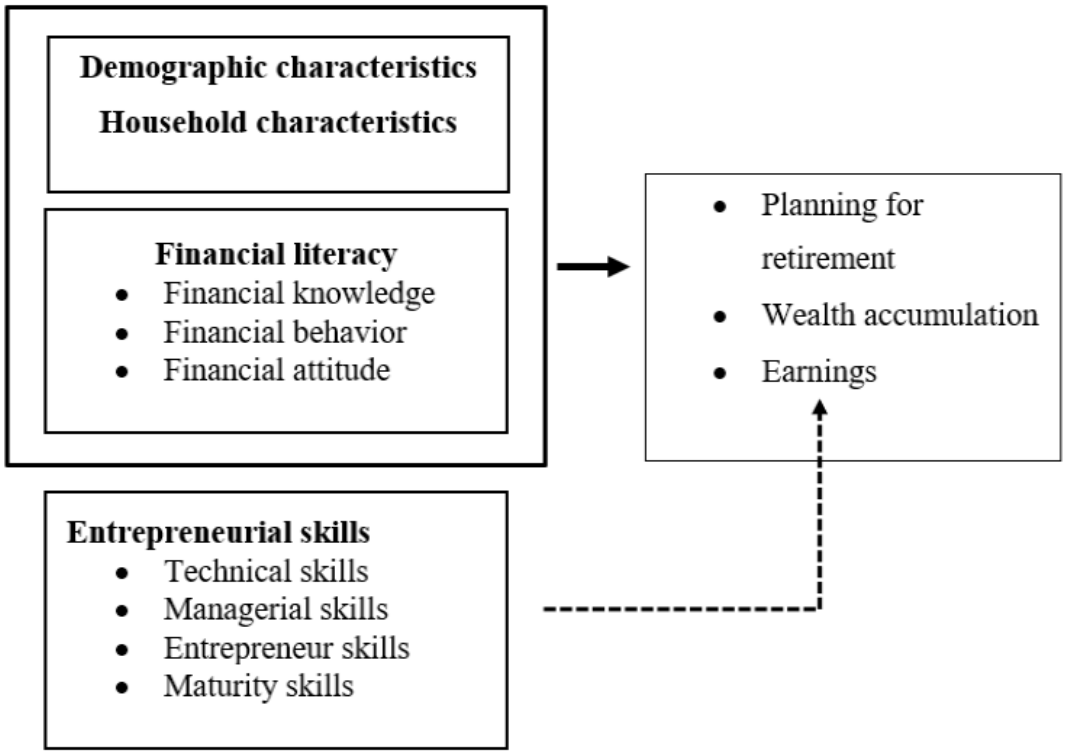

Figure 1.7 Conceptual Framework of this Study

CHAPTER 2

LITURATURE REVIEW AND THEORITICAL FRAMEWORK

2.1 Theoretical Approaches

2.1.1 The savings function

The ability of the poor to save and their saving approach has become the subject of much debate. Traditional theories in relation to saving and asset accumulation have been widely developed in many fields of study. Beverly and Sherraden (1999) grouped the theories into three categories based on their stages of development, i.e., neoclassical economics, psychological and sociological studies, and behavioral economics. However, existing theories lack the ability to efficiently explain the saving behavior of low-income households. Therefore, a new institutional approach has been introduced to complement the economic theory of saving.

Firstly, the most well-known traditional theories belong to the neoclassical economic group, namely the permanent income hypothesis (PIH) and life cycle hypothesis (LCH), proposed by Friedman (1957) and Modigliani and Brumberg (1954), respectively. Both models are similar in that they explicitly focus on long-term consumption, thereby emphasizing on how saving plays an important role in smoothing consumption for individuals in the future when their income declines. Theoretically, the LCH concerns on individual's income allocation for consumption and for saving over lifetime. LCH was developed under the assumption that individuals are rational and well-informed (e.g., know their income stream, interest rate in each period, or life span). With perfect information, they try to maximize their utility and to maintain their optimal lifetime consumption. During lifetime, each individual starts with a low income and high consumption, leading them to dissaving in early life. Income is likely to increase and exceed consumption for individuals in middle age, with savings rising during this period. However, income tends to reduce again during retirement, leading to fewer savings. Plotting this saving pattern against

a lifetime indicates an inverted U shape. This concept seems to work for a typical person, but not for low-income workers facing a greater income fluctuation thus have a higher potential risk of negative savings.

Even though the LCH model is broadly accepted among scholars, with empirical evidence in both time series and cross-sectional studies conforming to the model. It could not explain why many people cannot maintain their optimal lifetime consumption in the real-world situations. A part of the obstacle is due to binding liquidity constraints (i.e., facing an imperfect credit market) with income fluctuating and uncertainty. Moreover, further empirical studies reveal that people tend to be more sensitive to consume and save than the models predict and low-income households are reported to lack the ability to save.

However, the LCH model is a starting point for explaining saving and wealth accumulation mechanism though the assumptions may not manifest real saving behavior. Explanation for saving behavior thus extended to include sociological, psychological, and behavioral contexts.

2.1.2 Socio-psychological theory and behavioral theory

Both theories relax the assumptions set in the LCH since individuals are not rational nor well-informed. The socio-psychological theory of saving proposes that social and economic conditions form part of saving motivation and expectation. The ability and willingness to save are basic conditions for saving (Katona, 1951,1975). But, saving experiences, the influence of family and peers, as well as religious beliefs are considered to be motivational and aspirational factors of saving (Cronqvist & Siegel, 2010 ; Hogarth & Anguelov, 2003 ; Lusardi, 2001) .

Based on behavioral theory, an individual's decision is more complex. Impulsiveness, procrastination, and lack of motivation drive people toward irrationality and a low level of self-control. Among this group, the establishment of individual rules or conditions will help to improve saving behavior. Benartzi and Thaler (2007) reported that most people tend to use simple heuristics or rule of thumb to help improve their decision-making. Even though simple heuristics may lead to undesired biases, their study reported contrasting results. Applying simple heuristics

to individual saving (e.g., participation in a saving plan, contribution rate, investment allocation), the study found that saving was promoted rather than being delayed.

However, these propositions do not adequately explain saving and wealth accumulation among low-income households. Therefore, the researcher believes the new institutional saving approach would better explain the saving patterns of low-income households.

2.1.3 Institutional saving approach

Institutional saving is a new approach developed to explain the determinants of saving, particularly for low-income households. Beverly and Sherraden (1999) first proposed four saving determinants, but Barr and Sherraden (2005) latter classified institutions more precisely into seven aspects, as follows: 1) accessibility, 2) information, 3) incentive, 4) facilitation, 5) expectation, 6) restrictions, and 7) security. Barr and Sherraden (2005) considered that such institutional aspects would help to promote saving among low-income households. One aspect that has become a popular subject for debate is the information issue in relation to financial products and policies, including the acquisition of sufficient knowledge for achieving individual financial goals. Nowadays, there is a variety of financial products in the market, complicating individuals' decision -making. Education is thus an important tool for enhancing the financial literacy of individuals to help them dealing with a complex financial market and optimize their saving and investment decisions. In high-income countries, the role of financial literacy is frequently observed as consumer protection. In other words, financial literacy plays a significant role in retirement planning, investment behavior, debt, and mortgage outcomes as well as macroeconomic implications. Whereas, in low-income countries, financial literacy is associated with accessibility (Xu & Zia, 2012) . However, this study focuses on financial literacy in a developing country, particularly in the context of consumer protection which is rarely discussed. The study of financial literacy will help individuals to improve their knowledge, attitude, behavior, and ultimately financial well-being.

2.1.4 The human capital earnings function

As mentioned previously, self-employed people tend to have volatile incomes and low productivity due to insufficient labor skills which consequently, impacts their ability to save. This study therefore wants to analyze the role of financial literacy on both earnings and saving.

The original earnings function was proposed by Mincer (1974) . The simple model represents the log-linear function between individual earnings and its explanatory variables, namely education and experience. The model can be written as follows:

$$\ln Y_i = \beta_0 + \beta_1 S_i + \beta_2 t_i + \beta_3 t_i^2 + \varepsilon \qquad (1)$$

where the key variables in the earnings function consist of years of schooling (S_i) and working experiences. However, it is difficult to measure experience since it involves personal data (Mostly subject to an individual's own viewpoints or those of the employer's). Therefore, experience (t_i) will be roughly based on age – years of schooling – six, where, "six" is the age when an individual starts his/her first year in school (this may be different across countries). A quadratic function is used to represent labor market experience because benefit from working experiences is likely to decrease over life time. This is known as Mincer's earnings function widely adopted over decades. Several studies have attempted to extend the earnings function into different structural. However, years of schooling and experience remain as essential explanatory factors to explain earnings. One should be careful since these key factors may not explain the earnings function appropriately and the model may suffer from econometric issues such as the omission of variables (Polachek, 2008). For example, educational returns may be overestimated due to the correlation of other factors like family background. Besides educational level, personality also affects earnings. People with the same family background and education may have different earning levels due to their personality. In addition, since experience is an important determinant of earning function, it raises a question whether it is appropriate to calculate experience based on age – years of schooling – six years. This is because when an individual changes his/her job to work in an unrelated field, previous

experience may not have any effect on earnings. However, other factors also affect earnings besides education and experience.

Other explanatory variables should therefore be included in the classical earnings function to reduce the econometric impact, such as gender, race, health status, city size, regional dummy, union membership status, migration status, ethnicity, etc. With these explanatory variables in the model, several empirical studies have added new issues to the earnings function. For example, the wage gap between people of a different gender or race. Female earnings and occupation segregation are also being intensively debated nowadays.

Self-employed workers in Thailand are mainly concentrated in the informal sector without social security. The existence of empirical studies on self-employment earnings has been addressed by Chiswick (1977), Chiswick (1983) and Teilhet-Waldorf and Waldorf (1983). They examined the earnings of self-employed people in Bangkok. Their earnings function included years of schooling, working experiences, place of birth, previous occupation, migration status, gender, race, and weekly hours worked, while the hourly earnings of the self-employed were used as the dependent variable. The studies divided workers into two categories: self-employed (venders, self-employed in construction, and shopkeepers), and, wage workers (unskilled labor in construction, manufacturing and textiles, and government canal cleaners). The results reveal that informal workers earned significantly more than unskilled wage workers in the formal sector. In addition, experience tended to benefit self-employed in both construction and shopkeepers. The studies found that immigrants earn less than those born in Bangkok at the beginning, but they tended to earn more than the native born latter on. No gender discrimination was found among vendors, while the results were ambiguous among self-employed in constructions and shopkeepers. Lastly, race was found to influence the amount of earnings, with a significant difference between Chinese vendors and shopkeepers and non-Chinese in the same careers. Chiswick (1977) tried to apply an earnings function to the 1971 household survey data in Bangkok. She employed an earnings function for both wage earners and self-employed workers and estimated the share of self-employment income, applying the basic human capital earnings function proposed by Mincer (1974). One binary variable was included, namely self-employed workers' income (profit) as a

proportion of their annual income. Moreover, the earnings function was estimated separately for genders. The evidence reveals that *ceteris paribus*, self-employed workers tend to earn more than wage earners. Finally, Chiswick (1977) suggested that an individual managerial skill should be included in the model since this factor help to explain the higher earnings received by white-collar workers.

Clearly, many explanatory variables can be included in the model to investigate the degree to which they affect the earnings function. However, to run their own business and achieve optimum earnings, self-employed people may need at least basic financial knowledge and management skills since these are considered to be important requirements for success of self-employment. Effective financial planning, tracking business performance, and investment decisions tend to require special financial skills. Becker (1975) described human capital as investment in cultivating skills, experiences, and educational knowledge by individuals. Gratton and Ghoshal (2003) defined human capital as the composition of an individual's intellectual, social, and emotional capital. Financial literacy is also part of the human capital necessary for a successful business. Furthermore, other entrepreneurial skills may be considered to influence business performance as well. As cited by Kutzhanova, Lyons, and Lichtenstein (2009); Smith, Schallenkamp, and Eichholz (2007) introduced a skill set that influence entrepreneur performance. They are 1. Technical skills, 2. Managerial skills, 3. Entrepreneurial skills, and 4. Personal maturity skills. However, these skill set may be correlated with an individual financial literacy, for example, financial administrative skills are part of managerial skills. Therefore, this study extends entrepreneurial skills by including the financial literacy component in the assessment.

To apply the earnings function for self-employed workers, this study includes the explanatory variables of financial literacy and entrepreneurial skills, since they are considered to strongly influence earnings. The new extending model is expressed as follows.

$$\ln Y_i = \beta_0 + \beta_1 S_i + \beta_2 t_i + \beta_3 t_i^2 + \beta_4 \text{Finlit}_i + \beta_5 \text{EntS}_i + \beta_6 X_i + \varepsilon \qquad (2)$$

where Y_i is an individual i's earnings in natural logarithm form. $Finlit_i$ is an individual i's financial literacy, $EntS_i$ is his/her entrepreneurial skills, S_i is years of schooling, t_i is training obtained or business experiences, X_i is other exogenous explanatory variables that explain earnings.

2.2 Measurement of Financial Literacy

2.2.1 Definition of financial literacy and its measurement

Nowadays, scholars and policymakers are paying greater attention to financial literacy. But its concept and measurement still remain ambiguous, mainly due to a lack of clear definition and differences in the conceptual frameworks used in each study. Several studies use the term financial literacy and financial knowledge in exchange. But 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 definition of financial literacy. This leads to the differences in their conceptual frameworks, making comparisons among studies virtually impossible. Thus, a general agreement on the definition of financial literacy will help to create a common conceptual framework of financial literacy and clear measurement tools.

In 2002, the Australia and New Zealand Banking Group Limited (ANZ) defined financial literacy as "the ability to make informed judgments and to take effective decisions regarding the use and management of money." The original definition was proposed by Noctor, Stoney, and Stradling (1992). However, this definition has been changed over time and now focuses more on explicit factors (e.g., knowledge, skills, attitudes, behaviors, and personal financial circumstances). In 2002, 2005, and 2008 the conceptual framework for financial literacy focused mainly on an individual's financial knowledge and numeracy, but in 2011 and 2014 it has extended to include financial behavior. The Organization for Economic Co-operation and Development (OECD) in 2012, defined financial literacy as "a combination of awareness, knowledge, skills, attitude, and behavior necessary to make sound financial decisions and ultimately achieve individual financial well-being." This has become the standardized measurement criteria for the measurement of financial literacy among the OECD countries. Xu and Zia (2012) stated that financial literacy

represented a range of financial awareness and knowledge, financial skills, and financial capability. However, an overlap always exists in these definitions, especially between financial literacy and financial capability. For example, the OECD and ANZ include financial behavior as a major component of their financial literacy measurement, and this is often found in several studies. In addition, different terminology can be found in various financial concept studies. Financial capability is more generally used in the UK while financial literacy is commonly used in the US (O'Donnell & Keeney, 2010). The term financial capability is based on changes in consumer financial behavior such as financial decisions, while financial literacy mostly highlights the awareness, knowledge, and understanding of financial concepts (Fessler, Schürz, Wagner, & Weber, 2007). It is therefore important to clearly define financial literacy in each study to prevent confusion and improve the standardization of the conceptual financial literacy framework.

Basically, the different definitions and frameworks are likely to produce variations in the measurement of financial literacy. Several researchers have proposed their own methods for measuring financial literacy, depending on how they define it and create the conceptual framework. The traditional financial literacy measurement was captured by financial knowledge in the studies by Chen and Volpe in 1998 and 2002. These researchers provided a set of questions on personal finance knowledge, opinions, decisions and demographics to investigate the level of financial literacy among college students. The results indicate that low financial knowledge among college students leads to a lack of ability in making financial decisions.

Lusardi and Mitchell (2007) developed a new concise set of financial literacy questions, following the four key principles of simplicity, relevance, brevity, and capacity to differentiate. These questions related to the understanding of compound interest rates, inflation, and risk diversification, and have been widely adopted in many studies across countries: Behrman, Mitchell, Soo, and Bravo (2010); Lusardi and Mitchell (2011b) and Clark, Morrill, and Allen (2009) conducted surveys in the U.S.; Bucher-Koenen and Lusardi (2011) in Germany; Sekita (2011) in Japan; Crossan, Feslier, and Hurnard (2011) in New Zealand; Fornero and Monticone (2011) in Italy; Almenberg and Säve-Söderbergh (2011) in Sweden; Alessie, Van Rooij, and Lusardi (2011) in the Netherlands; Klapper and Panos (2011) in Russia; and more

recently, Boisclair, Lusardi, and Michaud (2017) in Canada; and Kalmi and Ruuskanen (2018) in Finland. Based on three main questions, the results across countries reveal that mathematical skills ability is higher in developed counties such as Sweden and the Netherlands, with respondents receiving higher scores for numeracy. Historical economic experience also played a significant role in responses to questions on inflation. For instance, Japan is a country with experience of pension privatization, while respondents from Sweden had a better understanding of risk diversification questions, than those from Russia and East Germany. Moreover, in well-developed financial markets, people tend to know less about risk diversification. Lusardi and Mitchell (2007) also reported that predictive financial planning was captured by understanding compound interest rates. Cole and Fernando (2008) pointed out that this set of questions implied predictive financial decisions. However, it is doubtful whether this concept was sufficiently appropriate to measure financial literacy. Huston (2010) argued that the three questions posed by the aforementioned researchers may not be sufficient to properly reflect the definition of financial literacy due to the lack of personal financial behavior. Moreover, she proposed that the financial literacy definition should consist of two dimensions: knowledge and use. However, O'Donnell and Keeney (2010) argued that financial literacy pays less attention to consumer behavior.

Other studies provide different financial literacy measurements but these are not suitable for direct comparison due to the broad concept of finance. The OECD has 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 UK, and the BVI). The observed data was returned to the OECD for analysis. For Thailand, the Bank of Thailand (BOT) has adopted the OECD financial literacy criteria since 2013 and conducted a survey for every three years. Although the main set of questions follow those of OECD, some questions have been modified to make them suitable in the Thai context. Moreover, the OECD also introduced the PISA test; a financial literacy framework assessment for young people that has been widely accepted around the world. Besides

the survey conducted by the BOT, Pootrakool et al. (2005) also measured an individual financial literacy using the ability of household to compare monthly versus yearly interest rates but they did not give a clear definition of financial literacy.

In the UK, the Financial Services Authority (FSA) is a well-known provider of the financial capability concept, introducing a campaign to improve the knowledge and understanding of individuals on the topic (Personal Finance Research Centre, 2005). The FSA aims to develop financial concepts to help change the financial behavior of individuals through financial capability. The concept of financial capability is broader than financial literacy ((Fessler et al., 2007); (O'Donnell & Keeney, 2010)), and its basic components include managing money, planning ahead, making choices and getting help. These criteria can also be found in the studies by Fessler et al. (2007) and O'Donnell and Keeney (2010).

Other nuanced criteria for financial capability measurement can be found in the ANZ survey on adult financial literacy in Australia. Before 2011, when the criteria focused mainly on financial knowledge and numeracy (See Worthington (2006) for further details). However, the criteria changed in 2011 to focus on financial behavior, consisting of five components: keeping track of finances, planning ahead, choosing financial products, staying informed, and financial control. Moreover, Media Research Consultants Pte Ltd (2015) conducted a survey on financial literacy in Singapore, using similar financial literacy measurement components as the FSA and ANZ, including basic money management, financial planning, and investment knowledge.

In summary, previous studies reveal that definitions and conceptual frameworks for financial literacy vary among organizations and research studies. But there exist some overlaps in measurement and terminology. Three definitions have been discussed, one based on financial knowledge (Lusardi and Mitchell, 2007, 2011a), another on financial behavior (ANZ, 2015) , and a mix of the two by OECD (Atkinson & Messy, 2012). In principle, if a standardized measurement could be found for financial literacy, it would lead to better understanding and cross countries comparison.

Financial literacy has been defined differently across several studies, with sophisticated financial knowledge, financial attitude, or financial behavior also being

counted as a part of the financial literacy measurement, depending on the objective of the study. Financial knowledge is considered as a crucial component in the measurement of financial literacy. However, it may not be appropriate to claim financial knowledge as financial literacy since the former does not include an action term. A person well equipped with such knowledge may exhibit poor financial behavior.

This study outlines the various definitions of financial literacy contained in previous research to develop a clear, easy to understand, conceptual framework and measurement tool for financial literacy as explains in following flowchart.

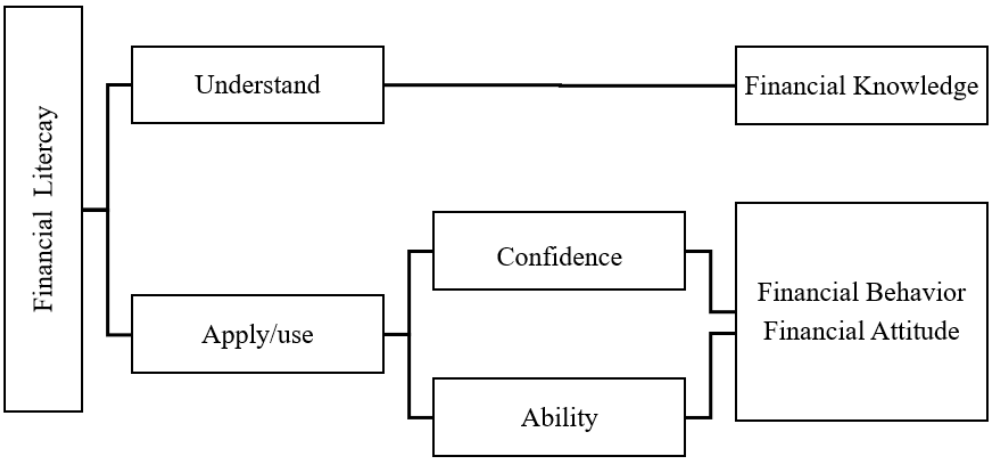

Figure 2.1 Proposed Conceptual Framework for Financial Literacy

Table 2.1 Summary of Financial Literacy Measurements in Current Academic Research

OECD - 2012 (Atkinson & Messy, 2012)	**ANZ-2014 (ANZ, 2015)**	**Lusardi & Mitchell (2007, 2011a)**
Financial knowledge	**Financial knowledge**	**Financial knowledge**
• Division • Time value of money	• Numeracy: the basic mathematical operation of addition, subtraction,	Discount rate Definition of

OECD - 2012 (Atkinson & Messy, 2012)	ANZ-2014 (ANZ, 2015)	Lusardi & Mitchell (2007, 2011a)
• Interest paid on loan • Calculation of interest plus principal • Compound interest rate • Risk and return • Definition of inflation • Diversification • Credit bureau* • Deposit protection law*	multiplication, division, and understanding percentages • Financial understanding and competence • Understanding of risk and relationship between risk and return - Risk and return - Diversification • Understanding the main features of basic financial services • Awareness of the responsibility for debt incurred on credit card by a secondary cardholder • Awareness of the responsibility for repayment of a jointly held loan • Understanding of superannuation • Awareness that employers	inflation Diversification

OECD - 2012 (Atkinson & Messy, 2012)	ANZ-2014 (ANZ, 2015)	Lusardi & Mitchell (2007, 2011a)
	are legally required to make prepayments for their employees • Awareness that employees can make additional superannuation payments to those made by their employer • Awareness of the best indication of superannuation performance • Awareness of financial responsibility • Understanding consumer rights and responsibilities • Awareness that providers of financial products and services have a legal duty to provide clear information to consumers • Awareness that insurers can refuse a claim if the relevant questions are not answered accurately • Awareness that consumers have a duty of honest disclosure when obtaining financial products or services • Awareness of responsibility for loss of money if a PIN is kept with an ATM card	

OECD - 2012 (Atkinson & Messy, 2012)	ANZ-2014 (ANZ, 2015)	Lusardi & Mitchell (2007, 2011a)
Financial behavior	**Financial behavior**	**Financial behavior**
• Considering purchases • Timely bill payment • Keeping track of financial affairs • Long-term financial goal setting • Household budget responsibility • Active saving • Choosing products • Borrowing to make ends meet	• Keep tracking finance • Planning ahead • Choosing financial products • Staying informed • Financial control	-
Financial attitude	**Financial attitude**	**Financial attitude**
• Attitude toward the future	• Financial self-efficacy • Stressed when dealing with money • Impulsivity • Financial aspirations	-

Source: Summary provided by author

Note: * Obtained from the BOT (2013)

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

The lack of financial literacy is widespread even in countries where financial markets are well-developed. Demographically, the pattern of financial literacy trends to have an inverted U shape, with a high level of financial literacy being observed among middle-aged group of population, while the young and elderly are observed to have lower financial literacy. In addition, females had on average, less financial literacy than their male counterpart. People with low educational attainment displayed a low level of financial illiteracy, while income was found to be a positive relationship with an individual financial literacy (Lusardi & Mitchell, 2011c)

Regarding educational attainment, (Behrman et al., 2010) reports that financial literacy is more powerful to wealth accumulation than educational attainment. This implies that merely education alone may not be enough to help improve individual financial decisions on accumulate wealth. Thus, financial literacy is an important component of human capital formation for all individuals. (Lusardi, 2003) explained that different levels of wealth accumulation depended on personal choices of saving Level of financial literacy could play an important role in reducing the cost of collecting financial information of all available saving alternatives. Therefore, individuals equipped with a high level of financial literacy are likely to benefit from having a lower cost of information collection, hence gaining a greater wealth accumulation. This relationship can possibly help to develop the link between financial literacy and an individual's retirement planning. In practice, retirement planning is a complex process and financial knowledge and numeracy skills are needed to make a suitable financial decision.

However, in the context of retirement planning and wealth accumulation, a few studies attempt to investigate the role of financial literacy. Most studies in high-income countries reveal contrasting results regarding the significance of the role played by financial literacy in retirement planning (Lusardi and Mitchell, 2007, 2008 and 2011c; Lusardi, Mitchell, & Curto, 2009; Clark, Morrill, & Allen, 2011, 2012; Pahnke & Honekamp, 2010; Klapper & Panos, 2011; Van Rooij, Lusardi, & Alessie, 2011; Bucher-Koenen & Lusardi, 2011; Sekita, 2011; Boisclair et al., 2017). Sekita (2011) also found that people who saved regularly when they were young, tended to

develop a retirement plan. Clark et al. (2011) included pension knowledge in the financial literacy measurement. However, all results reveal that financial literacy is positively related to retirement planning. Pahnke and Honekamp (2010) reported that in German, for households with above-average incomes, financial literacy seems to play a greater role in their retirement planning. In considering the endogeneity issue, instrumental variables were applied in the study by Bucher-Koenen and Lusardi (2011). The majority of the results still consistently represent that financial literacy has a strongly positive association with retirement planning—with the study by Crossan et al. (2011) being the exception. In conclusion, empirical research reveals that the existence of financial literacy plays a key role in helping people save and plan for their retirement.

2.2.3 Financial literacy and related issues in Thailand

In considering the saving situation in Thailand, Patmasiriwat and Hengpatana (2016) used the 2009 Socio-Economic Survey (SES) to investigate savings, wealth accumulation, and old age pension among Thai households. They found that household's savings rate had decreased continuously over two decades due to changes in consumption patterns and the improvement of accessibility to source of loan in financial sector. Various savings patterns were found among households. An overview revealed that 26 percent of total households had no savings. Both rich and poor households were likely to be faced with insufficient savings in their old age, especially for the poor. Leaving a bequest was the major purpose of saving, followed by health care in old age, and old age consumption respectively.

With respect to retirement savings, the survey on financial literacy by the Bank of Thailand (BOT) in 2013 reported that 77.4 percent of Thai households had some saving, and the proportion of long-term savings (52.6 percent) was greater than that of short term (47.4 percent). Even though the proportion of households with savings was quite high, less attention was paid to whether the amount is sufficient for consumption after 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 respondents expressed their concerns about their current situation and whether they will have adequate savings for retirement even though they had

been saving for a while. Moreover, respondents aged 51 and over had just started saving recently, meaning that they were likely to have insufficient savings upon retirement (Bank of Thailand, 2013).

Turning to the issue of 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 have focused on different characteristics of workers in various sectors of employment.

For the agricultural sector, Paukmongkol (2017)examined the financial literacy level among farmers in Pathum Thani Province and found it to be at a moderate level. Whereas Gongkhonkwa (2019) investigated the cause of debt default by farmers in Phayao Province. The results indicated that a misunderstanding concerning interest rate calculation also affected debt default. In addition, both studies found similar results with farmers experiencing problems with compound interest rate calculation. Augsuchoti and Kangwanpomsiri (2015) employed experimental analysis to establish the effectiveness of a financial training program on saving among the elderly, finding that after the training, financial behavior of the trainees improved and their savings increased. Furthermore, 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 to promote financial literacy and attitudes toward investing for retirement. Auepiyachut (2017) applied a quasi-experimental method to observe changes in financial literacy among contracted university workers. The results revealed that both their financial knowledge and financial attitude improved significantly in the control group, although their financial behavior did not. Moreover, financial literacy was also observed in teenagers by Sathirakul (2016), who measured the financial literacy of undergraduates in business studies; the outcomes revealed that the students had 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 individuals' financial knowledge, financial attitude, and financial behavior respectively.

In reference to its own household survey, the BOT also reported the level of financial literacy of Thai households. The survey results showed that Thai households had an average financial literacy score of approximately 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 the section on financial knowledge whereas the highest scores were the financial attitude and financial behavior sections. Households with a low level of education and in poor paying occupations tended to have low financial literacy. Such households were mostly concentrated in the northeastern region of Thailand. Furthermore, financial education helps to improve financial behavior. Although previous studies indicate a moderate level of financial literacy among various groups, there has not yet been much discussion on self-employed workers.

According to these studies, informal workers are likely to have inadequate savings and financial instability in retirement, and low financial literacy may be responsible for this. The importance of this factor should be investigated in detail and to gain a clear picture of the pattern emerging between financial literacy and saving for retirement among informal self-employed workers.

2.2.4 Entrepreneurial Skills, earnings, and business performance

Since the self-employed or entrepreneurs without employees are mostly concentrated in the trade and service sector and manufacturing, independence and self-management are important strengths. Therefore, equipping this group with entrepreneurial skills will benefit their business performance and earnings. Several studies use profits and sales growth to explain business performance. Effective business performance is also reflected in higher earnings among the self-employed. Skill diversity has also been investigated to identify whether or not it helps to increase business performance.

To extend the earnings issues further, this study adopts financial literacy since it is considered an important influential factor in the earnings performance of self-employed people. This is because financial literacy can be considered a self-employment skill, highly correlated with education level and part of the human capital stock. Higher education attainment is found to be strongly related to financial literacy,

especially financial knowledge. However, financial literacy tends to be low even in persons equipped with a higher education (Atkinson & Messy, 2012; Lusardi & Mitchell, 2011b). Therefore, financial literacy may create an effect that goes beyond education.

Since it is a common belief that a person well equipped with financial literacy has an advantage when making financial decisions, it is important to improve their skills and ability to earn. The findings in this study reveal that the self-employed can be expected to improve their earnings by acquiring financial skills along with education and work experience. Thus, this study attempts to investigate the role of entrepreneurial skills on the earnings and business performance of the self-employed. To define the skills of self-employment, this study focuses on entrepreneurial skills, since these are most correlated with improving earnings and business performance. According to Arayavechkit et al. (2015), employers and the self-employed are entrepreneurs whose main income is derived from business or farm profits.

Skill diversity has recently been introduced into entrepreneurship literature. Cedefop and Tissot (2008) defined a skill as the ability to perform tasks and solve problems (as cited in Ananiadou and Claro, 2009, p. 8). The performance of an entrepreneur is considered to be determined by a combination of various skills and attributes: These include inner discipline, risk-taking behavior, innovativeness, networking ability, change and team-orientated behavior, persistence, operational effectiveness, ability to communicate effectively, design-oriented behavior, research and development, environmental scanning, planning, decision-making, marketing, financial literacy, etc. (Smith et al., 2007; McElwee, 2008; Cooney, 2012). Therefore, self-employed skill sets are a combination of technical, management, entrepreneurial, and personal maturity skills. This criteria has been adopted in many studies to investigate the level of self-employed skills across different industrial sectors and their effect on business performance (Kutzhanova et al., 2009; Smith et al., 2007, Phelan & Sharpley, 2011; Cooney, 2012). To be successful in business, entrepreneurs must have expertise in financial management which involves accounting, costing, and budgeting, in parallel with their other activities (Ali, Anderson, McRae, and Ramsay, 2016). Aliyu (2015)suggested that managerial skills benefit the business function and are key to success or failure. Entrepreneurial skills are also found to be a crucial part

of new ventures and start-ups (Carter & Tamayo, 2017; Shabbir, Shariff, & Shahzad, 2016). This is because such skills involve environmental scanning and recognizing market gaps which are important for a new venture. Technical skills also help entrepreneurs to work effectively (Lyons, 2002).

Financial literacy is included as an entrepreneurial skill since it is found to be related to self-employment (Ćumurović & Hyll, 2019) and should help to create additional earnings. Fatoki (2014) points out that financial literacy improves an individual's competency in addressing business needs. Financial knowledge captures both numeracy skills and financial understanding, while financial behavior demonstrates the ability of an entrepreneur to regularly perform effectively and express an opinion on financial matters. The earnings function is more useful for increasing this variable.

However, the problems experienced with measuring financial literacy and savings are similar, since they both exhibit unclear patterns, and still lack consistency and standardized measurement formats from the perspective of business performance. In terms of business performance, the measurement of financial literacy shows a varying pattern. Wise (2013) stated the financial literacy level depends on the entrepreneur's familiarity with financial statements and ratios. Whereas Fatoki (2014) considered that financial planning, book-keeping, understanding funding sources, business terminology, finance and informal skills, use of technology, and risk-management to be important. Oseifuah (2010) used mathematical and computer literacy, financial attitude, financial knowledge, and financial behavior to observe financial literacy among young entrepreneurs. In addition, firm performance can be affected by Eniola and Entebang (2016). Financial ratios and statements are employed in the study by Wise (2013) to analyze the probability of business closures and loan repayments, while financial literacy was observed among the skills mostly found in young entrepreneurs (Bruhn & Zia, 2011; Wise, 2013) .

Regarding business performance, low financial literacy was observed in owners of new micro-enterprises in South Africa (Fatoki, 2014). Financial literacy also increases the probability of venture success. In contrast, the outcomes of financial literacy on business performance are reported as the low financial literacy of

entrepreneurs contributing to business failure and vice versa (Bruhn & Zia, 2011; Nunoo & Andoh, 2011; Wise, 2013; Kotze & Smit, 2008; Drexler et al., 2014).

Although financial literacy is not widely discussed in the context of entrepreneurial skills, it is considered to be an appropriate proxy for explaining knowledge acquisition, behavior, and attitude toward financial matters. This is because a person with a better understanding of financial concepts is believed to have the advantage of operating a business more effectively. In addition, the benefits of financial literacy presented in this study cover financial knowledge, financial behavior, and financial attitude. These components can reflect the specific personal characteristics of the self-employed toward financial expression.

CHAPTER 3

METHODOLOGY

This chapter presents the methodology employed in this study They consist of the econometric model for analysis, source of data used, sampling design, together with measurements of variables.

3.1 Econometric Model

The dependent variables in this study are planning for retirement, individual's wealth accumulation, and their earnings. Planning for retirement is measured using a dummy variable while wealth accumulation and earnings are continuous dependent variables. Therefore, Probit regression is suitable for analyzing a retirement saving plan, while the multiple linear regression is employed to analyze the wealth accumulation and earnings model respectively.

3.1.1 Probit regression

A Probit model is employed to measure the binary outcome of the dependent variable where the data value is either 1 or 0. Therefore, the estimation is based on the maximum likelihood estimator (MLE). The advantage of using the MLE instead of ordinary least squares (OLS) is that it helps to control the heteroskedasticity problem. Probit regression has been used in several studies (Lusardi & Mitchell, 2008, 2011a; Klapper & Panos, 2011). Details of the Probit model is as following.

$$\Pr(Y = 1 | X) = \Phi(z)$$

$$G(z) = \Phi(z) = \int_{-\infty}^{z} \emptyset(v)dv,$$

$$\Phi(z) = 2\pi^{-1/2} \exp(-z^2/2)$$

Where G is the standard normal cumulative distribution function (cdf) and $\Phi(z)$ is the standard normal density.

The empirical planning for retirement model can be written as

$$P(Y^i_j = 1| x) = \Phi (\alpha_0 + \beta_i X_i + \beta_i FL_i + \varepsilon_i) \quad (1)$$

Where;

Y^i_j is a binary variable, equals to 1 if person 'i' has a retirement saving plan and can follow the plan, hence will be called 'a planner') and equals to 0 if the definition of 'planner' is not satisfied.

X_i refers to the determinant variables, including demographic and household characteristics, such as genders, age, marital status, region, and individual earnings.

FL_i refers to the financial literacy components which is the main variables of interest in this study. consisting of financial knowledge, financial behavior, and financial attitude.

α_0 is a vector of intercept; β_i is a vector of coefficient; ε_i is an error term

3.1.2 Multiple linear regression (MLR) model

Multiple regression is applied to establish the effect of financial literacy on the earnings of self-employed people because the dependent variable of earnings is a continuous variable referring to monthly income. the general multiple linear regression (MLR), can be written as follows

$$Yi = Y^i_j = \alpha_0 + \beta_1 X_i + \beta_i X_i + \varepsilon_i \quad (2)$$

Where $\alpha_{0\ is}$ the intercept, β_1 is the parameter associated with X_1, β_i is the estimated parameter associated with X_i, ε_i is the error term or disturbance with a normal distribution, to obtain $\beta_{i,}$ the MLR estimator will be applied.

Mincer earnings equation is employed in this study. But education attainment and work experience may not be enough to explain all earnings of self-employed workers, and cause the estimated results not to be reliable due to omitted variables. Therefore, this study includes other variables in the earnings model, namely demographic and socio-economics characteristics, represented as follows

$$LN(Y^i_j) = \alpha_0 + \beta_1 SCH_i + \beta_1 Exp_i + \beta_1 Exp^2_i + \beta_1 X_i + \beta_2 FL_i + \varepsilon_i \quad (3)$$

Y^i_j is the natural log of monthly earnings of individual i..

SCH_i is years of schooling

Exp_i is working experience, calculated from the formular: "age – years of education – 6"

X_i refers to demographic and household characteristics of individuals.

FL_i refers to financial literacy components consist of financial knowledge, financial behavior, and financial attitude.

α_0 is a vector of intercept; β_i is a vector of coefficient; ε_i is an error term

In addition, an individual's wealth accumulation will be estimated using the following MLR equation.

$$(Wealth^i_j) = \alpha_0 + \beta_1 IND_i + \beta_2 HH_i + \beta_3 FL_i + \varepsilon_i \quad (4)$$

$Wealth^i_j$ refers to wealth accumulation of person i, measured by net worth per head of household (total household's assets minus household's divided by household's members). It is possible for this amount to have a negative value in the case where total assets of household are less than total household's debt. Therefore, amount of wealth per head will be rescaled by dividing 10,000 in order to keep negative values and make interpretation easier.

IDV_i and HH_i are determinant variables of demographic and household characteristics.

FL_i refers to financial literacy consisting of financial knowledge, financial behavior, and financial attitude.

α_0 is a vector of intercept; β_i is a vector of coefficient; ε_i is an error term

3.2 Data and Sample Design

Both primary and secondary cross-sectional datasets are employed in this study. The primary data set is a field survey data whereas the secondary dataset is the Socio-Economic Survey (SES) conducted by the National Statistical Office (NSO) in Thailand with a financial access survey of Thai households (FA). The BOT and NSO have collaborated to collect financial access and financial literacy of households since 2002. The information is collected on a quarterly basis through SES. There are five

such surveys: 2002–2003, 2006, 2010, 2013, and 2016. The measurement of individual's financial literacy is based on OECD's definition 2012.

The objective of the primary survey is to collect additional information not included in the SES and FA dataset. The survey consists of two main parts. The first part is entrepreneurial skills and business information, while the second part contains an extended version of financial literacy, adopting some of the Australia and New Zealand Banking Group Limited (ANZ) criteria. The main reason that researcher conducted this field survey because some information from the interview may be helpful to explain earnings ability of self-employed workers in the real world, such as financial knowledge includes information on awareness of both consumers' and producers' responsibility, financial attitude includes self-efficacy, and financial aspirations information.

In summary, this study uses two financial literacy criteria. For the data obtained from NSO (SES data). Questions on financial literacy is based on the OECD criteria. SES data is employed to analyze factors that affect planning and wealth accumulation. But for the earnings analysis, entrepreneurial skills are not available in SES data, a field survey thus is necessary. However, one advantage of a field survey is that, besides providing entrepreneurial skills, self-employed behavior and other characteristics can also be observed. ANZ-2014 criteria hence are applied in the field survey.

3.2.1 Primary data

Sampling design

The research chose Mahasarakham Province since it is a medium-sized city with a comparative economy to other provinces in the northeastern region. GPP and GPP per capita of Mahasarakham Province are ranked 10^{th} and 12^{th} in the northeastern region, respectively. Mahasarakham is a second-tier city, with an urbanized population which has grown wealthier and achieved better living standards due to an establishment of a large educational center in the province. Two large universities (Mahasarakham University and Rajabhat Mahasarakham University) are situated near the city, attracting a considerable number of students and businesses to the area.

Moreover, a second-tier city allowed researcher to observe the limitations in businesses operations, transportation system availability, and the level of financial accessibility. It is important to focus on a second-tier city in order to suggest some specific guidelines that might enhance savings and earnings of self-employed workers. in Mahasarakham province. Furthermore, the benefit of a medium-sized city (Town municipality or Tessaban Mueang) is that more than half of provinces in Thailand exhibit similar economic patterns to Mahasarakham Province. The results of this study can be applied with other cities with the same economic patterns and labor market structure.

Moreover, in collection of personal data like business profits or savings behavior, familiarity with respondents is important to complete a questionnaire. Since the researcher works at the Mahasarakham University, the acquaintance with local people is useful for data collection. Further details of the data collection steps are presented in Figure 3.1

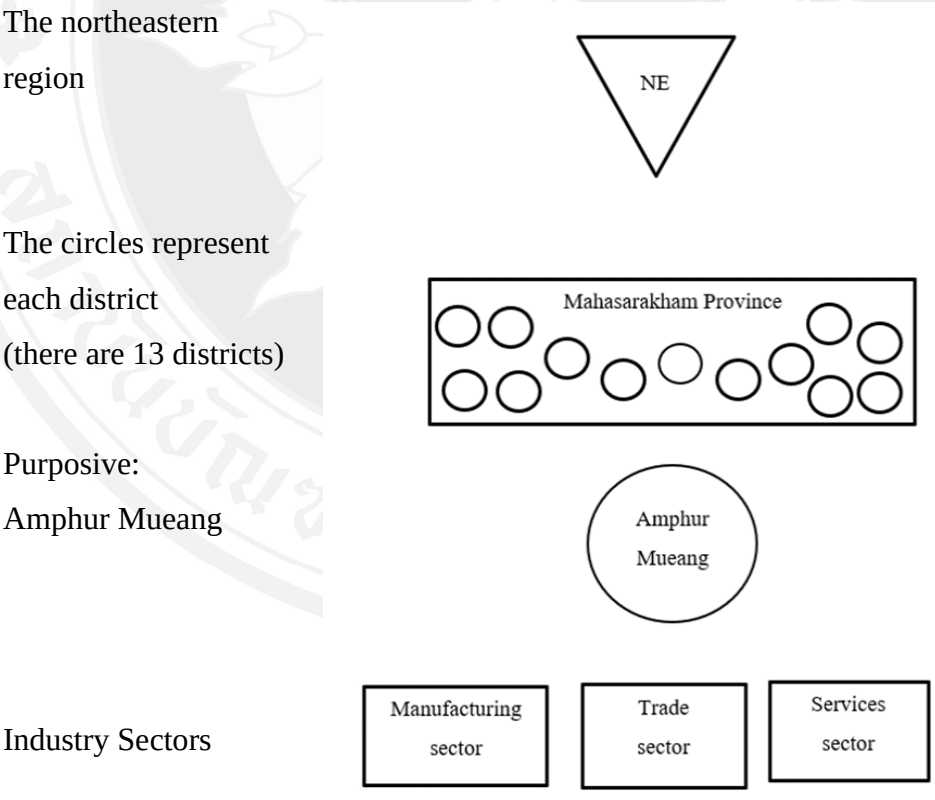

Figure 3.1 Sampling Procedure

The purposive sampling method involves the selection of a sample group in accordance with the objective of this study. Moreover, purposive sampling is cost-effective and helps to mitigate time constraints. Using purposive sampling, Aumphur Mueang Mahasarakham was selected as the location of a field survey. This is a medium-sized city with a large economy and the most densely populated in comparison to other districts in Mahasarakham Province.

After deciding on the survey area, the number of observations are calculated using the formula proposed by Yamane (1967). Based on the total labor force working in the non-agricultural sector, self-employed persons in Mahasarakham Province in this study refer to employers in small business and those working on their own account. Employers are considered to be micro-enterprises with less than five employees, whereas those working on their own account consist of individuals who work alone or without employees, and also include persons who are unpaid family workers. The NSO (2018) defines informal employment as "employed persons who are not protected or have no social security from work like formal employment." However, agricultural workers are not included in the survey due to their unique working skills and different working conditions than non-agricultural workers. For example, agricultural employment and income depend on uncontrollable factors like weather conditions. There are 85,298 self-employed persons according to the definition mentioned above. The population is calculated from the LFS-Q12018, using population weight.

The standard error is set to 10 percent. There are therefore 100 samples required.

$$n = \frac{N}{1+Ne^2} \; ; \; e = 10 \text{ percent}$$

$$n = \frac{85{,}298}{1+(85{,}298)(0.1)(0.1)}$$

$$n = 100$$

Following the NSO definition, this study contains 20 industrial sectors excluding agricultural sector. Proportion of the population are used to calculate proportion of sample in each sub-sector as shown in Table 3.1. In the case that sample in some sub-sectors could not reach. researcher will replace that observation with

some other sub-sector so as to maintain the 10 percent significance level for sample estimation.

Table 3.1 Populations and Samples by Industrial Sector in Mahasarakham Province

No.	Industry category	Population in each sector	Proportion in each sector	Samples (100 observations)
1	Agriculture, forestry, and fishing	Not included in the survey		
2	Mining and quarrying	N/A	N/A	N/A
3	Manufacturing	24,905	29.20	29
4	Electricity, gas, steam, and air conditioning supply	N/A	N/A	N/A
5	Water supply; sewerage, waste management, and remediation activities	N/A	N/A	N/A
6	Construction	851	1.00	1
7	Wholesale and retail trade; repair of motor vehicles and motorcycles	39,479	46.28	46
8	Transportation and storage	2,092	2.45	3
9	Accommodation and food service activities	13,578	15.92	16
10	Information and communication	220	0.26	1
11	Financial and insurance activities	N/A	N/A	N/A
12	Real estate activities	517	0.61	1
13	Professional, scientific, and technical activities	487	0.57	1
14	Administrative and support service activities	N/A	N/A	N/A

No.	Industry category	Population in each sector	Proportion in each sector	Samples (100 observations)
15	Public administration and defense; compulsory social security	N/A	N/A	N/A
16	Education	109	0.13	1
17	Human health and social work activities	N/A	N/A	N/A
18	Arts, entertainment, and recreation	230	0.27	1
19	Other service activities	2,830	3.32	3
20	Activities of households as employers; undifferentiated goods- and service-producing activities of households for their own use	N/A	N/A	N/A
21	Activities of extraterritorial organizations and bodies	N/A	N/A	N/A
	Total	**85,298**	**100**	**103**

Note: Author's calculation. A random sample of 103 observations was calculated based on the Labor Force Survey 2018 (LFSQ3/2018) using the proportion of labor in each industry.

20 industrial sectors were grouped into three main sectors, namely manufacturing, trade, and services. The number of samples are shown in Table 3.2 There are 29, 47, and 34 observations for the manufacturing sector, trade sector, and service sector, respectively. The random sample of 110 exceeded the target. However, the number of samples are within the targeted scope, as detailed in Table 3.2

Table 3.2 Summary of Samples by Industry Sector

Industries by sector	Target samples	Obtained samples
Manufacturing sector	29	29
Trade sector	46	47
Service sector	28	34
Total	103	110

Source: LFS Q3: 2018, Author's calculation.

Note: The service sector includes real estate activities, information and communication, transportation and storage, accommodation and food service activities, arts, entertainment and recreation, construction, professional, scientific, and technical activities, education, and other service activities.

Questionnaire design

The questionnaire for field survey consists of six parts: demographic characteristics, personal financial information, saving and planning for retirement, business information, entrepreneurial skills, and financial literacy. There exists a letter to respondents asking first for their permission of an interview survey. All respondents received an explanation of the purpose of this study and a brief summary of information required from them. The questionnaire was developed using the BOT-Financial access framework as a guideline, subsequently referred to in this study as the BOT/FA-Q12013 and ANZ-2014 framework. However, the questionnaire was later extended to include skills of self-employment which were omitted from the SES survey. The set of questions concerned business ownership, retirement planning participation, financial management information, and financial literacy. The financial literacy criteria were created on the basis of the OECD framework, but extended to following the ANZ-2014 criteria as well. This is because the measurement of financial attitudes is more in details and can better reflect personal traits than that of the OECD framework. A pretest survey was conducted to correct the questionnaire, with all suggestions and comments considered in the revision process. Due to the number of the questions, and the fact that several required responses of a private

nature, multiple-choice questions were created to obtain data easily and qualitatively. The interview process also allowed for the needs of respondents. A summary of the data collected is presented in Table 3.3

Table 3.3 Details of a Field Survey Questionnaire

	Data	Information	Questionnaire numbers
1	Personal characteristics	Demographic characteristics (age, gender, education level, marital status, family background, and risk preference) , financial literacy self-assessment	1-14, 71-73, 125
2	Personal income	Sources and amount of incomes	15
3	Personal expenditure	Types and amount of expenses	16
4	Personal property Personal financial assets Personal liability	Current debt situation Source of loan(s), reason for loan(s), financial accessibility	17-26
5	Planning and saving for retirement	Saving patterns, knowledge of savings, savings objective, Saving for retirement patterns and knowledge of retirement saving	27-40
6	Details of business operation	General information on the business operation Characteristics of the business	41-50

	Data	Information	Questionnaire numbers
7	Details of entrepreneurial skills (Katz, 1955, (Katz, 1955) 1974; Smith, et al., 2007; Phelan and Sharpley, 2012)	Managerial skills/conceptual skills: Ability to see the big picture, thinking and analyzing as well as having good problem-solving skills Technical skills/entrepreneurial skills Knowledge of business processes and the ability to conduct business Human skills/maturity skills: Working, interacting, and communicating with others, including human relationships	52-70
8	Financial knowledge	Financial services and access Numeracy skills Financial knowledge Knowledge of the economy Understanding consumer protection rights, debt settlement, financial responsibility English comprehension	51 74-96
9	Financial behavior	Financial tracking Planning ahead	97-107

	Data	Information	Questionnaire numbers
10	Financial attitude	Choosing financial products Staying informed about finances Financial control Financial self-efficacy Level of stress when dealing with financial situations Financial aspirations Impulsivity level	108-124

Note: The full version of the questionnaire can be found in the appendix B

3.2.2 Secondary data

This study used the SES data rather than the Labor Force Survey (LFS). This is because SES provides information on household's income, expenditure, asset accumulation, debt, housing characteristics, and financial access, all of which are key variables of this study. The data is a national household cross-sectional survey conducted by the National Statistical Office of Thailand (NSO), with the main objective of collecting household socioeconomic information. However, the objective of this study is to focus on data at the individual rather than household level since planning for retirement and financial literacy are personal knowledge and behavior. Therefore, it is more appropriate to analyze the data at the individual level. According to the financial accessed information (BOT/FA), the data is included in the SES since 2002 and will be called the SES-BOT/FA in this study. Since 2013, SES-BOT/FA followed the financial literacy measurement of the OECD for comparison with other countries. In 2016, the survey was updated and adapted to include questions on financial literacy and other financial aspects. However, this study uses data based on the first quarter of 2013 i.d., SES-BOT/FA-Q12013 since it provides a complete information of household's income. Unfortunately, the updated dataset in to 2016, does not provide the majority of income data used in this study. Government and state enterprise employees were not included in this study because they have social security

coverage and their incomes are more stable income than self-employed workers. After data cleaning, only members of households reporting their individual incomes are taken into account in this analysis. there are 6,712 observations in this study.

3.3 Measurement of the Variables

3.3.1 Earnings and measuring, planning, and saving for retirement

Retirement planning is considered to be a matter of self-assessment action. Therefore, to measure retirement planning, this study asks the question, “Have you thought about saving for retirement or have a retirement plan yet?” The level of action is categorized into two types: planners and non-planners. A planner is someone who answers, “I am thinking about saving for old age plan and trying to make a saving plan,” or “I do have a saving for old age plan and have started saving.” For non-planners, the level of action refers to those who claim, “I have not thought about saving for old age plan yet,” or “I have thought about it but have not started saving for old age plan.” The level of saving for old age plan is also associated with wealth accumulation (Van Rooij et al., 2011; Ameriks, Caplin, & Leahy, 2003). Therefore, this study employs wealth accumulation as a dependent variable to capture the long-term savings aspect. The measurement of wealth accumulation is adapted from Ameriks et al. (2003) which is calculated as follows:

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

In case of earnings, it is measured according to the income or profit received from work or business operations and provided by both SES-BOT/FA-Q12013 and the field survey. However, earnings from SES-BOT/FA-Q12013 are represented as negative due to the profit or loss of self-employed persons, whereas earnings from the field survey report only positive amounts. This may explain that most of the respondents gave a rough estimate of their own income during the period of survey. Therefore, earnings will be used in this study to capture a business or working performance.

3.3.2 Saving for retirement and earnings analysis

In the context of savings, it is first necessary to plan and save for retirement and wealth accumulation. Two dependent variables are introduced to meet the objectives of the study.

Table 3.4 Saving for Retirement and Earnings Analysis

Saving for retirement			
	Measurement	**Data source**	**Methodology**
Saving and Planning for retirement	Planner (Level of planning)	SES-BOT/FA-Q12013 The field Survey	Probit regression and Logit regression (MLE) Descriptive statistics
Wealth accumulation	Net worth per head	SES-BOT/FA-Q12013	Multiple regression (Multiple linear regression (MLR))

Note: Using logit regression for testing robustness of Probit regression. In the context of earnings, the second step is to investigate the influence of financial literacy on earnings among the self-employed.

Table 3.4 (Continued)

	Measurement	**Source of data**	**Methodology**
Business /working performance	Earnings (Profits from business operation)	SES-BOT/FA-Q12013 The field Survey	Multiple linear regression (MLR)Descriptive statistics

Source: Author's summary.

Note : The data obtained from the preliminary survey were included for further analysis. The findings are presented in Chapter 4.

3.3.3 Definition and creation of financial literacy for this study

3.3.3.1 Financial literacy definition

As previously mentioned, there are two types of financial literacy: financial knowledge-based and financial behavior-based. In this study, financial literacy is a combination of both "understanding and application." Accordingly, the definition of financial literacy in this study is defined as "an individual's ability to understand and apply basic financial knowledge to improve one own financial skills, financial attitudes, and financial behavior and to make effective financial decisions in managing his/her own money and planning strategy in order to achieve ultimate financial wellbeing."

3.3.3.2 Financial literacy scores based on SES-BOT/FA-Q12013 data

Table 3.5 The Combination of Variables Used to Create the Financial Literacy Components Based on the SES-BOT/FA-Q12013 Data

Financial literacy components	Questions	Interpretation
Financial knowledge (financial and mathematical skills + financial understanding)		
Financial and mathematical skills		
Division	If 1,000 baht is shared between five people, how much will each receive?	1 point for correct answer 0 in all other cases
Time value of money	If money is received next year at a 2 percent inflation rate, can you buy more or less than today?	1 point for correct answer 0 in all other cases
Interest paid on a loan	How much interest is paid if you borrow 100 baht and pay 120 baht in return?	1 point for correct answer 0 in all other cases

Financial literacy components	Questions	Interpretation
Calculation of interest plus principal	How much money is in the account if you deposit 100 baht and gain 2 percent interest per year?	1 point for correct answer 0 in all other cases
Compound interest rate	How much money will be in the account in the next five years if you deposit 100 baht at 2 percent interest per year?	1 point for correct answer 0 in all other cases
Financial understanding		
Credit bureau	If you default on your loan, do you think other financial institutions will know about it?	1 point for who answer yes and 0 for all other cases
Deposit protection law	Are deposits protected under the Deposit Protection Agency Act?	1 point for who answer yes and 0 for all other cases
Financial behavior		
Considering purchases: **Behave1:** Self-control	Before buying something, I always make sure I can afford it.	Rating scale from 1-5: 5 for totally agree, and 1 for totally disagree
Timely bill payment **Behave2**: Bill payment	I pay my bills on time.	Rating scale from 1-5: 5 for totally agree, and 1 for totally disagree

Financial literacy components	Questions	Interpretation
Keeping track of financial affairs **Behave3:** Financial info	I keep track of my financial affairs.	Rating scale from 1-5: 5 for totally agree, and 1 for totally disagree
Long-term financial goal setting **Behave4:** Financial goal	I set long-term financial goals and try to achieve them.	Rating scale from 1-5: 5 for totally agree, and 1 for totally disagree
Household budget responsibility **Behave5:** Household accounting	I make financial decisions and control the household budget. I keep a record of my financial budget.	Who answer yes for both questions will get 1 point and 0 in all other cases
Choosing a product **Behave6:** Product choice	Before using financial services, how do you compare them?	1 point for who answer compare many services from different agency and 0 in all other case
Borrowing to make ends meet **Behave7:** Borrowing	When faced with unforeseen expenses how do you deal them?	1 point for who answer never borrow money to make ends meet and

Financial literacy components	Questions	Interpretation
		0 in all other cases
Financial attitude		
	I prefer to spend money than save for the future.	Rating scale from 1-5: 5 for totally agree, and 1 for totally disagree; Convert score

Source: Author's summary.

3.3.4 Financial literacy component score and its estimation

The financial literacy score is divided into three components

1) Financial knowledge score. The maximum score of financial knowledge is 7 points, obtained using the following formula:

Financial knowledge = (total financial knowledge score/total maximum number of points for financial knowledge questions) x100

2) Financial behavior score consists of both the rating scale and dummy scale. It will be divided to seven components. For rating scale, there are 4 questions. The score is from 1- 5 points while the rest of three questions are dummy scale. For rating scale, each question is converted to percent as the following formula:

Financial behavior score = (total financial behavior score/5) x 100

3) Financial attitude score. The rating scale from minimum to maximum is 1–5. However, the score will be converted to represent a good financial attitude. The process of estimation is as follows:

Financial attitude score = (total financial attitude/5) x 100

As previously mentioned, an extended version of the financial literacy questionnaire has been prepared based on the field survey. Secondary and primary data will be estimated differently because some primary data questions are not included in the secondary data.

3.3.5 Creating financial literacy for the field survey

According to the financial literacy definition, its components can be created as three main dimensions, the first of which is financial knowledge, the second financial behavior, and the third financial attitude. Financial knowledge reflects the understanding of an individual toward the basic financial concept in everyday life and also involves numeracy skills.

Next, financial behavior reflects the ability to use or perform when dealing with financial management. Although both the OECD and ANZ-2014 provide almost similar measurements, the set of questions proposed by the ANZ-2014 is more detailed. Therefore, the collection of financial literacy data through a field survey based on the ANZ-2014 criteria can be used as a guideline (see Table 2.1 in Chapter 2). To create a financial literacy score, each dimension will be assessed through a set of questions and translated into scores.

Lastly, financial attitude reflects an individual's personal thoughts toward a financial situation and the confidence to deal with money. In other words, it is an emotional dimension. To extend the OECD measurement, a field survey was conducted using a set of questions following the ANZ-2014 measurement criteria. The ANZ-2014's measurement of financial literacy involves much more than questions on financial knowledge and includes both financial understanding and competence as well as awareness of financial responsibility. In addition, the measurement of financial attitudes is more detailed than the secondary data (SES-BOT/FA-Q12013) used in analysis. This is because personal traits are also part of financial attitude.

Financial literacy is a specialist skill and part of human capital. Its concept involves personal financial understanding and use. Basic financial knowledge is

objective whereas financial attitude and financial behavior are subjective. A combination of both is required for financial literacy.

Table 3.6 Components Used in the Field Survey for Measuring Financial Literacy

	Financial Literacy		
	Objective financial knowledge	**Subjective financial knowledge and ability**	
Definition	Understanding basic financial concepts and numeracy	Confidence and application ability	
Components	**Knowledge**	**Behavior**	**Attitude**
Measurements	• Division • Time value of money • Interest paid on loan • Calculation of principal plus interest • Calculation of compound interest • Risk diversification • Financial understanding and competence* • Awareness of financial responsibility*	• Keeping track of finances • Planning ahead • Choosing financial products • Staying informed • Financial control	• Financial self-efficacy* • Dealing with money dealing is stressful* • Impulsivity* • Financial* aspirations

Note: * These components will be used in the field survey, based on the ANZ-2014 criteria.

The reason for measuring financial knowledge followed the ANZ-2014 criteria is to ascertain the extent of an individual's numeracy skills, basic financial knowledge, and understanding. Therefore, the measurement consists of two parts:

financial knowledge (numeracy skills), financial understanding, and competence and awareness of financial responsibility. (See Table 3.7 for further details.)

Financial attitude is also an important component of financial literacy. Attitude refers to an individual's perception of a situation or activity which is reflected in their behavior. It is possible to have a good attitude but exhibit poor behavior, as demonstrated by a person's actions being the opposite of what they actually say. There are four composites of financial attitude based on the ANZ-2014 measurement: self-efficacy, level of stress when dealing with money, impulsivity, and financial aspirations. Financial self-efficacy reflects a person's self-belief that they can change their financial situation. This relates to the financial attitude exhibited by the OECD. A person with a high score in this trait tends to care about the future. Dealing with money is stressful and reflects an individual's ability to manage money in different situations without stress. The majority of people obtaining a high score in this category feel uncomfortable with financial matters even when the financial situation goes well. Impulsivity reflects the level of the risk-taker. High impulsivity reflects the self-image of a risk-taker. Financial aspirations represent a person's desire to achieve financial success. People with high financial aspirations mostly exhibit a strong achievement orientation and place considerable importance on planning their finances.

Financial behavior refers to the actions of people toward financial matters. The composition of financial behavior between the ANZ-2014 and the OECD is quite similar and there is some overlap. This study combines both components (see Table 2.1 for details). High scores in keeping track of finances, planning ahead, choosing financial products, staying informed about finances, and financial control reflect good financial behavior. The next section demonstrates how to calculate financial skill scores from secondary and survey data.

Table 3.7 The Combination of Variables Used to Create the Financial Literacy Components Based on the Field Survey

Financial literacy components	Criteria of measurement Questions	Interpretations
Financial knowledge		
Numeracy skills	Similar to SES/FA-Q12013 (Table 3.5) (#74–#80), (#82–#83)	
Financial understanding and competence	• Investments with high returns are often retained in large numbers. Is this right or wrong? (#80)	1 point for correct answer 0 in all other cases
	• If you deposit money in several forms such as banking, buying life insurance, buying and storing gold, the risk of losing your deposit will be reduced. Is this message right or wrong? (#79)	1 point for correct answer 0 in all other cases
	• Awareness of the responsibility for debt incurred on a credit card by a secondary cardholder. (#86)	1 point for correct answer 0 in all other cases
	• Awareness of the responsibility for the repayment of a jointly held loan. (#87)	1 point for correct answer 0 in all other cases

Financial literacy components	Criteria of measurement Questions	Interpretations
Awareness of financial responsibility	• Awareness of financial product and services have a legal duty to provide clear information to the consumer. (#88)	1 point for correct answer 0 in all other cases
	• Awareness that an insurer can refuse a claim if the relevant questions are not answered accurately. (#89)	1 point for correct answer 0 in all other cases
	• Awareness of the responsibility for loss of money if the PIN is kept with an ATM card. (#90)	1 point for correct answer 0 in all other cases
Financial behavior		
Keeping track of finances	• Checks/credit cards/bills/budget payments or transaction account statements (#98–#99–#100)	Rating scale from 1-5: 5 for totally agree, and 1 for totally disagree
Planning ahead	• Establishing a figure for retirement income (#35)	1 point for yes 0 in all other cases
	• Use a financial planner (#107)	1 point for yes 0 in all other cases
	• Use insurance (#31)	1 point for yes 0 in all other cases
	• Setting goals and try to	Rating scale from 1-

Financial literacy components	Criteria of measurement Questions	Interpretations
	accomplish them (#103)	5 : 5 for totally agree, and 1 for totally disagree
Choosing financial products	• Choice and width of search during selection (#105)	Consider insurance policy proposals from different companies and compare them = 2 Consider the various insurance policy proposals of a single company = 1 Choose only the existing insurance policy proposal. Or the people around you = 0
	• When I need a loan to buy a high price product, I always look for loan sources to compare the offers and benefits. I always obtain details before making a decision. (#104)	Rating scale from 1-5: 5 for totally agree, and 1 for totally disagree
Staying informed about finances	• Use of financial professionals (#107)	1 point for yes 0 in all other cases

Financial literacy components	Criteria of measurement Questions	Interpretations
	• I try to stay informed about money matters and finances. (#112)	Rating scale from 1-5 : 5 for totally agree, and 1 for totally disagree
	• I have followed financial news items in the last 12 months. (#106)	1 point for yes 0 in all other cases
Financial control	• I am comfortable with my current debt level. (#25)	1 point for yes 0 in all other cases
	• Have you missed a loan repayment in last 12 months? (#26)	1 point for yes 0 in all other cases
	• I always pay my bills on time. (#102)	Rating scale from 1-5 : 5 for totally agree, and 1 for totally disagree
	• I have never borrowed money or had any debt. (#25)	1 point for yes 0 in all other cases
Financial attitude		
Self-efficacy	• Nothing I do will make a big difference to my financial situation. (#116)	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree
	• Financial planning is only important for those who have a lot of money. (#109)	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree

Financial literacy components	Criteria of measurement Questions	Interpretations
	• Attitude toward the future (Similar to OECD's criteria) (#121–#123) • I only focus on the short term • I live more in the present day than for tomorrow • The future will take care of itself	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree
Stress level when dealing with money	• Dealing with money is stressful and overwhelming. (#117)	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree
	• Even when things are going well for me financially, thinking about money makes me stressed. (#118)	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree
	• If I had a major loss of income, I could manage for a period of time. (#114)	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree
	• I hesitate to spend money, except on absolute necessities. (#120)	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree
Impulsivity	• When it comes to financial matters, I think of myself as a risk-taker. (#115)	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree

Financial literacy components	Criteria of measurement Questions	Interpretations
	• I must admit that I purchase things because I know they will impress others. (#119)	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree
	• I prefer to buy things on credit than to wait and save up. (#108)	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree
Financial aspiration	• It is important to me to have a long-term financial plan. (#110)	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree
	• My parents discussed with me how to manage financial matters when I was growing up. (#124)	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree
	• It is important to me to have a financial plan for the short term. (#111)	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree
	• I would trust a financial professional and accept what they recommend to me. (#113)	Rating scale from 1-5: 1 for totally agree, and 5 for totally disagree

Note: The numbers in parentheses refer to the questionnaire numbers in the appendix B.

3.3.6 Creating the financial literacy score for the field survey

1) Financial knowledge: Financial numeracy skills, financial understanding and competence, and awareness of financial responsibility. The calculation of financial literacy for the field survey is based on the three criteria of the ANZ-2014. A maximum score of 15 points is achievable. The following formula is used to obtain financial knowledge score.

Financial knowledge score = (total financial knowledge score/total maximum number of points for financial knowledge questions) x 100

2) Financial behavior: The financial behavior score uses both the rating scale and dummy scale. Its components consist of keeping track of finances, planning ahead, choosing products, staying informed, and financial control. In the case of financial behavior, the maximum score of 15 points is achievable, 8 points for planning ahead, 7 points for choosing products, 7 points for staying informed, and 8 points for financial control. The following formulas are used to obtain the financial behavior scores.

Keeping track of finances score = (total keeping track of finances score/total maximum number of points from exhibiting particular behaviors) x 100

Planning ahead score = (total planning ahead score/total maximum number of points from exhibiting particular behaviors) x 100

Choosing products score = (total choosing products score/total maximum number of points from exhibiting particular behaviors) x 100

Staying informed score = (total staying informed score/total maximum number of points from exhibiting particular behaviors) x 100

Financial control score = (total financial control score/total maximum number of points from exhibiting particular behaviors) x 100

3) Financial attitude: Financial attitude consists of four categories: self-efficacy, financial stress, impulsivity level, and financial aspirations. In the case

of the self-efficacy, the maximum score is 25 points, with 20 points for the financial stress level, 15 points for the impulsivity, and 20 points for financial aspirations. The following formulas are used for estimation.

Self-efficacy score = (total self-efficacy score/total maximum number of points from exhibiting a particular financial attitude) x 100

Financial stress level score = (total financial stress level score/total maximum number of points from exhibiting a particular financial attitude) x 100

Impulsivity level score = (total impulsivity level score/total maximum number of points from exhibiting a particular financial attitude) x 100

Financial aspirations score = (total financial aspirations score/total maximum number of points from exhibiting a particular financial attitude) x 100

3.3.7 Measuring the entrepreneurial skills score

This study also adapts the entrepreneurial skills assessment introduced by Smith et al. (2007) and Phelan and Sharpley (2012). The criteria are categorized into four major skills: 1. Technical, 2. Managerial 3. Entrepreneurial, and 4. Personal maturity, as detailed in Table 3.8

Table 3.8 Measurement and Interpretation of Entrepreneurial Skills

	Measurement criteria	**Questions and their interpretations**
Technical skills	Operational: the skills necessary to produce the product or service (#57)	• Respondent has expertise and knowledge of business: 5 for strongly agree, and 1 for strongly disagree
	Supplier/raw materials: the necessary skills to obtain them (#67)	• Respondent uses modern business machinery or equipment properly: 5 for strongly agree, and 1 for

	Measurement criteria	Questions and their interpretations
		strongly disagree
	Technology: the skills to identify and obtain it (#53–#54)	• Respondent uses online payment services: 1 for yes, and 0 otherwise • Respondent uses computer software or applications to help manage business: 1 for yes, and 0 otherwise
Management skills	Management: planning, organizing, and networking (#68), (#59)	• Respondent is a member of a group, club or association related to the business in order to receive news or benefits from the cooperation of club members: 5 for strongly agree, and 1 for strongly disagree • Respondent has both short-term and long-term business plans: 5 for strongly agree, and 1 for strongly disagree
	Marketing/sales: identifying customers, and distribution channels (#52), (#55)	• Respondent uses social media such as Line, Facebook, Instagram, etc. to conduct business: 1 for yes, and 0 for otherwise • Respondent has an email specifically for doing business: 1 for yes, and 0

	Measurement criteria	Questions and their interpretations
		otherwise
	Financial: accounting, budgeting (#56)	• Respondent monitors the accounts and manages his/her income regularly and in detail: 5 for strongly agree, and 1 for strongly disagree
	Legal: risk management (#65)	• Respondent always has a plan for handling financial risks: 5 for strongly agree, and 1 for strongly disagree
	Administrative: consumer relations (#64)	• Following the service or sales of products, the respondent is constantly monitoring customer satisfaction: 5 for strongly agree, and 1 for strongly disagree
Entrepreneurial skills	Business concept: business plan (#60)	• Respondent pays attention to strategy such as product and service development, customer service, transportation channels, etc.: 5 for strongly agree, and 1 for strongly disagree • Respondent always makes his/her own business plans: 5 for strongly agree, and 1 for strongly disagree

	Measurement criteria	Questions and their interpretations
	Environmental scanning: recognizing market gaps, exploiting market opportunities (#63), (#62), (#66), (#61)	• The respondents' products and services are different from other products and services in the same business group: 5 for strongly agree, and 1 for strongly disagree • Respondent always sets goals for business and follows them: 5 for strongly agree, and 1 for strongly disagree • Respondent has been educated or tested to produce new products and services for better quality: 5 for strongly agree, and 1 for strongly disagree • Respondent always provides suggestions to customers about products and services: 5 for strongly agree, and 1 for strongly disagree
Maturity skills	Self-awareness: ability to reflect and be introspective (#70)	• Respondent believes that entrepreneurs who are starting a new business can succeed: 5 for strongly agree, and 1 for strongly disagree

	Measurement criteria	Questions and their interpretations
	Accountability: ability to take responsibility for resolving a problem (#69)	• When the respondent receives feedback from customers, he/she will immediately solve any problems: 5 for strongly agree, and 1 for strongly disagree

Source: Author's summary.

Note: The numbers in parentheses refer to the questionnaire numbers in the appendix B.

3.3.8 Entrepreneurial skills estimation

As mentioned earlier, the field survey included extra information relating to entrepreneurial operations and skills. The four relevant skills are technical, managerial, entrepreneurial, and maturity. In the case of technical skills, the maximum score for technical skills is 12 points, with 27 points for managerial skills, 30 points for entrepreneurial skills, and 10 points for maturity skills. The following formulas are used for estimation.

Technical score = (total technical score/total maximum number of points from exhibiting particular skills) x 100

Managerial score = (total managerial score/total maximum number of points from exhibiting particular skills) x 100

Entrepreneurial score = (total entrepreneurial score/total maximum number of points from exhibiting particular skills) x 100

Maturity score = (total maturity score/total maximum number of points from exhibiting particular skills) x 100

CHAPTER 4

EMPIRICAL RESULTS AND DISCUSSION

4.1 The Role of Financial Literacy on Saving for retirement and Wealth Accumulation

Recently, scholars become more interested in the relationship between financial knowledge and individual's saving behavior since it is widely believed that financial literacy is a key factor in helping people make wise decisions in this era of digital transformation with a large amount of information. Numerous research studies have documented how an inadequate of financial capability leads to inefficient financial management. The phenomenon also occurs in developed countries with highly developed financial institute. Therefore, a person equips with good financial literacy can handle an overload of information and make a proper plan for his own retirement planning. A high level of financial literacy will help people to manage their financial activities efficiently and ultimately contribute to a sustainable development. Lately, the issue of financial literacy has been much discussed internationally since it can help to improve retirement saving and wealth accumulation. Financial literacy is considered to be crucial to income security for retirement around the world (Lusardi & Mitchell, 2011c). This chapter examines the role of financial literacy in planning for retirement and wealth accumulation among self-employed workers.

4.2 Descriptive Statistics

4.2.1 The explanatory variables for analysis of a retirement saving plan and level of earnings among self-employed workers.

Several potential variables are added to explain an individual retirement saving plan and the basic Mincerian equation. First of all, gender is considered as an important variable for both planning for retirement and earnings analysis. Different genders may affect level of earnings and decision to save for old age in a different manner due to their differences in physical characteristics, behaviors, or living

conditions. To observe gender discrimination, gender will be included to the analysis using female as a reference group. Secondly, age is also an important variable. Based on the Life Cycle Hypothesis (LCH), individuals tend to smooth their consumption over their life time periods. Therefore, lifetime capturing by age of the respondents will influence the different patterns of personal resources allocation. Thirdly, education and work experiences, this study used years of schooling to express the level of education. Higher education tends to increase workers' productivity which later affects their earnings. Fourthly, marital status, different marital status brings about different household responsibilities. For example, married couple may have more family burden than those who are single. Fifthly, household's location which is captured by regions, municipal or non-municipal areas; because culture and cost of living are different by regions, they thus affect an individual's retirement saving plan and wealth accumulation. In addition, locational environments in different area may generate different opportunities for financial accessibility, financial information, and living conditions. Moreover, different areas also have different labor market conditions which directly affect earnings ability especially of self-employed workers. Therefore, this study divided living areas into four regions, Bangkok metropolitan, and two municipal areas. The four regions consist of the northern, central, northeast and south regions respectively. In the regression analysis, Bangkok and non-municipal area are taken as reference groups. Lastly, working in different industrial sectors may influence earning levels also. Therefore, industrial sectors are included in the earnings equation to indicate different working situations, activities and skills of workers.

This study considers three groups of samples which are describes as follows

1) Whole sample of 6,712 observations including all sectors of employment. However, government officers and state enterprise workers are not included in to the sample due to social security coverage and special benefit from work conditions. Microenterprise refers to employers with employees less than five persons.

2) Subsample with only non-agricultural sector consisting of 4,126 observations.

3) Only Self-employed workers are examined, referring to employers (microenterprise), own-account workers and unpaid family workers in non-

agricultural sectors. A total of 2,127 observations. The preliminary descriptive statistics of variable used in the analysis are reported in Table 4.1. Percentage, mean and standard deviation are provided across different subsamples.

Table 4.1 Personal Characteristics and Financial Literacy of Respondents Classified by Sectors of Employment and Working Status

	Whole sample	**Non-agricultural subsample**	**Self-employed subsample**
	Mean/ Percent/(SD)	**Mean/ Percent/(SD)**	**Mean/ Percent/(SD)**
Number of observations	6,712	4,126	2,127
Male	41.66	39.72	34.09
Age (years)	46.51	44.29	48.57
Year of schooling (years)	7.19	8.25	7.63
Work experience (years)	33.32	30.00	34.94
Married	72.37	66.82	70.66
Bangkok	4.87	7.93	5.45
Central	29.51	36.50	28.81
North	24.81	21.57	24.87
Northeast	25.67	19.92	25.15
South	15.14	14.08	15.70
Municipal areas	57.14	69.82	71.55
Retirement planner	56.09	53.94	61.27
Wealth per head (Baht)	589,433 (3,006,586)	513,296 (1,544,678)	631,163 (1,067,964)
Monthly income	11,650	14,656	15,572

	Whole sample	**Non-agricultural subsample**	**Self-employed subsample**
	Mean/ Percent/(SD)	**Mean/ Percent/(SD)**	**Mean/ Percent/(SD)**
(Baht)	(29,308)	(35,360)	(28,676)
Financial knowledge	49.19	51.53	53.05
Considered purchase; Self-control (Behave1)	86.68	86.52	87.52
Timely bill payment; Bill payment (Behave2)	80.25	80.09	81.19
Keep watching financial affairs; Financial info (Behave3)	81.30	81.17	82.81
Long-term financial goal setting; Financial goal (Behave4)	76.00	76.15	77.71
Response and has household budget; Household accounting (Behave5)	6.68	7.59	10.72
Choosing products; Product choice (Behave6)	58.08	61.22	61.87

	Whole sample	Non-agricultural subsample	Self-employed subsample
	Mean/ Percent/(SD)	Mean/ Percent/(SD)	Mean/ Percent/(SD)
Never borrowing to make ends meet; Borrowing (Behave7)	66.98	68.47	72.54
Financial attitude	64.86	64.73	64.49

Source: National Statistical Office (2013), Author's calculation. Standard deviation is denoted by ( ). Only workers who report income are included in this study. Behave5, behave6 and behave7 are dummy variables. Total maximum score is 100 for financial knowledge, financial attitude and financial behavior components, namely, behave1, behave2 and behave3, behave4.

The first two columns of Table 4.1 present a summary of descriptive statistics that categorize the sample into two main sub groups: whole sample and non-agricultural subsample. The last column is the self-employed in non-agricultural sector which is the key interested group in this study. Overall, there are a slightly higher proportion of female respondents (58–60 percent) than male. The average age of the respondents was 47, but when excluding agricultural workers, the average age declines to 44 years, most of whom are married. Focusing on self-employed workers, more than 67.4 percent of self-employed workers are female. Moreover, three-quarters of self-employed workers are married. Self-employed workers are found to be aged approximately 48.57 years on average, 72 percent of whom are married. As can be observed, the majority of respondents are in the middle age range. Therefore, working and making financial plans for the future are considered to be the important issues of this age group.

Regarding education, on average, respondents received seven to eight years of schooling, almost reaching the compulsory education target. However, when excluding agricultural workers (second column), the education period increased

slightly. Based on three subsamples, the self-employed spend the lowest number of years in education on average compared to other subsample groups.

According to region and living area, most workers reside in the central, northeastern, and northern regions, respectively. Regarding subsamples, non-agricultural workers tend to be concentrated in the central, and northern regions, respectively, with self-employed workers predominantly concentrated in the central region, followed by the northeast and northern regions in almost similar proportions. In considering living areas, different living location are related to work conditions. More than half of the whole sample living in municipal areas. However, when excluding agricultural workers, the results become largely differ from the whole sample. This means that non-agricultural workers around 70 percent live in municipal areas whereas whole sample reports around 57 percent living in municipal areas. This implies that agricultural workers mostly live outside municipal areas whereas non-agricultural workers living in municipal areas. In addition, self-employed workers also mainly settle in municipal areas, with about two-thirds located in municipal areas.

Focusing on a retirement saving plan, the key findings show that more than half of the whole sample are retirement planners but when exclude agricultural workers, they are least likely to be retirement planners compared to other sub groups. The proportion of a retirement saving plan of non-agricultural group is around 54 percent. It is possible that this subsample is covered by social security or receiving benefits from their workplaces due to share of wage workers in this subgroup. Therefore, they may lack motivation to plan for their own retirement. In addition, their income may be less volatile than their self-employed counterpart, making it less attractive to save for future. The amount of accumulated wealth and financial assets among this group is also less than other working status.

Regarding a retirement saving plan and wealth accumulation, approximately 61.27 percent of self-employed workers plan and save for retirement, whereas wealth accumulation per head is approximately 631,163 baht which show a majority group of planning and saving for old age and own highest net worth per head. In terms of earnings, the whole sample group earns 11,650 baht per month on average, while for non-agricultural workers subsample, the amount is slightly higher which is 14,656

baht on average. While self-employed workers earn highest approximately 15,572 baht.

The components of financial literacy analysis consist of financial knowledge, financial behavior, and financial attitude. According to the data, the whole sample has a moderate score for financial knowledge, but a good score for financial attitude. However, when agricultural workers are excluded from the whole sample, the financial knowledge score increases slightly. In considering self-employed subsample, they receive the highest score for financial knowledge, in contrast to whole sample who receive the lowest score. This is because agricultural workers share high proportion in the whole sample which an average score is dominated by agricultural workers. For financial behavior, its components are divided to analyze individually. The data indicates that all three groups have high score in consider purchase (Behave1), timely bill payment (Behave2), and keep watching financial affairs behavior (Behave3). These three components report approximately greater than 80 percent of total 100 maximum score. However, long term financial goal setting (Behave4) shows slightly lest score which is around 76 percent of total 100 maximum score. In addition, around 58 percent of the whole sample claim that they chose and compare products before they buy (Behave6), while considering non-agricultural subsample and self-employed subsample, the proportion slightly increases to 60 percent. Moreover, considering experience of borrowing for living expenses (Behave7), only self-employed groups claim that they have no borrowing experiences exceed 70 percent. Furthermore, less than 10 percent of all groups claim that they manage and keep a record of their financial budget (Behave5). This considers as poor behavior of tracking finances.

Regard with financial attitude, approximately 65 percent of whole sample receiving relatively high scores for financial attitude. This implies that most respondents pay more attention to the future when asked to weigh it against living for today.

4.3 A Retirement saving plan and wealth accumulation analysis

Table 4.2 Variables Used in This Study for SES Data

Variable		Meanings
Dependents		
	Retirement Planner	Dummy variable equals 1 if the respondent has a saving for retirement plan, 0 otherwise
	Net worth per head	(Total household asset value minus total debt) divided by number of household members
	Earnings	Monthly labor market income
Control variables		
	Female	Dummy variable: 1 if the respondent is female, 0 if the respondent is male
	Age, Age^2	Age of respondents (Age^2 is used to examine whether wealth accumulation function is concave)
	Exp, Exp^2	Age – years of schooling – six (Exp^2 is used to examine whether earning function is concave)
Educational attainment	Years of schooling	Continuous variable
	Married	Dummy variable: 1 if marital status of respondent is married, 0 otherwise
	BKK (Reference group)	Dummy variable: 1 if the respondent is living in Bangkok, 0 otherwise
	Central	Dummy variable: 1 if the respondent is living in the central region, 0 otherwise

Variable		Meanings
	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
	Municipality	Dummy variable: 1 if the respondent is living in a municipal area, 0 otherwise
Variables of interest		
Financial literacy		
Financial knowledge		Seven questions of numeracy skills were added and converted to percent (Total score /7) x 100
Financial behavior consists of		
	Behave1: Self-control	Score of self-assessment on considering whether they could afford potential purchase. Respondent's score is divided by five to convert to percent.
	Behave2: Bill payment	Score form 1-5 of self-assessment if respondent pays all his/her bills on time. Respondent's score is divided by five to convert to percent.
	Behave 3 Financial info	Score from 1-5 of self-assessment on the frequency of following financial information. Respondent's score is divided by five to convert to percent.

Variable		Meanings
	Behave 4: Financial goal	Score from 1-5 of self-assessment if the respondent did have a long-term financial goal. Respondent's score is divided by five to convert to percent.
	Behave 5: Household accounting	Dummy variable: 1 if respondent keeps track of household accounting, 0 otherwise.
	Behave 6: Product choice	Dummy variable: 1 if comparing product information before purchasing or searching for information before purchasing, 0 otherwise
	Behave7: Borrowing	Dummy variable: 1 if never borrow money, 0 otherwise
Financial attitude		Score from 1-5 of self-assessment if the respondent feels more satisfying to spend money than to save it for future.
Industrial sectors		
	Agriculture	Agriculture, forestry, and fishing Dummy variable: 1 if the respondent is in the agricultural sector, 0 otherwise
	Construction	Construction Dummy variable: 1 if the respondent is in the construction, 0 otherwise
	Manufacturing and resources	Manufacturing Resources: Mining and quarrying,

Variable	Meanings
	electricity, gas, steam and air conditioning supply, water supply; sewerage, waste management, and remediation activities Dummy variable: 1 if the respondent is in the manufacturing sector and resources sector, 0 otherwise
Trade	Wholesale and retail trade; repair of motor vehicles and motorcycles Dummy variable: 1 if the respondent is in the trade sector, 0 otherwise
Services	Services: Transportation and storage, accommodation and food service activities, other service activities, administrative and support, activities of households as employers, undifferentiated goods and service-producing activities of households for own use Finances: Financial and insurance activities, real estate activities Information: Information and communication Professional: Professional, scientific and technical activities, education, human health and social work activities, arts, entertainment and recreation, public administration and

Variable	Meanings
	defense, compulsory social security, activities of extraterritorial organizations and bodies Dummy variable: 1 if the respondent is in the services sector or financial sector or information sector ow professional sector, 0 otherwise

Source: Author's summary

4.4 Empirical results of retirement saving plan

The regression analysis of a retirement saving plan is considered using whole sample, non-agricultural sub-sample and self-employed sub-sample. Probit regression is used as a main analysis while Logit regression is used to test the consistency of the Probit regression results.

The results of the relationship between a retirement saving plan, socio-economic characteristics of respondents, and their financial literacy are presented in Table 4.3. Marginal effects of Probit regression together with the coefficients of Logit regression and Huber-White's robust standard errors are reported. The analysis whether there exists a multicollinearity problem between education and financial literacy and /or other explanatory variables. This study measures the degree of multicollinearity using correlation analysis, and the results reveal no multicollinearity problem. Details of the multicollinearity test results are presented in the appendix A.

Table 4.3 Probit and Logit Regressions on Retirement Saving Plan for the Whole Sample and Non-agricultural Sub-sample

Variables	**Whole sample**		**Non-agricultural Sub-sample**	
	Probit regression	**Logit regression**	**Probit regression**	**Logit regression**
male	-0.0284**	-0.0286*	-0.0193	-0.0191
	(0.0144)	(0.0147)	(0.0189)	(0.0194)
age	0.0110***	0.0113***	0.0110***	0.0113***
	(0.000685)	(0.000715)	(0.000877)	(0.000922)
year of schooling	0.00293	0.00306	0.00344	0.00366
	(0.00212)	(0.00219)	(0.00256)	(0.00265)
married	0.0382**	0.0380**	0.0349*	0.0346*
	(0.0162)	(0.0167)	(0.0197)	(0.0202)
central	-0.0804**	-0.0842**	-0.0939**	-0.0973**
	(0.0365)	(0.0376)	(0.0374)	(0.0385)
north	-0.113***	-0.116***	-0.102***	-0.105***
	(0.0374)	(0.0386)	(0.0395)	(0.0407)
northeast	-0.0799**	-0.0832**	-0.112***	-0.116***
	(0.0380)	(0.0393)	(0.0402)	(0.0415)
south	-0.0531	-0.0569	-0.0814*	-0.0863**
	(0.0391)	(0.0406)	(0.0424)	(0.0440)
municipal	-0.0288**	-0.0291*	-0.0283	-0.0287
	(0.0146)	(0.0150)	(0.0203)	(0.0209)
Ln(labor income)	0.0209***	0.0208***	0.0292**	0.0296**
	(0.00706)	(0.00728)	(0.0117)	(0.0122)
Financial	0.00245***	0.00250***	0.00211***	0.00216***
knowledge	(0.000326)	(0.000334)	(0.000428)	(0.000441)

Variables	Whole sample		Non-agricultural Sub-sample	
	Probit regression	Logit regression	Probit regression	Logit regression
Self-control (Behave1)	0.00106	0.00107	0.00153*	0.00150*
	(0.000661)	(0.000677)	(0.000853)	(0.000876)
Bill payment (Behave2)	0.00211***	0.00220***	0.00186**	0.00195**
	(0.000654)	(0.000679)	(0.000834)	(0.000870)
Financial info (Behave3)	0.00214***	0.00219***	0.00229**	0.00234**
	(0.000733)	(0.000754)	(0.000954)	(0.000993)
Financial goal (Behave4)	0.00475***	0.00488***	0.00485***	0.00501***
	(0.000579)	(0.000597)	(0.000777)	(0.000811)
Household accounting (Behave5)	0.0950***	0.0989***	0.0761**	0.0799**
	(0.0269)	(0.0277)	(0.0334)	(0.0346)
Product choice (Behave6)	0.00835	0.00904	0.00719	0.00753
	(0.0148)	(0.0152)	(0.0198)	(0.0204)
Borrowing (Behave7)	0.0438***	0.0443***	0.0433**	0.0442**
	(0.0154)	(0.0158)	(0.0203)	(0.0208)
Financial attitude	0.00159***	0.00164***	0.00159***	0.00166***
	(0.000316)	(0.000325)	(0.000413)	(0.000425)
Observations	5,523	5,523	3,346	3,346
Wald chi^2	671.12	614.22	421.43	384.36
Pseudo R^2	0.0983	0.0983	0.1025	0.1026

Variables	Whole sample		Non-agricultural Sub-sample	
	Probit regression	Logit regression	Probit regression	Logit regression
Log pseudolikelihood	-3414.9843	-3414.7736	-2072.1162	-2071.908

Note: ***, **, and * denote coefficients significant at the 1, 5 and 10 percent statistical levels, respectively. Huber-White's robust standard error estimates are given in parentheses.

According to Table 4.3, the results show that both Probit and Logit regressions are consistency. Therefore, the rest of estimation of this study will base on Probit regression only. The results show that gender has a significant effect on a retirement saving decision for the whole sample group. Male are less likely to save than their female counterpart. Age is also associated with a retirement saving plan for both samples, for older people are more likely to plan and save for their retirement. In other words, a year increase in age tends to increase the probability of one's retirement saving plan by 1 percentage point for both samples. However, years of schooling does not appear to make any significant contribution to a retirement saving plan for both groups. In respect of marital status, married people or those with a family are more likely to plan and save for retirement than any other marital groups. This is possible that they may not want to burden their children when they are old. In addition, people in Bangkok have a greater tendency to plan and save for retirement than those in other regions except in the South. However, when focusing on the residential area, people living in municipal areas are less likely to undertake financial planning for retirement as compared to those in country area, but the residential area appears to have no effect on the non-agricultural sector subsample. This means that residential areas have an important role on a retirement saving plan among agricultural workers. In considering income variable, it plays a strongly significant role in a retirement saving plan, as a higher income significantly increases the

probability of a retirement saving plans for both whole sample and the non-agricultural subsample.

Since the main objective of this study is to analyze effect of financial literacy components on a retirement saving plan, financial knowledge and financial attitudes are found to have a positive and strongly significant relationship with a retirement saving plan in both groups. Regrading, the financial behavior components, it consists of seven characteristics. There are self-control (Behave1), bill payment (Behave2), financial info (Behave3), financial goal (Behave4), household accounting (Behave5), product choice (Behave6) and borrowing (Behave7). The findings reveal that self-control behavior (Behave1) is found to be important only for the non-agricultural subsample. Other financial behavior, which are bill payment (Behave2), financial info (Behave3), financial goal (Behave4), household accounting (Behave5) and borrowing (Behave7) all play strongly significant role in a retirement saving plan for both groups, whereas product choice (Behave6) has no significant effect on probability of a retirement saving plan for both groups.

In sum, the findings reveal that keeping track of finances (i.e., household accounting (Behave5), and financial info (Behave3)), financial control (i.e., bill payment (Behave2), borrowing (Behave7)), and planning ahead (i.e., financial goal (Behave4)) are important characteristics for increasing the probability of a retirement saving plan for the whole sample and non-agricultural workers. But self-control (Behave1) is found to influence a retirement saving plan only for subsample in the non-agricultural sector, but has no effect on the whole sample. Product choice (Behave6) is also observed to have no effect on a retirement saving plans.

Table 4.4 Marginal Effects of Financial Literacy on a Retirement Saving Plan Across Whole Sample, the Non-agricultural Workers and Self-employed Workers

Variables	Whole sample	Non-agricultural subsample	Self-employed subsample
		Probit regression	
male	-0.0284**	-0.0193	-0.0176
	(0.0144)	(0.0189)	(0.0260)
age	0.0110***	0.0110***	0.0093***
	(0.0007)	(0.0009)	(0.0012)
years of schooling	0.0029	0.0034	0.0026
	(0.0021)	(0.0026)	(0.0034)
married	0.0382**	0.0349*	0.0476*
	(0.0162)	(0.0197)	(0.0275)
central	-0.0804**	-0.0939**	-0.0146
	(0.0365)	(0.0374)	(0.0586)
north	-0.113***	-0.102***	-0.0470
	(0.0374)	(0.0395)	(0.0596)
northeast	-0.0799**	-0.112***	-0.0636
	(0.0380)	(0.0402)	(0.0600)
south	-0.0531	-0.0814*	-0.0646
	(0.0391)	(0.0424)	(0.0627)
municipal	-0.0288**	-0.0283	0.0152
	(0.0146)	(0.0203)	(0.0274)
Ln(labor income)	0.0209***	0.0292**	0.0126
	(0.0071)	(0.0117)	(0.0131)
Financial knowledge	0.0025***	0.0021***	0.0018***
	(0.0003)	(0.0004)	(0.0006)
Self-control (Behave1)	0.0011	0.0016*	0.0012
	(0.0007)	(0.0009)	(0.0012)

Variables	Whole sample	Non-agricultural subsample	Self-employed subsample
Bill payment (Behave2)	0.0021***	0.0019**	0.0012
	(0.0007)	(0.0008)	(0.0011)
Financial info (Behave3)	0.0021***	0.0023**	0.0040***
	(0.00073)	(0.0010)	(0.0013)
Financial goal (Behave4)	0.00475***	0.00485***	0.00433***
	(0.0006)	(0.0008)	(0.0010)
Household accounting (Behave5)	0.0950***	0.0761**	0.0505
	(0.0269)	(0.0334)	(0.0379)
Product choice (Behave6)	0.0084	0.0072	0.0101
	(0.0148)	(0.0198)	(0.0260)
Borrowing (Behave7)	0.0438***	0.0433**	0.0116
	(0.0154)	(0.0203)	(0.0280)
Financial attitude	0.0016***	0.0016***	0.0017***
	(0.0003)	(0.0004)	(0.0005)
Observations	5,523	3,346	1,792
Wald chi^2	671.12	421.43	165.01
Pseudo R^2	0.0983	0.1025	0.0765
Log pseudolikelihood	-3414.9843	-2072.1162	-1104.627

Note: ***, **, and * denote coefficients significant at the 1, 5, and 10 percent statistical levels, respectively. Huber-White robust standard error estimates are given in parentheses.

Various group's characteristics may influence the motivation to plan and save for retirement in different ways. This is due to different in level of earnings, demographics, and financial literacy. This study divides sample into three groups as previous mentioned. Self-employed workers subsample is included into this table. It is the main focus group of this study.

Regarding self-employed subsample, age and marital status reveal positive relationship on a retirement saving plan, whereas regional effect, location effect and income level are observed no significant relationship on a retirement saving plan. This is possible that income is not a key factor for increasing probability of a retirement saving plan among self-employed worker due to unstable income. Age may affect individual decision of saving for old age plan since increasing in age will leads to motivation to plan and save for future. According to the findings, age is found to be strongly significant on a retirement saving plan for self-employed workers. In contrast, education does not seem to have any effect on saving for old age plan. With marriage only slightly increasing the likelihood of a retirement saving plan for the self-employed workers.

As previously mentioned, education, location and labor income may not influence a retirement saving plan among self-employed workers. However, financial literacy components have significant effects on a retirement saving plan. Both financial knowledge and financial attitude substantially increase the probability of a retirement saving plan in self-employed. The effect of financial knowledge on a retirement saving plan is also consistent with the findings of Alessie et al. (2011); Van Rooij et al. (2011); Lusardi and Mitchell (2011a); Pahnke and Honekamp (2010); Bucher-Koenen and Lusardi (2011); Sekita (2011); Fornero and Monticone (2011); Boisclair et al. (2017). Financial attitude of self-employed workers is also observed largest coefficient comparing to whole sample and non-agricultural subsample meaning that financial attitude has an effect on planning and saving for old age more than other subsamples. Then, promoting financial attitude will be benefit for self-employed for a retirement saving plan.

Besides, the effect of each financial behavior component on a retirement saving plan differs across groups. The outcomes report that financial info (Behave3) and financial goal (Behave4) significantly promote planning and saving for old age for self-employed workers. Especially, financial info (Behave3) is an important factor for planning and saving for old age since it creates highest probability to plan and save for old age in compare to other groups. On the other hand, keeping track of finances (i.e., financial info (Behave3)) and planning ahead (i.e., financial goal

(Behave4)) significantly increase the probability of a retirement saving plan in the self-employed.

In conclusion, across different subsamples lead to different effects of financial behavior components. Self-control (Behave1), bill payment (Behave2), household accounting (Behave5) and borrowing (Behave7) are important financial behavior for non-agricultural subsample (wage workers). Financial info (Behave3), and financial goal (Behave4) are important for all groups that are agricultural workers, wage workers and self-employed workers. Financial info (Behave3) is especially the most important factor for a retirement saving plan for self-employed due to its coefficient is highest. However, product choice (Behave6) has insignificant impact on a retirement saving plan for all groups.

Table 4.5 Multiple Regression Analysis of Financial Literacy Components on Wealth Accumulation in the Three Groups; the Whole Sample, Non-agricultural Subsample and Self-employed Subsample

Variables	**Whole sample**	**Non-agricultural subsample**	**Self-employed subsample**
male	-1.735	-4.9030	-0.3530
	(8.2540)	(3.4570)	(5.2390)
age	4.5360***	2.4200***	4.2760***
	(0.7730)	(0.6860)	(1.0310)
age^2	-0.0213***	-0.0026	-0.0233**
	(0.0072)	(0.0089)	(0.0100)
year of schooling	3.1630***	3.4500***	4.9720***
	(1.0180)	(0.7890)	(0.9040)
married	-8.2330	-2.8550	-8.3430
	(10.5600)	(3.6180)	(5.2470)
central	1.2390	-14.3300	4.3550
	(16.8000)	(11.4700)	(14.4900)
north	-1.603	-5.095	4.444

Variables	Whole sample	Non-agricultural subsample	Self-employed subsample
	(13.7400)	(14.090)	(15.3800)
northeast	17.7800	2.1260	-3.2560
	(18.7700)	(19.7500)	(14.1900)
south	5.0740	-14.3500	-5.1820
	(16.7800)	(12.5100)	(14.4700)
municipal	-5.9950	0.1310	0.5180
	(7.1790)	(2.6170)	(3.6410)
Ln (labor income)	32.3300***	34.3000**	17.9100***
	(11.0300)	(14.1000)	(2.9310)
Financial knowledge	0.0732	0.2370***	0.3250***
	(0.1480)	(0.0559)	(0.0816)
Self-control (Behave1)	0.1920	-0.3720	0.0767
	(0.4530)	(0.3760)	(0.1950)
Bill payment (Behave2)	0.4610*	0.3180***	0.4020***
	(0.2460)	(0.1030)	(0.1490)
Financial info (Behave3)	-0.1890	0.2870**	0.2100
	(0.3850)	(0.1180)	(0.1900)
Financial goal (Behave4)	0.5240	0.1630*	0.2620*
	(0.4550)	(0.0950)	(0.1400)
Household accounting (Behave5)	21.6500*	27.0900**	24.3600**
	(12.5600)	(13.7200)	(9.8690)

Variables	Whole sample	Non-agricultural subsample	Self-employed subsample
Product choice	-3.3880	0.6370	6.7480
(Behave6)	(7.8330)	(3.0360)	(4.7260)
Borrowing	17.9900***	15.3400***	20.3900***
(Behave7)	(3.4530)	(2.1990)	(3.2500)
Financial attitude	-0.1400	-0.0989	0.0002
	(0.1900)	(0.1020)	(0.1170)
Constant	-487.1000***	-427.9000***	-398.4000***
	(126.3000)	(96.5500)	(48.9100)
Observations	6,712	4,126	2,127
R-squared	0.0290	0.0990	0.1560
F-test	23.2200	20.8000	10.4900

Note: ***, **, and * denote coefficients significant at the 1, 5, and 10 percent statistical levels, respectively. Huber-White robust standard error estimates are given in parentheses. Wealth accumulation is rescaled by dividing 10,000.

Wealth accumulation is reflected in long-term savings. Multiple regression is used to simultaneously analyze the relationship between wealth accumulation, socio-demographics and financial literacy.

According to the analysis, age plays strongly significant role on net worth per head, and shows to have a concave shape relation in the whole sample and self-employed workers subsample. This implies that with an increasing age, the wealth accumulation is increasing at a declining rate, and thus begins to drop down as people become old for the accumulated wealth will be transformed to expenditure for old age living. The years of schooling also have a strongly positive effect on wealth

accumulation for all groups, especially the self-employed workers who year of schooling play greater effect on wealth accumulation. Being married is found insignificant impact on the net worth across all groups. Moreover, the regional effect and residence living area show insignificant effect on wealth accumulation for all groups as well.

An analysis of the income effect reveals that all groups receive benefit from income on wealth accumulation. However, income tends to create effect on wealth accumulation on self-employed less that other subsamples. This may due to the unstable income of self-employed becomes an obstacle for their wealth accumulation. Moving along to the financial literacy analysis, the outcomes indicate that financial knowledge has a strongly significantly positive effect on wealth accumulation across all subsamples except whole sample. This implies that financial knowledge may not affect to increase net worth per head for agricultural workers. Since the agricultural workers share a major part of whole sample. When remove agricultural workers from the whole sample, financial knowledge in non-agricultural workers subsample becomes significant. Therefore, financial knowledge may not an important factor to stimulate wealth for agricultural workers. However, financial knowledge plays greater effect on wealth accumulation for self-employed workers due to highest coefficient comparing to other subsamples. Therefore, financial knowledge is very important for self-employed worker in order to accumulate net worth per head. Furthermore, the effect of financial knowledge on wealth accumulation are similar to the studies by Ameriks et al. (2003), Behrman et al. (2010), and Van Rooij et al. (2011). In contrast financial attitude seems to play an insignificant role in wealth accumulation for all groups. However, when analyzing financial behavior according to each component, the findings report different outcome vary on subsample. First, self-control (Behave1) plays insignificant on effect on all groups whereas bill payment (Behave2) which reflect to financial situations are in control display positive effects on lift up net worth per head for all groups especially self-employed workers. It shows strongly significant effect larger than other groups. Financial info (Behave3) is only observed as an important factor for non-agricultural subsample (wage workers) in term of wealth accumulation because its coefficient is significant individually. While financial goal (Behave4) plays a key role on collecting net worth per head for both non-agricultural

subsample (wage workers) and self-employed. Household accounting (Behave5) is also found significant for all groups similar to borrowing (Behave7) report strongly positive significant on wealth accumulation. Especially borrowing (Behave7) seems to be important factor for self-employed due to its magnitude of coefficient is largest compare to other subsamples. However, product choice (Behave6) is found no significant for all groups. Therefore, financial control capturing by bill payment (Behave2) and borrowing (Behave7) are crucial factors for self-employed workers to accumulate wealth. Financial goal (Behave4) and Household accounting (Behave5) also important key accordingly.

In conclusion, when it comes to self-employment, financial literacy can be seen to have a significantly positive effect on both a retirement saving plan and wealth accumulation, especially, financial knowledge which is based on financial numeracy skills. Moreover, financial behaviors relating to financial tracking (i.e., Financial info (Behave3) and planning ahead (i.e., financial goal (Behave4)) also significantly increased the probability of a retirement saving plan. These factors will ultimately result in increased wealth accumulation, as can be seen by planning behavior having a positively significant effect on the wealth accumulation of self-employed workers. Furthermore, financial control (i.e., bill payment (Behave2), borrowing (Behave7)), and household accounting (Behave5) also represent important financial behavior for wealth accumulation in the self-employed. Policymakers should bear this in mind when setting an effective savings policy.

4.5 Influence of Financial Literacy on Earnings of Whole Sample, Non-agricultural Subsample and Self-employed Subsample

Table 4.6 Empirical Results Based on the Multiple Linear Regression (MLR) Method for Analyzing the Financial Literacy and Earnings Across Different Groups

Variables	**Whole sample**	**Non-agricultural subsample**	**Self-employed subsample**	**Whole sample**	**Non-agricultural subsample**	**Self-employed subsample**
	Without industrial sector			**With industrial sector**		
Male	0.1300***	0.1960***	0.2860***	0.1740***	0.2120***	0.2810***
	(0.0242)	(0.0244)	(0.0425)	(0.0235)	(0.0249)	(0.0430)
Work experience	0.0267***	0.0303***	0.0300***	0.03130***	0.0308***	0.0315***
	(0.0034)	(0.0034)	(0.0067)	(0.0033)	(0.0034)	(0.0066)
Work experience^2	-0.0005***	-0.0005***	-0.0006***	-0.0005***	-0.0006***	-0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
year of schooling	0.0587***	0.0462***	0.0264***	0.0472***	0.0448***	0.0261***
	(0.0041)	(0.0040)	(0.0071)	(0.0039)	(0.0040)	(0.0070)
married	-0.0291	0.0844***	0.0980**	0.0433*	0.0828***	0.0864**

Variables	Whole sample	Non-agricultural subsample	Self-employed subsample	Whole sample	Non-agricultural subsample	Self-employed subsample
	Without industrial sector			With industrial sector		
	(0.0256)	(0.0251)	(0.0429)	(0.0247)	(0.0250)	(0.0423)
central	-0.2150***	-0.2030***	-0.1840**	-0.1790***	-0.1990***	-0.2220**
	(0.0442)	(0.0434)	(0.0923)	(0.0433)	(0.0434)	(0.0904)
north	-0.7170***	-0.5220***	-0.4910***	-0.5620***	-0.5220***	-0.5060***
	(0.0475)	(0.0480)	(0.0930)	(0.0464)	(0.0479)	(0.0904)
northeast	-1.0430***	-0.5280***	-0.4710***	-0.8470***	-0.5420***	-0.5030***
	(0.0496)	(0.0498)	(0.0929)	(0.0477)	(0.0498)	(0.0907)
south	-0.2040***	-0.2810***	-0.2200**	-0.0558	-0.3000***	-0.2630***
	(0.0472)	(0.0489)	(0.0957)	(0.0479)	(0.0492)	(0.0937)
municipal	0.201***	0.0991***	0.128***	0.0239	0.0959***	0.146***
	(0.0254)	(0.0268)	(0.0455)	(0.0254)	(0.0269)	(0.0456)
Financial	0.0052***	0.0048***	0.0050***	0.0050***	0.0046***	0.0048***
knowledge	(0.0005)	(0.0005)	(0.0009)	(0.0005)	(0.0005)	(0.0009)
Self-control	-0.0017	-0.0008	-0.0005	-0.0014	-0.0006	-0.0003
(Behave1)	(0.0012)	(0.0012)	(0.0018)	(0.0011)	(0.0011)	(0.0018)

Variables	Whole sample	Non-agricultural subsample	Self-employed subsample	Whole sample	Non-agricultural subsample	Self-employed subsample
	Without industrial sector			With industrial sector		
Bill payment (Behave2)	0.0025** (0.0011)	0.0016 (0.0011)	0.0018 (0.0017)	0.0030*** (0.0010)	0.0016 (0.0011)	0.0018 (0.0017)
Financial info (Behave3)	0.0033*** (0.0012)	0.0017 (0.0012)	0.0040* (0.0021)	0.0029** (0.0012)	0.0016 (0.0012)	0.0040* (0.0021)
Financial goal (Behave4)	0.0019* (0.0010)	0.0025*** (0.0010)	0.0014 (0.0016)	0.0016* (0.0009)	0.0023** (0.0010)	0.0011 (0.0016)
Household accounting (Behave5)	0.2720*** (0.0544)	0.2950*** (0.0551)	0.3500*** (0.0661)	0.2440*** (0.0528)	0.2770*** (0.0555)	0.3270*** (0.0670)

Variables	Whole sample	Non-agricultural subsample	Self-employed subsample	Whole sample	Non-agricultural subsample	Self-employed subsample
	Without industrial sector			With industrial sector		
Product choice	0.1280***	0.1450***	0.1420***	0.1190***	0.1410***	0.1380***
(Behave6)	(0.0256)	(0.0256)	(0.0421)	(0.0244)	(0.0255)	(0.0418)
Borrowing	0.1950***	0.1550***	0.1470***	0.1800***	0.1480***	0.1450***
(Behave7)	(0.0258)	(0.0246)	(0.0437)	(0.0244)	(0.0246)	(0.0433)
Financial attitude	0.0005	0.0004	0.0006	0.0007	0.0005	0.0006
	(0.0005)	(0.0006)	(0.0010)	(0.0005)	(0.0006)	(0.0010)
Construction	-	-	-	0.5930***	-0.2190***	-0.0207
				(0.0439)	(0.0446)	(0.1190)
Trade	-	-	-	0.7830***	-	-
				(0.0353)	-	-
Services	-	-	-	0.6720***	-0.1050***	-0.1560***
				(0.0331)	(0.0308)	(0.0432)
Manufacturing and resources	-	-	-	0.6190***	-0.1620***	-0.3650***

Variables	Whole sample	Non-agricultural subsample	Self-employed subsample	Whole sample	Non-agricultural subsample	Self-employed subsample
	Without industrial sector			With industrial sector		
				(0.0372)	(0.0345)	(0.0655)
Constant	7.5040***	7.6880***	7.6740***	6.9630***	7.8260***	7.8130***
	(0.1350)	(0.1350)	(0.2580)	(0.1310)	(0.1370)	(0.2570)
Observations	6,712	4,126	2,127	6,712	4,126	2,127
R-squared	0.3166	0.2912	0.2329	0.3800	0.2970	0.2470
F-test	168.4300	78.7400	30.9700	163.7900	71.4800	28.7700

Note: ***, **, and * denote coefficients significant at the 1, 5, and 10 percent statistical levels, respectively. Huber-White robust standard error estimates are given in parentheses. With industrial sectors analysis, trade sector is reference sector.

The earnings analysis has been conducted following the classic Mincerian wage equation. However, it extends further than Mincer's classical version with the addition of more explanatory variables, including financial literacy components. Financial knowledge, financial behavior, and financial attitude are included in the analysis to observe their influence on earnings across the whole sample non-agricultural subsample and self-employed subsample. The regressions results are presented in Table 4.5

A person's gender may have an effect on earnings due to discrimination in the labor market or the difference in skills between male and female. In this study, females are used as the reference category in the estimated equations. The findings confirm gender discrimination exists in the Thai labor market, with male tending to earn significantly more than female across all subsamples. Especially, a significant earnings gap between male and female is found highest among the self-employed workers.

The primary results reveal that education has a positive and highly significant effect on earnings among the whole sample, non-agricultural subsample and the self-employed subsample. In other words, agricultural workers, wage workers and self-employed workers receive benefit for education in order to increase their earnings. However, the year of education tends to benefit to self-employed earnings less than other subsamples. Work experiences show a non-linear effect (in quadratic terms) on earnings in all subsamples. A concave pattern conforms with the Mincerian wage equation. In addition, being married is observed to have a positive effect on higher earnings compared to the other marital statuses across all subsamples.

To observe the regional effects, dummy regions are added to the estimation. The different regional characteristics, circumstances or environment may create different working condition and opportunities. For example, the Northeast of Thailand is concentrated with informal workers and low-skilled agricultural workers, resulting in low earnings. The findings show significant differences in earnings across regions compared to Bangkok. Especially workers in the north and the northeast, a magnitude of regional effect is large. Besides, workers living in Bangkok tend to enjoy higher earnings than those in other regions. In addition, location effect (i.e., municipal area) is another key factor to controlling the area of residence living. This is because the

level of economic activity and job opportunities may differ according to living areas, thereby controlling the effect locations. The results show that whole sample, non-agricultural workers and self-employed workers living in municipal areas tend to earn more than those who live in non-municipal areas. Especially, self-employed worker shows highest impact.

Considering the impact of financial literacy on earnings, financial knowledge has a statistically significant positive effect on earnings across all groups, after controlling for other variables, while financial attitude seems to play an insignificant role. To observe the financial behavior effect on earnings, each component is included in the analysis. The initial outcomes represent that self-control (Behave1) has no significant impact on earnings across all groups, whereas bill payment (Behave2) is important factor for agricultural workers. Financial info (Behave3) is also found significant positive effect on both agricultural workers and self-employed workers. Moreover, financial goal (Behave4) also found strongly positive effect for non-agricultural subsample (wage workers). In addition, the findings reveal that, household accounting (Behave5), product choice (Behave6) and borrowing (Behave7) are strongly significant factors to lift up earnings for all groups.

Regrading to self-employed workers, financial info (Behave3), household accounting (Behave5), product choice (Behave6) and borrowing (Behave7) are significant positive effect on earnings, especially household accounting (Behave5) and financial info (Behave3) tends to play large impact on earnings for self-employed workers compare to agricultural workers and wage workers. Therefore, keeping tracks finances is the most important factor for self-employed worker in order to increase their earnings. However, financial attitude seems to be insignificant effect on earnings for self-employed workers as mention earlier.

Moving on work sector, working in a different industrial sector may substantially affect earnings. Therefore, this study includes the industrial sector (Table 4.5; the last three columns) to capture the income differences of workers in each industrial sector. Due to the style and nature of the works, each industry requires different skills and experiences, leading to variations in income. Therefore, to study its effect on income, the industrial sectors are included in the analysis. There are five

sectors including agricultural sector, construction sector, manufacturing and resources sector, trade sector and services sector.

Focusing on whole sample, agricultural sector is reference sector. The findings reveal that workers in all industrial sectors earn more than those in the agricultural sector. However, when excluding the agricultural sector from the analysis, trade sector becomes a reference sector. The results show that workers in all sectors are observed earn less than trade sector except self-employed workers in construction sector reveal insignificant difference earnings to trade sector.

As mention earlier, most self-employed are in the trade, services and manufacturing sector which their ability to earn is different across sectors. In addition, education also affect to earnings level less than other work statuses. Consequently, when analyzing self-employed workers, it is necessary to add other important explanatory variables such as entrepreneurial skills. Such skills are required to help them run or manage their business. Unfortunately, the SES and LFS do not provide data on entrepreneurial skills. Therefore, a field survey is required to collect data on the other characteristics needed for analysis.

CHAPTER 5

A FIELD SURVEY ANALYSIS

5.1 Descriptive Statistics of Field Survey

A field survey was conducted in Mahasarakham Province involving a sample of 110 respondents. A questionnaire was developed based on a review of the relevant literature, with some questions modified to meet the study objectives and local context. The questionnaire was divided into six sections: 1) demographics and household characteristics; 2) information on income, expenses, assets held, and debt situation; 3) planning and saving for retirement; 4) business information; 5) financial services, products, and technology; and 6) financial literacy and entrepreneurial skills.

Table 5.1 Personal and Household Characteristics

Variables	**Percentage/Mean**
Gender (#1)	
• Male	30.91
• Female	69.09
Age (years) (#2)	40.36
Marital status (#3)	
• Married	58.18
• Other	41.82
Level of education (#4)	
• Primary	4.55
• Secondary	25.45
• Vocational certificate/Diploma	14.55
• Bachelor’s degree	43.64

Variables	Percentage/Mean
• Master's degree	11.82
Years of education	14.14
Business studies or business-related majors (#5)	33.64
Proportion taking a business course (#6)	57.27
Level of business study performance (grade) (#6)	
• Very good	7.94
• Good	38.10
• Fair	50.79
• Poor	3.17
Level of mathematical performance (grade) (#7)	
• Very good	5.45
• Good	38.18
• Fair	49.09
• Poor	8.7
Level of English communication (self-evaluation) (#8)	
• Cannot communicate	9.09
• Just a few words	69.09
• Sentences	20.00
• Fluent	1.02
"I reached the maximum limit on my credit cards." What does this sentence mean? (#96)	
• Correct translation	19.09
• Incorrect translation or does not understand the meaning	80.91
Number of elderly (over 60 years old) in household (#10)	2
Number of young children (under 15 years old) in household (#9)	2

Variables	Percentage/Mean
Number of household members (#11)	5
Number of working household members (#11)	3
Type of business (industrial sectors)	
• Trade sector	42.73
• Manufacturing sector	26.36
• Services sector	30.91
Level of father's education (#13)	
• Below undergraduate degrees	79.44
• Undergraduate degrees or above	20.56
Level of mother's education (#13)	
• Below undergraduate degrees	82.41
• Undergraduate degrees or above	17.59
Level of spouse's education (#14)	
• Below undergraduate degrees	53.13
• Undergraduate degrees or above	46.88

Source: Author's calculation
Note: # refers to question number in the questionnaire

There were more women than men in the sample, and the self-employed respondents were aged 40 years on average, with more than half married and earning a bachelor's degree or above. Compared to the SES-BOT/FA-Q12013, the average age of the self-employed was higher whereas the education level was lower than the primary data. There are five persons on average in a household, two of whom are workers. On average, households have two elderly persons (aged 60 years old and above) and two children aged 15 and under. In addition, the average education of parents or spouses in the sample is below a bachelor degree.

Regarding education level, one-third of the self-employed respondents possessed a business degree, while approximately 60 percent had taken a business course. Around 50 percent claim that they achieved average grades in their business course. As for mathematical performance, most of the self-employed respondents

exhibited a fair performance, but for English communication, evaluated themselves poorly, as judged by their ability to translate and understand the given text in English. More than 80 percent did not understand the meaning of the given text. The overall data in this section reflect that the self-employed respondents had a relatively high level of education with some also having obtained business knowledge through their studies, but the majority still lacked adequate English communication skills.

Table 5.2 Personal Earnings/Expenditure/Wealth Accumulation and Debts

Variables	**Percentage/ Mean (SD)**
Profits from business operation (annual: baht) (#15)	452,409.1
	(453,815)
Total earnings (annual: baht) (#15)	541,903.6
(including from other sources)[1]	(536,018)
Total expenses (annual: baht) (#16)	324,548
	(323,258)
Wealth accumulation	
House ownership (#17)	
• Yes	69.09
• No	30.91
Approximate value (#17)	
• Less than 100,000 baht	7.89
• 100,000–500,000 baht	15.79
• 500,001–1,000,000 baht	11.84
• 1,000,001–1,500,000 baht	13.16
• 1,500,001–2,000,000 baht	6.58

Variables	Percentage/ Mean (SD)
• 2,000,001–3,000,000 baht	11.84
• More than 3,000,000 baht	32.89
Vehicle ownership (#18)	
• Yes	93.64
• No	6.36
Approximate value (#18)	
• Less than 100,000 baht	28.16
• 100,000–500,000 baht	24.27
• 500,001–1,000,000 baht	26.21
• 1,000,001-1,500,000 baht	10.68
• 1,500,001-2,000,000 baht	4.85
• 2,000,001–3,000,000 baht	2.91
• More than 3,000,000 baht	2.91
Financial assets (#19)	
• Savings with a bank	89.36
• Bonds/stocks	8.18
• Mutual funds	11.82
• RMF/LMF	3.64
• Lottery savings[2]	11.82
• Life insurance	51.82
• Cash, gold, jewelry, antiques, etc.	57.27
• Savings with a village bank, savings with a cooperative	2.73
Total financial assets (#20)	
• less than 10,000 baht	10.91
• 10,000–50,000 baht	30.00
• 50,001–100,000 baht	14.55

Variables	Percentage/ Mean (SD)
• 100,001–150,000 baht	4.55
• 150,001–200,000 baht	4.55
• 200,001–250,000 baht	3.64
• 250,001–300,000 baht	2.73
• 300,001–350,000 baht	0.91
• 350,001–400,000 baht	3.64
• 400,001-450,000 baht	3.64
• 450,001–500,000 baht	0
• More than 500,000 baht	20.91
Current personal debts	
Proportion of persons without debt (#23)	30.00
Purpose of borrowing (only for those who were indebted) (#21)	
• Real estate	27.27
• Education	13.64
• Health	4.55
• Business	60.00
• Entertainment/travel	10.91
• Vehicle purchase	31.82
• Family support	8.18
• Furniture/electrical appliance purchase	21.82
• Jewelry/valuable items purchase	72.7
• Daily expenditure	24.55
• No borrowing	16.36
Sources of borrowing (#22)	
• Formal sources	56.36
• Informal sources	3.64

Variables	Percentage/ Mean (SD)
• Both	23.64
Total amount of debts (baht) (#23)	859,107 (1,244,927)
Level of debt compared to the previous year (#24)	
• Increased	16.88
• Decreased	61.04
• No change	18.18
• Unsure	3.90
Level of concern about debt (#25)	
• Very low	12.99
• Low	9.09
• Fair	46.75
• High	20.78
• No concerns	10.93
Refinance experience (#26)	
• Yes	24.68
• No, but understand refinance	64.94
• Do not understand refinance	10.39

Source: Author's calculation

Note: [1]Income from other sources include pension, work compensation, money assistance from another person outside, elderly/disability assistance from the government, scholarships, property rental copyright license, interest shares, bonds, stocks, money lending, inheritance, gifts, insurance payouts, other kinds, e.g., windfall from lottery winnings. [2] Lottery saving refers to financial products such as GSB salak, BAAC salak, etc.; # refers to question number in the questionnaire

The findings reveal that self-employed respondents earned an average of 541,904 baht annually, with approximately 84 percent of total earnings coming from business profit, whereas total annual expense was approximately 324,548 baht. It can

therefore be concluded that the earnings of the self-employed respondents are greater than their expenses which leads to the assumption that self-employed respondents have the wherewithal to save. However, based on secondary data (SES-BOT/FA-Q12013), the self-employed workers, from the primary data, seemed to earn less than the self-employed because they reported negative earnings from their business operations due to loss of profit. But primary data indicate only a rough estimation that show only positive earnings. Moreover, level of education from a field survey reports higher level than secondary data. Most of the self-employed surveyed had earned a bachelor's degree whereas most self-employed, as reported from secondary data, had not received a bachelor's degree.

Regarding wealth accumulation, almost 70 percent of the self-employed in this survey owned property or land, the value of which for around 32.89 percent was worth in excess of 3,000,000 baht. Moreover, more than 90 percent of the sample group owned vehicles valued at between 500,000 and 600,000 baht, approximately.

From the perspective of savings, most of the self-employed used traditional rather than sophisticated savings methods. Almost 90 percent of the self-employed saved in a specific account and invested in valuable items such as jewelry, gold, and life insurance. However, more sophisticated saving methods such as investment in the stock market and mutual funds such as LMF/RMF were not popular among the self-employed workers in this survey, with less than 10 percent participating in such sophisticated investment vehicles. However, the majority of self-employed had assets worth approximately 10,000–100,000 baht, but around 20 percent of the sample owned assets exceeding 500,000 baht. This indicates that self-employed workers in this survey had a relatively low level of savings and lacked diversity in their saving patterns. Therefore, increasing the saving options and improving financial access may be necessary for promoting greater savings diversity among the self-employed.

Regarding debts and loan issues, around 16 percent of the self-employed respondents reported that they never borrow money, whereas the other 84 percent revealed that the main reason of their borrowing was to buy valuable items (73 percent), to spend for business purposes (60 percent), and to buy vehicles (32 percent). In addition, some types of borrowing were non-performing loans like the

purchase of luxury goods. The majority of loans came from formal financial institutions such as commercial banks.

The level of debt was approximately 859,107 baht per person. Most self-employed respondents reported a better debt situation in comparison with their situation the previous year and thus had only a moderate concern about their debt situation. This result is supported by the average score on their sense of "financial control," with approximately 64 percent of respondents claiming that their financial situation was controllable (see Table 5.2). In addition, most borrowers had no experience of refinancing but reported that they understood the refinancing process. Overall, the findings imply that our self-employed respondents were comfortable with their debt situation, despite the level of debt being quite high compared to their earnings.

Table 5.3 Personal Retirement Savings

	Percentage
Financial activities during the previous 12 months (#28)	
• Joining a seminar on financial planning or savings	1.82
• Asking for advice from a financial professional	6.36
• Searching for information about savings/financial planning	12.73
• Discussing or exchanging ideas on financial issues or savings	20.91
• No participation in savings-related activities	58.14
Planning and saving for retirement (#29)	
• Not thought about it	35.45
• Thought about it but no savings plan yet in place	19.09
• Thought about it and following a plan	45.45
• Savings plan in place	0

	Percentage
Amount of retirement savings in the previous 12 months (#30)	
• Less than 50,000 baht	48.00
• 50,001–100,000 baht	18.00
• 100,001–300,000 baht	18.00
• 300,001–500,000 baht	0.00
• 500,001–700,000 baht	6.00
• 700,001–1,000,000 baht	2.00
• 1,000,001–1,500,000 baht	2.00
• 1,500,001–3,000,000 baht	0.00
• Over 3,000,000 baht	6.00
Type of retirement savings (#31)	
• Savings with a commercial bank/government bank	62.00
• Real estate investment	22.00
• Compulsory savings such as National Savings Fund	6.00
• Government bonds, debentures	12.00
• Saving with a cooperative	6.00
• Family	6.00
• Investing in valuable items	32.00
• Cash/holding cash/keeping cash at home	2.00
• Equities	8.00
• Mutual funds: RMF/LMF	8.00
• Insurance policy	42.00
Ranking of factors affecting saving ability (#32)	
• Unstable income	37.27
• Economic and social conditions	28.18

	Percentage
If the government has a policy for promoting compulsory savings for retirement such as deducting sums automatically from earnings, would this be of interest to you? (#33)	
• Yes	44.55
• No	55.45
Should saving for old age be compulsory or voluntary? (#34)	
• Voluntary	81.82
• Compulsory	18.18
Do you know how much money will be required for your living expenses in old age? (#35)	
• Yes	9.09
• No	90.91
If the government were to have plan for helping people with retirement such as providing professional financial advice on saving plans, would you participate? (#36)	
• Yes	51.82
• No	15.42
• Unsure	32.73
Source of income during retirement (#37)	
• Personal savings	48.18
• Continue working	43.64
• Family	38.18
Concerns about the level of savings for retirement (#38)	
• Very low	8.18
• Low	16.36
• Average	32.73
• High	6.36
• Very high	2.73

	Percentage
• No concerns	33.64
Is the elderly subsistence allowance sufficient? (#39)	
• Yes	3.64
• No	70.91
• Unsure	25.45
Issues affecting the ability to save (#40)	
• Insufficient income	49.09
• Lack of savings information	36.36
• No savings knowledge	32.73

Source: Author's calculation

Note: # refers to question number in the questionnaire

When asked about planning and saving for retirement, approximately 46 percent of the self-employed respondents reported having thought about planning and that they were taking action toward saving, 35 percent said they had not yet thought about a savings plan for retirement, and around 19 percent had thought about it but a savings plan was still not in place. This means that more than half had not thought about a retirement plan or did not yet have one in place. This reflects a serious lack of retirement preparedness among self-employed respondents.

Regarding the level of retirement savings, around 48 percent of the self-employed respondents reported having a savings plan for retirement, but also reported having less than 50,000 baht in retirement savings during the previous 12 months, which is very meager amount to cover cost of even basic living expenses. Fewer than 10 percent reported savings of over one million baht for retirement. Moreover, most saving patterns involved saving with financial institutions such as commercial banks, or collecting valuable items or purchasing life insurance. This implies that the self-employed respondents had paid insufficient attention to planning and saving for retirement and had insufficient savings for retirement even though they claimed they had prepared for saving for old age. Moreover, a lack of diversification in savings methods is observed.

From the savings scheme perspective, almost 80 percent of the self-employed respondents in this study believed that compulsory savings is an effective method. Moreover, more than 50 percent indicated a willingness to accept financial advice from the government whereas only 46 percent of the self-employed respondents were interested in an auto deduction from earnings program with a specific amount set aside for retirement savings. This is because volatile incomes, as well as economic and social conditions, are considerable obstacles for retirement saving among the self-employed, with less than half of them interested in auto deduction from earnings to ensure such saving. A compulsory savings scheme in parallel with the provision of financial advice may be an appropriate method for encouraging saving among the self-employed since this would allow them to allocate the funds according to their circumstances, with the help of a professional financial advisor. Therefore, to encourage saving by the self-employed, saving schemes should be diverse and flexible.

Furthermore, savings awareness among the self-employed respondents was found to be only moderate. Around 42 percent of self-employed respondents had searched for information on retirement saving, and approximately only 10 percent had calculated the amount of savings required to support their retirement. Thus, a very small proportion of the self-employed were aware of the necessity of saving for retirement, perhaps because they believed that they could work indefinitely and could rely on their family.

Table 5.4 Business Operations

	Percentage/Mean (SD)
Do you have experience running a business? (#41)	
• Yes	56.36
• No	43.46
Years of business experience (#43)	9.13
Approximate amount of initial business investment (Baht)	652,313 (3,106,238)
Do you have business partners? (#44)	
• Yes	7.27
• No	92.73
Is your business registered? (#45)	
• Yes	59.09
• In progress	2.73
• No	38.18
• Government officer	8.18
• Private employee	33.32
• Freelance/general contractor	20.00
• Other	9.41
• None	29.09
Has your business ever been faced with financial problems? (#47)	
• No	7.27
• Sometimes	79.09

	Percentage/Mean (SD)
• Always	13.64
Sales/production changes compared to previous year (#48)	
• Increased	16.36
• Decreased	46.36
• Remained the same	37.27
Changes in net profit compared to previous year (#48)	
• Increased	14.55
• Decreased	49.09
• Remained the same	36.36
Initial source of business funds (#49)	
• Personal savings	71.82
• Informal funds	4.55
• Formal funds	24.55
• Inheritance	8.18
• Family, relatives, or business partner funds	33.64
Opinion toward financial inclusion for business (#50)	
• Coverage and it is accessible	17.43
• Coverage and it is difficult to access	15.06
• It is insufficient and difficult to access	43.12
• Unsure	23.85

Source: Author's calculation

Note: # refers to question number in the questionnaire

Regarding business information, more than half the self-employed respondents in this study had run a business before, with an average of nine years of experience in business operations. Most businesses were registered and had no business partners. Some self-employed respondents had previously worked as private employees, freelance, or government officers before switching to run their own business. As for business performance, almost half claimed that they had experienced a drop in both profit and sales compared to the previous 12 months. When asked about initial sources of business funds, they mentioned personal savings, family, relatives, or a business partner as main sources. This is related to their experience in terms of financial inclusion, and approximately 43 percent of them claimed that formal business funding sources were insufficient and difficult to access.

Table 5.5 Financial Services Knowledge and Use

Have you ever used any of the following financial services, or do you at least know about these items? (The "frequency of use" question is not applicable for those answering "don't know"; 0 refers to "never used," and 5 refers to "regularly use") (#51)

	Frequency of use					
	0	**1**	**2**	**3**	**4**	**5**
Bank deposit/withdrawal • Know = 100 • Don't know = 0	0.91	23.64	14.55	20.00	10.00	30.91
Opening a savings account • Know = 99.09 • Don't know = 0.91	1.83	36.70	20.18	18.35	4.59	18.35
Opening a fixed deposit account • Know = 90.91 • Don't know = 9.09	25.00	49.00	5.00	11.00	2.00	8.00
Opening an investment account • Know = 58.18 • Don't know = 41.82	54.69	20.31	14.06	6.25	0	4.69

	Frequency of use					
	0	**1**	**2**	**3**	**4**	**5**
Opening an equity investment account • Know = 43.64 • Don't know = 56.36	64.58	16.67	4.17	8.33	2.08	4.17
Cheque deposit • Know = 76.36 • Don't know = 23.64	30.95	65.71	11.90	13.10	3.57	4.76
Purchase/issue of a cashier's cheque • Know = 66.36 • Don't know = 33.64	49.32	24.66	12.33	8.22	2.74	2.74
Sending a money order • Know = 70.00 • Don't know = 30.00	55.84	29.87	2.60	5.19	0	6.49
Withdrawing cash from an ATM • Know = 94.55 • Don't know = 5.45	3.85	8.65	6.73	16.35	18.27	46.15
Credit card transactions • Know = 89.09 • Don't know = 10.91	41.84	10.20	6.12	15.31	8.16	18.37
Debit card transactions • Know = 82.73 • Don't know = 17.27	25.27	17.58	8.79	15.38	15.38	17.58
Depositing cash via a cash deposit machine • Know = 97.27 • Don't know = 2.73	2.80	18.69	14.02	18.69	10.28	35.51
Transferring money between	8.57	34.29	17.14	16.19	10.48	13.33

	Frequency of use					
	0	**1**	**2**	**3**	**4**	**5**
accounts at the bank counter • Know = 95.45 • Don't know = 4.55						
Paying utility bills at the bank counter • Know = 89.09 • Don't know = 10.91	17.35	44.90	13.27	9.18	5.10	10.20
Paying utility bills automatically by deducting money from the account • Know = 87.27 • Don't know = 12.73	44.79	23.96	11.46	3.13	3.13	13.54
Paying utility bills at a convenience store • Know = 89.09 • Don't know = 10.91	18.37	23.47	16.33	11.22	8.16	22.45
Using an electronic payment card (e.g., Rabbit Card) • Know = 60.00 • Don't know = 40.00	42.42	21.21	10.61	10.61	0	15.15
Transferring money through the PromptPay service • Know = 90.00 • Don't know = 10.00	16.16	15.15	18.18	12.12	7.07	31.31
Receiving money from other people through the PromptPay service • Know = 89.09	16.33	14.29	17.35	16.33	5.10	30.61

	Frequency of use					
	0	**1**	**2**	**3**	**4**	**5**
• Don’t know = 10.91						
Conducting financial transactions via online banking (e.g., internet banking)	12.22	13.33	7.78	16.67	10.00	40.00
• Know = 81.82						
• Don’t know = 18.18						
Conducting financial transactions via mobile phone (e.g., mobile banking)	13.54	11.46	5.21	12.50	14.58	42.71
• Know = 87.27						
• Don’t know = 12.73						
Performing transactions by transferring money via QR code	19.57	17.39	18.48	10.87	14.13	19.57
• Know = 83.64						
• Don’t know = 13.36						
Using an application to transfer money (e.g., Airpay, Line Pay)	41.25	21.25	15.00	5.00	5.00	12.50
• Know = 72.73						
• Don’t know = 27.27						
Using an application to record income/expenses	52.31	21.54	9.23	4.62	4.62	7.69
• Know = 59.09						
• Don’t know = 40.91						
Using an application for financial management/savings	53.45	18.97	12.07	6.90	1.72	6.90
• Know = 52.73						
• Don’t know = 4 7.27						

	Frequency of use					
	0	**1**	**2**	**3**	**4**	**5**
Using an application for tax calculation • Know = 41.82 • Don't know = 58.18	60.87	21.74	8.70	6.52	0	2.17
Using an application for investment • Know = 39.09 • Don't know = 60.91	41.86	18.60	13.95	11.63	4.65	9.30
Using an application for selling-buying products, shopping, and payment, • Know = 82.73 • Don't know = 17.27	16.48	20.88	9.89	8.79	15.38	28.57

Source: Author's calculation

Note: # refers to question number in the questionnaire

According to Table 5.5, most self-employed respondents were unfamiliar with sophisticated financial services such as complicated savings and financial products, e.g., opening an investment account or opening an equity investment account, with about half knowing about the products but rarely using them. However, traditional financial products and services are more well-known and frequently used. Financial activities such as depositing a cheque, sending a money order, or the purchasing or issuing a cashier's cheque are well-known but not favored by respondents whereas basic financial activities such as withdrawing cash from an ATM or depositing cash via a cash deposit machine are very well-known and often used. Self-employed respondents tended to use financial applications instead of visiting a bank or financial service counter. For example, almost 96 percent knew about transferring money between accounts via the bank counter but rarely used this service, preferring online banking or PromptPay. Therefore, it can be observed that there is potential for

becoming a cashless society given the advances and popularity of financial services applications, especially for money transfers and making payments. Such applications are mostly used for shopping and selling or buying products, in contrast to financial investment applications, such as those for tax calculation, financial management/savings, and investment, which appear to be unpopular among the self-employed. This unpopularity is possibly because these more sophisticated financial services may be difficult to understand because of their complicated, difficult to access and use applications, which makes them unsuitable for the lifestyles of some self-employed respondents.

Table 5.6 Sources of Financial Information and People Involved in Financial Decision-Making

		Percentage
Financial information sources (#106)		
	Financial websites	30.91
	Financial magazines/publications	23.64
	Government publications	20.00
People involved in financial decision-making (#107)		
	Family	58.18
	Bank officers	40.91
	Insurance salespersons	19.09

Source: Author's calculation

Note: # refers to question number in the questionnaire

Here we can see a growing trend toward obtaining information via the internet. Financial websites and social media have become the primary sources of financial information. Financial magazines and government publications are the second and third most popular sources, respectively. Moreover, family, bank officers, and insurance salespersons are influential in self-employed respondents' financial decision-making.

Table 5.7 Risk Preference and Sources of Financial Information

Risk preference (#71- #73)		**Percentage**
	Risk-averse	36.36
	Risk-lover	13.64
	Inconsistent preference	50.00

Source: Author's calculation

Note: # refers to question number in the questionnaire

Table 5.7 presents the consumption choices of self-employed respondents that were observed under uncertain conditions, explained in terms of risk preference (see the questions numbered 71, 72, and 73 in the appendices). Risk preference reflects an individual's attitude toward risk and can affect both savings behavior and consumption. It is assumed that the individual knows the probabilities of gaining returns in different situations. However, the payoffs are explained in terms of utility. There are three types of risk preference.

1) Risk-averse consumers are those reluctant to take risks and more likely to choose the option provided with certain returns.

2) Risk-lover consumers are those who prefer the uncertainty of a potentially greater profit over certain returns of a lower profit.

3) Inconsistent preference consumers are those who have an inconsistent attitude toward risk and change their preference according to different situations.

According to the field survey, self-employed respondents exhibited inconsistent preferences and were both risk-averse and risk-loving, with only 36 percent preferring outcome certainty (i.e., risk-averse). About 50 percent showed inconsistence preferences, with their decisions based on the potential outcomes of different situations.

Table 5.8 Financial Literacy and Entrepreneurial Skills

Financial literacy	**Average Score (percentage)**	**Min score**	**Max score**
Financial knowledge	49.94	0	86.67
Financial behavior			
• Keeping track of finances	68.91	33.33	93.33
• Planning ahead	53.64	12.5	87.5
• Staying informed	67.14	28.57	100
• Choosing products	67.66	14.29	100
• Financial control	63.52	12.5	100
Financial literacy self-assessment 1 = very low/5 = very high (#125)	3.01	2	5
Financial attitude			
• Self-efficacy	67.67	20	100
• Financial stress	61.82	30	95
• Impulsivity	55.94	26.67	100
• Financial aspirations	75.14	50	100
Entrepreneurial skills (#52 -#70)			
• Technical skills	66.52	33.33	100
• Managerial skills	71.01	44.44	100
• Entrepreneurial skills	75.94	53.33	100
• Maturity skills	80.73	40	100

Source: Author's calculation

Note: Maximum total score is 100 percent for all financial literacy components and entrepreneurial skills components. (#) refers to question number in the questionnaire

Table 5.8 presents the scores for overall financial literacy and entrepreneurial skills resulting from the field survey. The main components of financial literacy are financial knowledge, financial behavior, and financial attitude, based on the ANZ-

2014 criteria (see details in Chapter 3, Table 3.6, 3.7). It includes financial understanding and competence as well as awareness of financial responsibility along with the additional components of financial knowledge and numeracy skills. Study results indicate that self-employed respondents received a financial knowledge score of approximately 50 percent, which is at the average level. This score is slightly different from the financial knowledge calculation based on the SES data source, which was approximately 53 percent. Regarding the financial behavior score, the highest score was attained for staying informed about money matters. This is because accessing financial information is easier and more convenient nowadays with the use of internet or social media channels. On the other hand, self-employed respondents received their lowest scores for planning ahead. In addition, the "keeping track of finances" score was approximately 69 percent, meaning that self-employed respondents were likely to track their financial activities, such as checking bank account transfers and recording the details of their personal accounts. Moreover, the "choosing products" score, which refers to comparing and searching for information before making a purchase, was 68 percent on average among self-employed respondents. And the "financial control" score of 64 percent indicates that the financial situation of self-employed respondents was likely to be under control. However, when each financial behavior component in our primary dataset is compared with the results from secondary data in the SES-BOT/FA-Q12013 dataset, we see lower scores.

Next, there is "financial attitude," which consists of four components. The first, self-efficacy, reflects a person's self-belief in the ability to make changes and also relates to their attitude toward the future. The score for self-efficacy is around 68 percent which indicates that self-employed respondents tended to believe in the changes they intended to make. This attitude has a positive effect on future actions and the score here conforms with the financial attitude score from the SES-BOT/FAQ12013 dataset as respondents pay more attention to future financial situations than current ones. Moreover, self-employed respondents scored 62 percent on financial stress, meaning that they felt rather stressed when dealing with money matters. A similar interpretation was also found in the impulsivity score, on which

respondents scored 56 percent, indicating an average level of impulsivity. For the final component, financial aspirations, the high percentage reflects the desire of the self-employed to succeed in financial matters. Focusing on both short-term and long-term financial planning, as well as obtaining compliance and having access to financial advice from professionals, are key financial aspiration elements. The percentage for financial aspirations represents the highest percentage among the four financial attitude components, demonstrating that most self-employed respondents focus strongly on their desire to succeed financially. Moreover, self-employed respondents scored three out of five on average when self-evaluating their financial literacy.

Entrepreneurial skills comprise technical skills, managerial skills, entrepreneurial ability, and maturity (see details in Chapter 3, Table 3.8). Self-employed respondents reported the lowest scores for technical skills but the highest for maturity, entrepreneurial ability, and managerial skills, respectively. This can possibly be explained by the fact that most self-employed respondents were very small business owners with little need to invest in technology or implement advanced, high-tech production. Hence, their technical skills were quite low compared to other skills, the highest percentage of which was logged for maturity skills, which may reflect the age and business experience of self-employed respondents.

In summary, the field survey generated four main conclusions: (1) Self-employed respondents tended to have little awareness of planning and saving for retirement. (2) Some self-employed respondents experienced problems with debt, but most had such problems under control. (3) Most self-employed respondents knew about basic financial products, services, and technology, but had little knowledge about and rarely used sophisticated financial products and services. (4) Financial literacy is a composite of financial knowledge, behavior, and attitude. The self-employed respondents had an average level of financial knowledge; almost similar to that based on the SES dataset, with financial behavior exhibiting the lowest score for planning ahead and financial control, while the financial attitude of the self-employed respondents reflects their financial conservativism, although they also wanted to succeed in financial matters.

In the following section, the primary data from the field survey are employed to analyze two issues: first, the effect of financial literacy on saving and planning for retirement, and second, the effect on financial literacy and entrepreneurial skills across earning levels of the self-employed. The first analysis is presented in Table 5.9

5.2 The Effect of Financial Literacy on Saving and Planning for Retirement

Table 5.9 Demographic Characteristics, Personal Financial Information, Financial Knowledge, Financial Behavior, and Financial Attitude toward Planning and Saving for Retirement

	Retirement Planner	**Non- retirement planner**
Observations	50	60
Proportion of the whole sample	45.45	54.55
Age (years)	40.1	40.58
Gender (male)	30.00	31.67
Years of education (years)	14.54	13.8
Marital status		
Married	60	57
Personal financial information		
Annual earnings (baht)	710,368*	401,517
	(619,407)	(409,966)
Annual expenses (baht)	366,680	289,438
	(388,241)	(255,168)
Savings (baht)	343,688	112,079
	(586,371)	(330,983)
Amount of debt (baht)	1,118,212	655,524
	1,295,884	(1,179,025)

	Retirement Planner	Non- retirement planner
Financial literacy (ANZ-2014 criteria)		
Financial knowledge (Total score in percent)	51.33	48.78
Financial knowledge components (percentage)		
Division (#74)	68	67
Time value of money (#75)	64	48
Interest paid on loan (#76)	66	72
Interest rate paid on loan in percent (#76)	64	50
Calculation of interest plus principal (#77)	50	45
Compound interest rate (#78)	38	37
Risk diversification (#79)	36	37
Risk investment (#80)	74	70
Awareness of credit bureau/debt default (#82)	72	73
Awareness of deposit protection law (#83)	16	8
Understanding of basic financial services (#86)	58	52
Loan payment responsibility (#87)	74	75
ATM responsibility (#90)	67	58
Awareness of consumer responsibility to disclose information (#89)	46	25
Awareness of provider responsibility to give clear information to consumers (#88)	4	7

	Retirement Planner	Non- retirement planner
Financial behavior (Total score in percent)		
Keeping track of finances	67.73	69.89
Planning ahead	58.50	49.58
Product choice	71.00	67.00
Financial control	64.25	62.92
Staying informed	68.86	65.71
Financial attitude (Total score in percent)		
Self-efficacy	68.48	67.00
Financial stress	62.83	60.06
Impulsivity	55.87	56.00
Financial aspirations	75.10	75.17

Source: Author's calculation

Note: # refers to question number in the questionnaire

Data set from Table 5.9 demonstrates how various related variables, namely demographic characteristics, personal financial information, and financial literacy components vary according to retirement preparedness. In Table 5.9, the sample is divided into two subsamples, consisting of retirement planners (those who have a retirement plan and save for old age) and non-planners (those who have not yet thought about planning for retirement). According to the data, 45.45 percent of the total self-employment sample were retirement planners, slightly fewer than non-planners. Females were found to be the majority among both retirement planners and non-planners. The average age of both retirement planners and non-planners was similar, at approximately 40 years. However, the number of years of educational attainment for retirement planners was slighter greater than for non-planners, with 14.54 years on average for retirement planners and 13.80 years for non-planners. In addition, more than half of both retirement planners and non-planners were married.

Retirement planners also tended to have a higher annual income, greater expenditure, and more savings than did those without a retirement savings plan. However, in terms of debt, non-planners were found to have less debt than did

planners. And for financial literacy, more retirement planners tended reported having financial knowledge (51.33 percent) than did non-planners (48.77 percent). As for individual in-depth financial knowledge, retirement planners tended to have proportionately better knowledge and understanding regarding the time value of money (inflation), interest (percentage interest rate paid on a loan, calculation of interest plus principal), and investment risk than did those without a retirement plan. Knowledge of credit bureau reporting was proportionately high for both retirement planners and non-planners. However, only about 40 percent of both groups exhibited knowledge of compound interest rates and risk diversification. And, surprisingly, not many at all knew about the deposit protection law. In this analysis, financial understanding, competence, and awareness of financial responsibilities were also included in the measurement of financial knowledge. A greater proportion of retirement planners (vs. non-planners) seemed to be aware of credit cardholder responsibility, ATM cardholder responsibility, and to understand the consumer's responsibility to disclose information. While a high proportion of both planners and non-planners knew about loan payment responsibility, neither group reported sufficient awareness of the responsibility of loan providers to provide clear information to consumers. In addition, in terms of individual financial behavior components, retirement planners also reported better financial behavior than did non-planners, according to their higher scores for planning ahead, product choice, financial control, and staying informed about financial information. However, non-planners scored slightly higher for keeping track of finances. In terms of financial attitude, the scores for self-efficacy and financial aspirations are similar, 68 and 75 percent, respectively, for planners and non-planners Regarding financial stress and impulsivity, both retirement planners and non-retirement planners appeared to feel quite stressed when dealing with money while both groups exhibited average scores for impulsivity.

5.3 The Effect on Financial Literacy and Entrepreneurial Skills across Earnings Levels of Self-employed Respondents

Table 5.10 Demographic Characteristics, Personal Financial Information, Financial Knowledge, Financial Behavior, and Financial Attitudes Across Earnings Levels

	Income levels		
	Low income	**Middle income**	**High income**
Observations	28	55	27
Age	40.43	40.86	39.30
Gender (male)	32.14	29.09	33.33
Years of education	12.89	14.33	15.04
Marital status	57.14	63.63	48.15
Business experience (Baht)	7.39	10.77	6.99
Annual earnings (Baht)	132,421	370,653	1,315,396
	(32,621)	(114,153)	(558,955)
Annual expenses (Baht)	186,176	267,007	585,259
	(169,336)	(167,589)	(501,758)
Amount of debt (Baht)	393,833	831,111	1,670,733
	(627,442)	(1,214,789)	(1,670,733)
Financial literacy (ANZ-2014's criteria)			
Financial knowledge (Total score in percent)	48.10	48.85	54.07
Financial knowledge (percentage)			
Division (#74)	71.42	63.64	70.37
Time value of money (#75)	57.14	47.27	70.37
Interest paid on loan (#76)	71.42	70.91	62.96
Interest rate paid on loan (understanding percent) (#76)	50.00	47.27	48.15

	Income levels		
	Low income	**Middle income**	**High income**
Calculation of interest plus principal (#77)	50.00	45.45	48.15
Compound interest rate (#78)	21.43	40	48.15
Risk diversification (#79)	39.28	34.55	37.04
Risk investment (#80)	78.57	67.27	74.07
Awareness of credit bureau/debt default (#82)	67.86	69.09	85.19
Awareness of deposit protection law (#83)	10.71	3.64	29.63
Understanding of basic financial services (#86)	57.14	52.73	55.56
Loan payment responsibility (#87)	67.86	76.36	77.78
ATM responsibility (#90)	64.29	69.09	48.15
Awareness of consumer responsibility to disclose information (#89)	14.29	38.18	48.15
Awareness of the loan provider's responsibility to give clear information to consumers (#88)	0	7.27	7.41
Financial behavior (Total score in percent)			
Keeping track of finances	70.47	69.21	66.67
Planning ahead	50.00	51.14	62.5
Product choice	62.76	67.79	72.49
Financial control	60.27	62.96	68.06
Staying informed	62.68	68.31	69.84
Financial attitude (Total score in percent)			
Self-efficacy	64.71	66.55	73.04
Financial stress	62.69	64.00	56.48
Impulsivity	55.23	56.12	56.30
Financial aspirations	73.04	76.00	75.56

	Income levels		
	Low income	**Middle income**	**High income**
Entrepreneurial skills (Total score in percent)			
Technical skills	59.82	66.21	74.07
Management skills	64.68	71.92	75.72
Entrepreneurial skills	69.17	78.55	77.65
Maturity skills	73.93	83.27	82.59

Source: Author's calculation

Note: # refers to question number in the questionnaire

This section illustrates the results of the field survey, including demographic characteristics, personal financial information, and financial literacy across earning levels. Quartile classifications are used to categorize income level. There are three income levels, the first of which refers to the lowest income group, which is Q_1, while the third group refers to the highest income class, which is Q_4. The middle-income group comprises those in either Q_2 or Q_3 groups. The low-income group has average annual earnings of around 132,421 baht, the middle-income group approximately 370,653 baht, and the high-income group about 1,315,396 baht, on average. As can be observed from Table 20, the average age of those in the high-income group is 39.30; slightly lower than the low and middle-income groups who are aged 40.43 and 40.86 years on average, respectively. Looking at the gender proportions across income levels, one-third were found to be male in all income levels. The majority of married people were found in the middle-income group, with the high-income group having the lowest proportion. Furthermore, in terms of education, income level was found to increase along with years of schooling. Whereas the greatest average number of years of business experience was found in the middle-income group (10.77 years on average). However, annual expenditure was found to increase according to income level. The amount of debt increased in proportion to income, which is similar to the expenses pattern.

Financial knowledge also increases along with income level. The low and middle-income groups were found to have less financial knowledge than did the

highest income group. Looking at financial knowledge components individually, we see that most of self-employed respondents have basic mathematical skills (providing correct answers to division questions). In terms of the time value of money, the high-income group showed the highest proportion of understanding on this issue. As for time value, around half of both the low- and middle-income groups could understand this concept. And for the calculation of loan interest paid, most self-employed respondents provided correct answers, but when asked to convert the amount of repayment into a percentage, most did not answer correctly. Only half of the respondents could correctly convert the interest rate paid on the loan into a percentage. This implies that most of the self-employed respondents in all income levels did not understand percentages. In addition, a low proportion of self-employed respondents were able to estimate the correct figure for interest plus principal and the compound interest rate. In particular, only 21 percent of people in the low-income group were able to calculate the compound interest rate. Furthermore, around 60 percent of self-employed respondents in each subgroup appeared to lack understanding of the concept of risk diversification. The results also reveal that two-thirds of self-employed respondents in each income group understood that investment returns depend on the risk level of the investment. Moreover, most respondents knew about the functions of credit bureaus, with the high-income group demonstrating the greatest proportion of understanding that a debt default will be disclosed. Furthermore, very few self-employed respondents knew about the deposit protection law, especially in the low-income and middle-income subgroups, with only 11 and 4 percent, respectively, knowing that they are protected against the loss of their deposits at financial institutions.

Understanding consumer rights and responsibilities, as well as awareness of provider responsibility, is included as part of financial knowledge, based on the ANZ-2014 criteria. Overall, the self-employed respondents seemed to understand basic financial services (credit card holder responsibility), with just over half (57 percent) of the low-income group exhibiting the highest proportion. The middle- and low-income groups demonstrated the greatest awareness of ATM cardholder responsibility, and quite a high proportion of them also knew about loan payment responsibility. However, self-employed respondents overall showed very little

awareness of provider responsibility to give clear information to consumers, especially those in the low-income group who have very little understanding of financial concepts. A very low proportion of those in the low-income group were aware of consumer responsibility to disclose information, while about 50 percent of people in the high-income group exhibited an understanding of this concept.

With regard to financial behavior, according to the field survey, the high-income group generated higher scores for planning ahead, product choice, financial control, and staying informed of financial information than did those in the middle- and low-income groups. But the low- and middle-income groups has higher percentages for keeping track of behavior. As for financial attitude, the high-income group exhibited a higher self-efficacy score than did other subgroups whereas people in the middle- and low-income groups were found to experience more stress when dealing with money than did those in the high-income group. This implies that they may feel uncomfortable when dealing with financial situations. However, similar scores for impulsivity were reported among the three income groups, with the average score for all respondents revealing a slightly average personal impulsivity trait. High financial aspirations were reported among the middle and high-income groups while those in the low-income group had the lowest financial aspirations.

Analysis of the field data shows that the high-income group had the most technological and managerial skills compared to their low- and middle-income counterparts. Those in the high and middle-income groups were found to have greater entrepreneurship skills and maturity than those in the low-income group as well, entrepreneurial skill component scores increasing along with income level. Analyses in Chapter 4 and Chapter 5 employed different datasets although the two datasets, one including primary data (a field survey) and one secondary data (the SES-BOT/FA-Q12013), had different data patterns (e.g., measurement processes) as well as different collection methods. The secondary data was population representative and was used as a main dataset in the analysis presented in Chapter 4. However, this dataset lacks important information (such as entrepreneurial skills and business information) needed in order to be used in the analysis. Therefore, the field survey was conducted in order to fill in the missing dataset. Although the characteristics of the two data sources differ and a survey questionnaire is more detailed and has many

more financial questions than the number of questions used to compile secondary data, financial knowledge and financial attitude among the self-employed turned out to be rather similar for both datasets—moderate scores for financial knowledge and a little over sixty percent for financial attitude. This means that while the self-employed had a rather good financial attitude as reflected in both secondary and primary data, their financial knowledge was still a problem. However, financial behavior scores in each component highlighted differences between both datasets. Namely, each financial behavior score recorded from primary data was less than that obtained from the secondary data. In other words, the financial behavior percentages as reported from the field survey tended to be lower than those from secondary data. This makes it possible to explain that the different sample demographics between primary and secondary data may explain why the self-employed seem to act differently in each instance.

Using both datasets to analyze the relationship between financial literacy on retirement saving planning and the relationship between financial literacy on earnings among self-employed workers reveals that using secondary data to analyze financial knowledge, financial attitude, financial goals (Behave4), and financial info (Behave3) has an important effect on retirement saving planning. This outcome was similar to what was discovered from the primary dataset, which found that those who had planned for retirement saving had higher levels of financial knowledge, a "better" financial attitude, better planning for the future (financial goal; Behave4), and had kept themselves informed (financial info/Behave3) compared to those who had not yet implemented a plan. In terms of financial literacy's effect on the earnings of the self-employed, data revealed that financial knowledge, financial info (Behave3), household accounts (Behave5), product choice (Behave6), and borrowing (Behave7) affected an increase in self-employed earnings. Primary data indicated that the middle- and high-income self-employed group had more financial knowledge than did the low-income self-employed group. Moreover, the highest percentages for staying informed (financial info/Behave3) and financial control (borrowing: Behave7), which were also considered the highest financial behavior scores, were found in high-income group, with the exception of keeping track of finances (household accounts/Behave5), which were found highest score in low-income group.

Although a rough comparison of these two data sets reveals both similarity and differences, we can nevertheless see that financial knowledge plays quite an important role in retirement saving planning as well as generating earnings among self-employed workers.

CHAPTER 6

CONCLUSION AND POLICY IMPLICATION

6.1 Conclusions

Many countries are transforming into super-aged societies, in which impacts on the economy are impossible not to notice. For instance, family sizes are shrinking and people are living longer and have better access to a large amount of information about the diversity of financial products and services. Financial literacy is therefore becoming an important instrument in helping people making appropriate financial allocations, and this topic is being discussed in various countries worldwide. Thailand is expected to be a super-aged society in less than 15 years (in 2033), which will lead to a manpower shortage. Furthermore, as Arayavechkit et al. (2015) suggest, a majority of employed workers in Thailand are likely to switch to become self-employed during their 40s and 50s. This phenomenon is a concern due to the fact that it is not a compulsory for self-employed workers in Thailand to become members of the Social Security Fund. This means that they do not have any compulsory savings for retirement. But given self-employed workers' general fragility in terms of their livelihood, the volatility of their labor income due to an inadequate skill set, and their relative low productivity, their ability to save for old age on their own becomes doubtful.

A retirement savings plan among the self-employed thus is an important issue nowadays because most self-employed do not have social security coverage. Moreover, self-employed workers are likely to work until they are unable to do so and hence further diminish their motivation to save for retirement. Policymakers must try to find a way to deal with this issue in order to reduce a fiscal burden in the near future in case the Thai government ends up needing to take care of all elderly. Saving for old age has intrigued scholars' interest and discussions of late. Most scholars agree

that an individual's financial literacy is a key factor for better wealth allocation. Most policy recommendations hence suggest improving financial literacy among household members because greater financial literacy is believed to result in an increase of savings and better financial decision-making. This suggestion has been broadly supported by previous research. Therefore, this study aims to identify the relationship between financial literacy and retirement saving planning among self-employed workers and to understand how financial literacy affects earnings, which is a key source for saving. This study employed the Socio-Economic Survey (SES) in conjunction with the BOT/FA-Q12013 dataset to examine retirement saving planning, wealth accumulation, and earnings of self-employed workers in Thailand. In addition, a field survey was conducted to collect additional information on business and entrepreneurial skills, which are important factors for self-employed people's earnings, factors which are not taken into account in the BOT/FA-Q12013 database.

The analysis of the role of financial literacy for retirement saving planning and wealth accumulation shows that, in particular, financial knowledge is a significant factor for increasing the probability that self-employed workers will plan and save for their retirement and thus accumulate more wealth, as discussed in the empirical results. In addition, financial knowledge has also been found to have a positive relationship with earnings among self-employed workers. For financial behavior, this study divided financial behavior into seven habits: self-control (Behave1), bill payment (Behave2), financial info (Behave3), financial goal (Behave4), household accounting (Behave5), product choice (Behave6), and borrowing (Behave7). Results show that keeping track of financial info (Behave3) and having one's own financial goal (Behave4) are the key behaviors for retirement saving planning among self-employed workers. But bill payment (Behave2), financial goal (Behave4), household accounting (Behave5), and borrowing (Behave7) also play strongly significant roles in increasing wealth accumulation of self-employed households. Therefore, keeping track of a household's financial situation (i.e., financial info/Behave3 and household accounting/Behave5), planning ahead behavior, such as always keeping in mind long-term financial goals (i.e., financial goal/Behave4), and maintaining control of one own's financial situation (i.e., bill payment/Behave2) and borrowing (Behave7)) are substantial determinants for both retirement saving planning and wealth accumulation

for self-employed workers. In particular, setting a financial goal (financial goal/Behave4) is considered as a core financial behavior since it has a strongly significant impact on both retirement saving planning and wealth accumulation. This study also found that individuals' financial attitudes reflect their personal perspectives on current and possible future financial scenarios. Such attitudes in turn help increase the probability of retirement saving planning as they generate a positive effect in the Probit analysis of the retirement saving planning equation but become insignificant in the MLR regression of wealth accumulation.

Regarding earnings analysis, financial literacy components were added to the Mincerian wage equation, which indicated that financial knowledge played a strongly significant role on earnings among self-employed workers. Moreover, examination of financial behavior in each component found that financial info (Behave3), household accounting (Behave5), product choice (Behave6), and borrowing (Behave7) were strongly significant factors in increasing earnings among self-employed workers. And financial info (Behave3) and household accounting (Behave5) had an especially significant impact on earning ability.

Based on primary data, findings show that retirement saving planning is a problem among self-employed workers, as indicated by the fact that most did not even have a retirement saving plan and that those who did were saving too little. Moreover, their saving patterns were not diversified enough. Bank deposits were the most popular method among self-employed workers, but some basic financial applications were also widely used, such as applications for shopping online and banking applications for transferring money. This shows that self-employed workers had at least adapted to modern financial technology, which helps prepare them for a cashless society. As for financial literacy, this study adopted ANZ-2014's criteria to measure respondents' financial literacy. The first two components of financial literacy, financial knowledge and financial behavior, are similar to those of the OECD's. In addition to mathematical ability, financial knowledge was broadened to include individual financial understanding and responsibility as an additional measurement. (Survey results indicate that self-employed workers in Mahasarakham had an average level of financial knowledge.) The measurement of financial attitudes was based on personal traits and attitudes toward autonomy regarding financial issues.

As for financial behavior, it can be broken down into five components: (1) keeping track of finances, (2) planning ahead, (3) keeping informed, (4) choosing products, and (5) being autonomous in terms of financial control. The score on this component was around 60 percentage points, which is a good score among the self-employed workers surveyed in Mahasarakham. However, their lowest percentages were for planning ahead behavior, which is considered a key factor for retirement saving planning and wealth accumulation in the national survey data of SES and the BOT/FA-Q12013 databases.

Financial attitude among self-employed workers consists of four components: (1) self-efficacy, (2) financial stress, (3) impulsivity, and (4) financial aspirations. Self-employed workers generated high scores on financial aspirations and self-efficacy. This implies that self-employed workers had the ambition to strive for financial success as well as the confidence to achieve it. But financial stress and level of impulsivity were slightly greater than fifty percent, suggesting that self-employed workers were rather stressed and impulsive when dealing with money. Primary data from the field survey were employed to analyze the effect of financial literacy on retirement savings planning and the effect of financial literacy and entrepreneurial skills on earnings level among self-employed workers.

The total financial knowledge score represents a weakness of retirement non-planners since their score is much lower than that of retirement planners. Most retirement planners did quite well on numeracy skills, such as calculating the time value of money and interest rates, and had adequate financial understanding of investment risk and awareness of credit bureau/debt default loan repayment responsibility. In contrast, most self-employed respondents did not understand very well or were not aware of compound interest rates, risk diversification, the deposit protection law, and provider responsibility to give clear information to consumers.

A look at individual financial behavior components reveals that retirement planners had slightly better financial behavior than did non-planners, including higher percentages for planning ahead, product choice, financial control, and staying informed about financial information. In contrast, the percentage for keeping track of finances highest among non-planners. In terms of financial attitude, scores for self-efficacy and financial aspirations were almost the same among retirement planners

and non-planners, at 68 percent and 75 percent, respectively. This means that both groups were passionate about providing for their future and wanted to be successful in financial matters. Regarding financial stress and impulsivity, both groups reported feeling slightly stressed when dealing with money, while impulsivity was reported on average among them.

Moving on to the earnings analysis, we see that the financial knowledge score increased along with income level. The high-income group had the highest score. Evaluating financial knowledge components separately shows that the different groups had similar proportions of respondents who answered correctly, except that the high-income group was able to calculate time value of money and compound interest rate better than were other sub groups. In addition, high- and middle-income groups for the most part had adequate financial understanding and competence as well as awareness of financial responsibility.

For financial behavior components, the high-income group had higher percentages for planning ahead, product choice, financial control, and staying informed of financial information than did those in the middle- and low-income groups; however, the high-income group scored lower on keeping track of financial matters. This reflects a more sophisticated, future-oriented perspective in the behavior of the high-income group. In addition, different percentages were reported across different income levels with regard to financial attitude. The high-income group had a higher self-efficacy score than did other subgroups. In contrast, middle- and low-income groups reported feeling more stress when dealing with money than did those in the high-income group. In other words, these groups tended to feel uncomfortable when dealing with financial situations. However, impulsive behavior was reported among all three income groups, with average percentages suggesting that self-employed respondents had slightly average impulsive personal traits. High financial aspirations were reported among the middle- and high-income groups, while those in the low-income group had the lowest financial aspirations.

Each entrepreneurial skill component tended to increase with the level of income since it was the high-income group that had the most technological and management skills. Also, the high- and middle-income groups also had greater entrepreneurship skills and maturity than did those in the low-income group.

Therefore, entrepreneurial skills are considered crucial for self-employed workers operating a business.

6.2 Policy Implications

This study reveals not only the importance of educating the self-employed about having their own retirement saving plan but also how to implement their plan and make better financial decisions. It is necessary to imbed these issues into the education system. Financial knowledge should be considered as a core subject in schools at all levels of education and, at the very least, youth must learn how to manage their financial resources, with particular emphasis on the acquisition of financial information as well as its implications. Learning about the fundamentals of finance early on in life will help increase awareness among youth about the importance of their behavior and attitudes toward financial matters. Moreover, financial applications and training for adults must be provided on a variety of financial matters to match the willingness to learn among various target groups, their personal characteristics, and living circumstances. It is important that everyone have equal access to comprehensive financial information to gain sufficient knowledge regarding retirement saving planning and wealth accumulation.

Based on each individual's financial behavior components, this study concludes that keeping track of finances and information, household accounting, planning ahead, and keeping one's financial situation under control are important habits to promote planning for retirement and accumulating wealth. Making financial information easy to access and understand will help more people to follow financial news. Furthermore, providing knowledge and incentives to keep accurate household accounts can also improve individual saving.

The findings of the field survey indicate that half of self-employed people were interested in consulting professional financial advisors. In addition, about 40 percent of self-employed people performed activities related to financial matters, such as searching the internet to find information about savings or participating in financial seminars. Furthermore, the high scores for both financial self-efficacy and financial aspirations among the self-employed imply that they are keen to be successful in

financial matters. Therefore, increasing the sources and diversity of financial information will help people become more aware of saving and planning for retirement and developing healthy financial habits. Moreover, entrepreneurial skills are also an important factor in helping self-employed workers, and promoting learning centers that provide essential skills to self-employed workers will help them operate their businesses more efficiently.

BIBLIOGRAPHY

Alessie, R., Van Rooij, M., & Lusardi, A. (2011). Financial literacy and retirement preparation in the Netherlands. *Journal of Pension Economics & Finance, 10*(4), 527.

Ali, P., Anderson, M. E., McRae, C. H., & Ramsay, I. (2016). The financial literacy of young people: socio-economic status, language background and the rural-urban chasm. *Australian and International Journal of Rural Education, 26*(1), 54-66.

Aliyu, I. M. D. Y. O. (2015). Impact of managerial skills on small scale businesses performance and growth in Nigeria. *European Journal of Business and Management, 7*(5), 109-114.

Almenberg, J., & Säve-Söderbergh, J. (2011). Financial literacy and retirement planning in Sweden. *Journal of Pension Economics and Finance, 10*(4), 585-598.

Ameriks, J., Caplin, A., & Leahy, J. (2003). Wealth accumulation and the propensity to plan. *The Quarterly Journal of Economics, 118*(3), 1007-1047.

Arayavechkit, T., Manprasert, S., & Pinthong, J. (2015). Intertwining Inequality and Labor Market under the New Normal. Discussion Paper No.6. *Puey Ungphakorn Institute for Economic Research*. Retrieved from https://www. pier.or.th/wp-content/uploads/2015/10/pier_dp_006.pdf

Atkinson, A., & Messy, F.-A. (2012). Measuring financial literacy: Results of the OECD/International Network on Financial Education (INFE) pilot study. OECD Working Papers on Finance, Insurance and Private Pensions No.15. *OECD Publishing*. Retrieved from https://doi.org/10.1787/5k9csfs90fr4-en

Auepiyachut, W. (2017). Financial literacy: Determinants and its implications for saving behavior. *Journal of Humanities and Social Sciences, 25*(47), 67-93.

Augsuchoti, S., & Kangwanpomsiri, K. (2015). Approaches and measures in promoting elderly saving in accordance with philosophy of the sufficiency economic: A case study of Nonthaburi province. *Journal of Humanities and Social Sciences, 7*(14), 146-158.

Australia and New Zealand Banking Group Limited. (2015). *ANZ Survey of Adult Financial Literacy in Australia* Retrieved from https://www.anz.com/resources/3/1/31cbc1fd-9491-4a22-91dc4c803e4c34ab/adult-financial-literacy-sur

vey-full-results.pdf

Bank of Thailand. (2013). Thailand's Financial Literacy Survey Results. Retrieved from https://www.1213.or.th/en/Pages/statistics.aspx

Barr, M. S., & Sherraden, M. W. (2005). Institutions and inclusion in saving policy.

Becker, G. S. (1975). Front matter, human capital: a theoretical and empirical analysis, with special reference to education. In *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education, Second Edition* (pp. -22-20): NBER.

Behrman, J. R., Mitchell, O. S., Soo, C., & Bravo, D. (2010). Financial Literacy, Schooling, and Wealth Accumulation. NBER Working Paper No. 16452. *National Bureau of Economic Research*.

Benartzi, S., & Thaler, R. (2007). Heuristics and biases in retirement savings behavior. *Journal of Economic perspectives, 21*(3), 81-104.

Beverly, S. G., & Sherraden, M. (1999). Institutional determinants of saving: Implications for low-income households and public policy. *The Journal of Socio-Economics, 28*(4), 457-473.

Boisclair, D., Lusardi, A., & Michaud, P.-C. (2017). Financial literacy and retirement planning in Canada. *Journal of Pension Economics & Finance, 16*(3), 277-296.

Bruhn, M., & Zia, B. (2011). Stimulating managerial capital in emerging markets: the impact of business and financial literacy for young entrepreneurs.

Bucher-Koenen, T., & Lusardi, A. (2011). Financial literacy and retirement planning in Germany.NBER Working Paper No.17110. *National Bureau of Economic Research*.

Butbumrung, C. (2012). The Income and Pattern of Saving for Readiness toward Old - age of People Age between 30 – 40 year in Dusit District Bangkok Retrieved from http://ssruir.ssru.ac.th/bitstream/ssruir/678/1/057-55.pdf

Carter, M., & Tamayo, A. (2017). Entrepreneurial and intrapreneurial skills of managers as determinant of organizational performance of small and medium enterprises in Davao region, Philippines. *Philippines (March 6, 2017)*.

Cedefop, & Tissot, P. (2008). Terminology of Education and Training Policy. *A selection a 100 key terms*.

Chen, H., & Volpe, R. P. (1998). An analysis of personal financial literacy among college students. *Financial services review*, *7*(2), 107-128.

Chen, H., & Volpe, R. P. (2002). Gender differences in personal financial literacy among college students. *Financial services review*, *11*(3), 289-307.

Chiswick, C. U. (1977). On estimating earnings functions for LDCs. *Journal of Development Economics*, *4*(1), 67-78.

Chiswick, C. U. (1983). Analysis of earnings from household enterprises: methodology and application to Thailand. *The Review of Economics and Statistics*, 658-662.

Clark, R. L., Morrill, M. S., & Allen, S. G. (2009). Employer-provided retirement planning programs. Wharton Pension Research Council Working Papers. 335. *Wharton Pension Research Council Working Papers*.

Clark, R. L., Morrill, M. S., & Allen, S. G. (2011). Pension plan distributions: The importance of financial literacy. *Financial Literacy: Implication for Retirement Security and the Financial Marketplace*, 40-58.

Clark, R. L., Morrill, M. S., & Allen, S. G. (2012). The role of financial literacy in determining retirement plans. *Economic inquiry*, *50*(4), 851-866.

Cole, S., & Fernando, N. (2008). Assessing the importance of financial literacy. *ADB Finance for the Poor*, *9*(2), 1-6.

Cooney, T. (2012). *Entrepreneurship skills for growth-oriented business.* Paper presented at the Report for the OECD-DBA International Workshop 'Skills Development for SMEs and Entrepreneurship,'Copenhagen, November.

Cronqvist, H., & Siegel, S. (2015). The origins of savings behavior. *Journal of Political Economy*, *123*(1), 123-169.

Crossan, D., Feslier, D., & Hurnard, R. (2011). Financial literacy and retirement planning in New Zealand. Center for Research on Pensions and welfare Policies Working Paper 113/11. *CeRp Workimg Paper Series*.

Ćumurović, A., & Hyll, W. (2019). Financial literacy and self-employment. *Journal of Consumer Affairs*, *53*(2), 455-487.

Drexler, A., Fischer, G., & Schoar, A. (2014). Keeping it simple: Financial literacy and rules of thumb. *American Economic Journal: Applied Economics*, *6*(2), 1-31.

Eniola, A. A., & Entebang, H. (2016). Financial literacy and SME firm performance.

International Journal of Research Studies in Management, 5(1), 31-43.

Fatoki, O. (2014). The financial literacy of micro entrepreneurs in South Africa. *Journal of social sciences, 40*(2), 151-158.

Fessler, P., Schürz, M., Wagner, K., & Weber, B. (2007). Financial capability of Austrian households. *Monetary Policy & the Economy Q, 3*, 50-67.

Fornero, E., & Monticone, C. (2011). Financial literacy and pension plan participation in Italy. Center for Research on Pensions and Welfare Policies Working Paper111/11. . *CeRp Workimg Paper Series*.

Friedman, M. (1957). The permanent income hypothesis. In *A theory of the consumption function* (pp. 20-37): Princeton University Press.

Gongkhonkwa, G. (2019). The Causes of Formal Debt Default: The Case Study of Farmers in Phayao Province. *University of the Thai Chamber of Commerce Journal Humanities and Social Sciences, 39*(1), 1-21.

Gratton, L., & Ghoshal, S. (2003). Managing Personal Human Capital:: New Ethos for the 'Volunteer'Employee. *European Management Journal, 21*(1), 1-10.

Hogarth, J. M., & Anguelov, C. E. (2003). Can the poor save? *Journal of Financial Counseling and Planning, 14*(1), 1.

Huston, S. J. (2010). Measuring financial literacy. *Journal of Consumer Affairs, 44*(2), 296-316.

Kalmi, P., & Ruuskanen, O.-P. (2018). Financial literacy and retirement planning in Finland. *Journal of Pension Economics & Finance, 17*(3), 335-362.

Katz, R. L. (1955). Skills of an effective administrator *Harvard Business Review, 33*(1), 33-42.

Klapper, L. F., & Panos, G. A. (2011). Financial literacy and retirement planning: the Russian case. *Journal of Pension Economics & Finance, 10*(4), 599-618.

Kotzé, L., & Smit, A. (2008). Personal financial literacy and personal debt management: the potential relationship with new venture creation. *The Southern African Journal of Entrepreneurship and Small Business Management, 1*(1), 35-50.

Kutzhanova, N., Lyons, T. S., & Lichtenstein, G. A. (2009). Skill-based development of entrepreneurs and the role of personal and peer group coaching in enterprise development. *Economic Development Quarterly, 23*(3), 193-210.

Lusardi, A. (2001). Explaining why so many people do not save. CRP WP 2001-05. *Center for Retirement Research Working Paper*.

Lusardi, A. (2003). Planning and saving for retirement. Retrieved from https://static.twentyoverten.com/5df7ffacb22b20786b33bcac/6YoHI1IFiT/Lusardi_pdf.pdf

Lusardi, A., & Mitchell, O. S. (2007). Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth. *Journal of monetary Economics, 54*(1), 205-224.

Lusardi, A., & Mitchell, O. S. (2011a). Financial literacy and planning: Implications for retirement wellbeing.NBER Working Paper17078. *National Bureau of Economic Research*.

Lusardi, A., & Mitchell, O. S. (2011b). Financial literacy and retirement planning in the United States. NBER Working Paper 17108. *National Bureau of Economic Research*.

Lusardi, A., & Mitchell, O. S. (2011c). Financial literacy around the world: an overview. Working Paper w17107. *National Bureau of Economic Research*

Lusardi, A., Mitchell, O. S., & Curto, V. (2009). Financial literacy and financial sophistication among older Americans. NBER Working Paper 15469. *National Bureau of Economic Research*.

Lyons, T. S. (2002). Building social capital for rural enterprise development: Three case studies in the United States. *Journal of Developmental Entrepreneurship, 7*(2), 193.

McElwee, G. (2008). A taxonomy of entrepreneurial farmers. *International Journal of Entrepreneurship and Small Business, 6*(3), 465-478.

Media Research Consultants Pte Ltd. (2015). Quantitative Research on Financial Literacy Levels in Singapore. Retrieved from https://www.mas.gov.sg/-/media/MAS/resource/news_room/press_releases/2005/Financial-Literacy-Levels-in-Singapore-Full-Report.pdf?la=en&hash=3AF434C39B8636A5B0F6F464BD1AA14FFA8F697D

Mincer, J. A. (1974). The human capital earnings function. In *Schooling, Experience, and Earnings* (pp. 83-96): NBER.

Modigliani, F., & Brumberg, R. (1954). Utility analysis and the consumption function: An interpretation of cross-section data. *Franco Modigliani, 1*(1), 388-436.

National Statistical Office. (2013). *The Informal Employment Survey 2013*. Retrieved from http://www.nso.go.th/sites/2014en/Pages/survey/Social/Labour/The-Informal-Employment-Survey.aspx

National Statistical Office. (2014). *The Informal Employment Survey 2014*. Retrieved from http://www.nso.go.th/sites/2014en/Survey/social/labour/informal/ 2014/6 .Full%20Report.pdf

National Statistical Office. (2015). *The Informal Employment Survey 2015*. Retrieved from http://www.nso.go.th/sites/2014en/Survey/social/labour/informal/2015/ 6.Full%20Report.pdf

National Statistical Office. (2016). *The Informal Employment Survey 2016*. Retrieved from http://www.nso.go.th/sites/2014en/Survey/social/labour/informal/2016/6. 2016_iep_Full_Report.pdf

National Statistical Office. (2017). *The Informal Employment Survey 2017*. Retrieved from http://www.nso.go.th/sites/2014en/Survey/social/labour/informalEmploy ment/2017/Fullreport_60.pdf

National Statistical Office. (2018). *The Informal Employment Survey 2018*. Retrieved from http://www.nso.go.th/sites/2014en/Survey/social/labour/informalEmploy ment 2018/2561_Full_Report.pdf

Noctor, M., Stoney, S., & Stradling, R. (1992). Financial literacy: a discussion of concepts and competences of financial literacy and opportunities for its introduction into young people's learning. *National Foundation for Educational Research*.

Nunoo, J., & Andoh, F. K. (2011). *Sustaining small and medium enterprises through financial service utilization: does financial literacy matter?* Retrieved from https://ageconsearch.umn.edu/record/123418/

O'Donnell, N., & Keeney, M. (2010). Financial capability in Ireland and a comparison with the UK. *Public Money & Management, 30*(6), 355-362.

Office of the National Economic and Social Development Council. (2018). National Account. Retrieved from https://www.nesdc.go.th/main.php?filename=social

Office of the National Economic and Social Development Council. (2019). Thai people of the future *Economic and Social Journal, 56*(2). Retrieved from https://www.nesdc.go.th/ewt_dl_link.php?nid=9526&filename=economic_magazine

Oseifuah, E. K. (2010). Financial literacy and youth entrepreneurship in South Africa. *African journal of Economic and management studies, 1* (2), 164-182. Retrieved from https://doi.org/10.1108/20400701011073473

Pahnke, L., & Honekamp, I. (2010). Different effects of financial literacy and financial education in Germany. MPRA Paper No.22900. *Munich Personal RePEc Archive*. Retrieved from https://mpra.ub.uni-muenchen.de/ 22900/1 /MPRA_paper_22900.pdf

Patmasiriwat, D., & Hengpatana, S. (2016). Income, saving, and wealth of Thai rural households: a case study of saving adequacies. *Applied Economics Journal, 23*(1), 75-91.

Paukmongkol, W. (2017). Financial literacy of the public in prathumthani province *Journal of Humanities and Social Sciences Valaya Alongkorn 12*(3), 311-323.

Personal Finance Research Centre. (2005). *Measuring financial capability: an exploratory study* Retrieved from http://www.bristol.ac.uk/media-library/sites/ geography/migrated/documents/pfrc0510.pdf

Phananiramai, M. (2008). Incorporating time into the National Transfer Accounts. *NIDA Development Journal 48*(3), 65-87.

Phelan, C., & Sharpley, R. (2012). Exploring entrepreneurial skills and competencies in farm tourism. *Local Economy, 27*(2), 103-118.

Polachek, S. W. (2008). *Earnings over the lifecycle: the Mincer earnings function and its applications*: Now Publishers Inc.

Pootrakool, K., Ariyapruchya, K., & Sodsrichai, T. (2005). Long-term Saving in Thailand: Are we saving enough and what are the risks? Working Papers 2005-03. *Monetary Policy Group, Bank of Thailand*.

Sathirakul, N. (2016). Measuring of financial literacy of undergraduate students in Business Japanese program (BJ) at Thai-Nichi institute of technology. *TNI Journal of Business Administration and Languages, 4*(1), 35-40.

Seelajaroen, R., Busaratrakul, P., Pisedtasalasai, A., Ratanabanchuen, R., Assawareungpipop, N., & Lhaopadchan, S. (2016). The effectiveness of financial education on making investment choices of saving for retirement. *Chulalongkorn Business Review, 38*(4), 149-190.

Sekita, S. (2011). Financial literacy and retirement planning in Japan. *Journal of Pension Economics and Finance, 10*(4), 637.

Shabbir, M. S., Shariff, M. N. M., & Shahzad, A. (2016). A conceptual development of entrepreneurial skills and entrepreneurial intentions: A case of IT employees in Pakistan. *International Journal of Academic Research in Business and Social Sciences, 6*(3), 65-78.

Smith, W. L., Schallenkamp, K., & Eichholz, D. E. (2007). Entrepreneurial skills assessment: an exploratory study. *International Journal of Management and Enterprise Development, 4*(2), 179-201.

Suwanrada, W., & Chandoevwit, W. (2010). *Old-age Welfare and National Pension*. Retrieved from https://tdri.or.th/wp-content/uploads/2013/04/d2010017.pdf

Teilhet-Waldorf, S., & Waldorf, W. H. (1983). Earnings of self-employed in an informal sector: a case study of Bangkok. *Economic Development and Cultural Change, 31*(3), 587-607.

Thaler, R. H., & Benartzi, S. (2007). The behavioral economics of retirement savings behavior.

The Fiscal Policy Office. (2015). *Fiscal Risk Statement 2015*. Retrieved from http://www.fpo.go.th/main/getattachment/Economic-report/Risk-of-Fiscal-Report/5324/CNT0015551-1.pdf.aspx

The United Nations. (2015). *World Population Prospects : Key Findings and Advance Tables*. Retrieved from https://population.un.org/wpp/Publications/Files/Key_ Findings_WPP_2015.pdf

Van Rooij, M. C., Lusardi, A., & Alessie, R. J. (2011). Financial literacy and retirement planning in the Netherlands. *Journal of economic psychology, 32*(4), 593-608.

Wise, S. (2013). The impact of financial literacy on new venture survival. *International Journal of Business and Management, 8*(23), 30.

Worthington, A. C. (2006). Predicting financial literacy in Australia. *Financial services*

review, 15(1), 59-79.

Xu, L., & Zia, B. (2012). Financial literacy around the world: An overview of the evidence with practical suggestions for the way forward. Policy Research Working Paper, (WPS6017) *The World Bank , Development Research Group*

Yamane, T. (1967). *Statistics: An intoductory statistics* (2nd ed.).

APPENDICES

APPENDIX A

Table A1: A Correlation (r) Between Selected Variables: Retirement and Saving Model: Whole Sample

	retirement planner	**male**	**age**	**year of schooling**	**married**	**central**
retirement planner	1					
male	0.0023	1				
age	0.2438*	0.0234*	1			
year of schooling	-0.0006	0.0535*	-0.4605*	1		
married	0.018	0.0927*	-0.0992*	-0.0206*	1	
central	-0.0245*	0.0165	-0.0704*	0.0493*	-0.0183	1
north	0.0124	0.0058	0.0623*	-0.0962*	-0.0196	-0.3644*
northeast	-0.0416*	-0.0211*	0.0618*	-0.0828*	0.0385*	-0.3841*
south	0.0398*	-0.0087	-0.0409*	0.0480*	0.0227*	-0.2632*
municipal	0.0038	-0.011	-0.0479*	0.1852*	-0.0831*	-0.0576*
lnlabor income	0.0565*	0.0653*	-0.2439*	0.3993*	-0.0235	0.1882*
financial knowledge	0.1411*	0.0427*	-0.2208*	0.4421*	0.0721*	0.0217*
behave 1	0.1252*	-0.0415*	0.0306*	0.0500*	0.0448*	-0.0287*

	retirement planner	male	age	year of schooling	married	central
behave2	0.1432*	-0.014	0.0271*	0.0753*	0.0422*	-0.0457*
behave3	0.1545*	-0.0393*	0.0146	0.0611*	0.0235*	-0.0936*
behave4	0.1842*	-0.0141	-0.0032	0.0943*	0.0504*	-0.0748*
behave5	0.0808*	-0.0146	-0.0399*	0.1545*	0.0535*	-0.0238*
behave6	0.0344*	0.0519*	-0.1372*	0.2454*	0.0404*	-0.008
behave7	0.1030*	0.0148	0.0891*	0.0775*	-0.0427*	-0.0073
financial attitude	0.0692*	-0.0272*	0.0440*	-0.0172	0.0076	0.012

Source : Author's calculation.

Table A1: (Continued)

	north	**northeast**	**south**	**municipal**	**lnlabor income**	**financial knowledge**	**behave 1**
north	1						
northeast	-0.3386*	1					
south	-0.2320*	-0.2446*	1				
municipal	-0.0388*	0.0122	-0.0296*	1			
lnlabor income	-0.1212*	-0.2874*	0.1501*	0.1585*	1		
financial knowledge	0.0176	-0.1320*	0.0597*	0.0879*	0.2924*	1	
behave 1	0.0662*	-0.0355*	-0.0043	0.0029	0.0228	0.1372*	1
north	0.0461*	-0.0168	0.0248*	0.0133	0.0820*	0.1600*	0.3313*
northeast	0.0565*	0.0272*	0.0294*	-0.0001	0.0588*	0.1469*	0.4105*
south	0.0558*	-0.0187	0.0572*	0.0358*	0.0854*	0.1424*	0.2645*
municipal	-0.0204*	-0.0099	0.0283*	0.0464*	0.1324*	0.1412*	0.0820*
lnlabor income	-0.0258*	-0.0349*	0.0656*	0.0921*	0.1818*	0.2546*	0.0397*
financial knowledge	0.0134	-0.0371*	0.0240*	0.0509*	0.1227*	0.0881*	0.0123
behave 1	0.0955*	-0.0404*	-0.0907*	-0.0104	-0.0035	0.0351*	0.0891*

Source : Author's calculation.

Table A1: (Continued)

	behave2	**behave3**	**behave4**	**behave5**	**behave6**	**behave7**	**financial attitude**
behave2	1						
behave3	0.4302*	1					
behave4	0.3555*	0.5086*	1				
behave5	0.0956*	0.1092*	0.1133*	1			
behave6	0.0791*	0.0739*	0.1267*	0.0690*	1		
behave7	0.1288*	0.0506*	0.0914*	0.0425*	0.0847*	1	
financial attitude	-0.0413*	0.0117	-0.0948*	0.0168	-0.0682*	-0.0254*	1

Source : Author's calculation.

Table A2: A Correlation (r) Between Selected Variables: Retirement and Saving Model: Non-agricultural Sample

	retirement planner	**male**	**age**	**year of schooling**	**married**	**central**
retirement planner	1					
male	-0.0028	1				
age	0.2694*	-0.0118	1			
year of schooling	-0.0058	0.0897*	-0.4761*	1		
married	0.019	0.0760*	-0.1055*	0.0182	1	
central	-0.0449*	0.0380*	-0.0910*	0.0141	0.0481*	1
north	0.0404*	-0.0254*	0.0831*	-0.0803*	-0.0466*	-0.3898*
northeast	-0.0453*	-0.019	0.0722*	-0.0611*	-0.0233	-0.3741*
south	0.0221	-0.0221	-0.0367*	0.0354*	0.0207	-0.2871*
municipal	-0.0016	0.0274*	-0.0796*	0.1683*	-0.0247*	-0.1375*
lnlabor income	0.0753*	0.1359*	-0.2083*	0.3969*	0.0735*	0.0914*
financial knowledge	0.1317*	0.0405*	-0.2507*	0.4861*	0.0799*	0.0077
behave 1	0.1362*	-0.0576*	0.0335*	0.0579*	0.0527*	-0.0352*
behave2	0.1458*	-0.0266*	0.0346*	0.0838*	0.0365*	-0.0504*
behave3	0.1568*	-0.0508*	0.0232	0.0699*	0.0185	-0.1083*
behave4	0.1855*	-0.0175	-0.0073	0.1064*	0.0512*	-0.0877*

	retirement planner	male	age	year of schooling	married	central
behave5	0.0800*	-0.0192	-0.0428*	0.1670*	0.0581*	-0.0502*
behave6	0.0317*	0.0541*	-0.1508*	0.2723*	0.0432*	-0.0229
behave7	0.1130*	0.0082	0.0950*	0.0695*	-0.0408*	-0.0187
financial attitude	0.0718*	-0.0215	0.0415*	-0.0123	0.0156	0.0067

Source : Author's calculation.

Table A2:(continued)

	north	**northeast**	**south**	**municipal**	**lnlabor income**	**financial knowledge**	**behave 1**
north	1						
northeast	-0.2814*	1					
south	-0.2160*	-0.2072*	1				
municipal	-0.0094	0.0288*	0.0046	1			
lnlabor income	-0.1390*	-0.1301*	0.0538*	0.1027*	1		
financial knowledge	0.0217	-0.1157*	0.0293*	0.0874*	0.3123*	1	
behave 1	0.0645*	-0.0411*	0.0091	0.0064	0.0339*	0.1368*	1
behave2	0.0431*	-0.0102	0.0267*	0.0164	0.0875*	0.1586*	0.3368*
behave3	0.0711*	0.0413*	0.0261*	0.0091	0.0614*	0.1478*	0.4207*
behave4	0.0643*	-0.0099	0.0616*	0.0458*	0.1046*	0.1557*	0.2796*
behave5	-0.0139	-0.0113	0.0468*	0.0489*	0.1695*	0.1612*	0.0871*
behave6	-0.0112	-0.0186	0.0467*	0.1094*	0.2109*	0.2798*	0.0542*
behave7	0.0358*	-0.0192	-0.0071	0.0387*	0.1238*	0.0987*	0.0144
financial attitude	0.0888*	-0.0338*	-0.0918*	-0.0251*	0.0027	0.0406*	0.0804*

Source : Author's calculation.

Table A2:(continued)

	behave2	behave3	behave4	behave5	behave6	behave7	financial attitude
behave2	1						
behave3	0.4370*	1					
behave4	0.3835*	0.5289*	1				
behave5	0.1090*	0.1172*	0.1199*	1			
behave6	0.0824*	0.0779*	0.1403*	0.0811*	1		
behave7	0.1263*	0.0656*	0.0960*	0.0537*	0.0841*	1	
financial attitude	-0.0405	-0.0008	-0.1040*	0.0107	-0.0609*	-0.0175	1

Source : Author's calculation.

Table A3: A Correlation (r) Between Selected Variables : Retirement and Saving Model : Self-employed Subsample

	retirement planner	**male**	**age**	**year of schooling**	**married**	**central**
retirement planner	1					
male	0.0043	1				
age	0.1693*	0.009	1			
year of schooling	-0.0216	0.1121*	-0.4917*	1		
married	0.0064	0.1080*	-0.1315*	0.0294	1	
central	0.0035	0.0357	-0.0081	-0.0391	0.0189	1
north	0.0339	-0.0378	0.0798*	-0.0718*	-0.0576*	-0.3641*
northeast	-0.03	-0.0258	-0.002	-0.0395	0.0063	-0.3691*
south	-0.0203	-0.0078	-0.0645*	0.1042*	0.0598*	-0.2770*
municipal	0.0225	0.0342	-0.0049	0.1242*	-0.0601*	-0.1194*
lnlabor income	0.0322	0.1626*	-0.2493*	0.3189*	0.1056*	0.0651*
financial knowledge	0.0971*	0.0422*	-0.1919*	0.3585*	0.0475*	-0.0041
behave 1	0.1207*	-0.0548*	0.0239	0.0409	0.0159	-0.0460*
behave2	0.1243*	-0.018	0.0256	0.0486*	0.0544*	-0.0737*
behave3	0.1831*	-0.0377	0.008	0.0474*	-0.0054	-0.1052*
behave4	0.1867*	0.0394	-0.0131	0.0700*	0.0296	-0.0829*

	retirement planner	male	age	year of schooling	married	central
behave5	0.0646*	-0.0132	-0.0923*	0.1942*	0.0264	-0.0482*
behave6	0.0169	0.0697*	-0.1334*	0.1979*	0.03	-0.0531*
behave7	0.0580*	0.0175	0.0439*	0.0446*	0.0013	-0.0254
financial attitude	0.0642*	-0.0582*	0.0124	0.0068	-0.0041	0.0031

Source : Author's calculation.

Table A3:(continued)

	north	**northeast**	**south**	**municipal**	**lnlabor income**	**financial knowledge**	**behave 1**
north	1						
northeast	-0.3300*	1					
south	-0.2477*	-0.2511*	1				
municipal	0.0008	0.0294	0.0169	1			
lnlabor income	-0.1119*	-0.0933*	0.0876*	0.0980*	1		
financial knowledge	0.0095	-0.0540*	0.038	0.0515*	0.2666*	1	
behave 1	0.0725*	-0.0363	0.0155	0.0182	0.0445*	0.0863*	1
behave2	0.0421*	0.023	0.0394	0.0104	0.0733*	0.1038*	0.3256*
behave3	0.0775*	0.0405	-0.0025	0.0167	0.0814*	0.1266*	0.3969*
behave4	0.0947*	-0.0138	0.0146	0.022	0.0951*	0.1158*	0.2474*
behave5	-0.0293	-0.0023	0.0728*	0.033	0.1873*	0.1641*	0.0905*
behave6	-0.0256	-0.0031	0.0916*	0.1064*	0.1810*	0.2031*	0.0445*
behave7	0.0295	-0.0038	-0.0007	0.0312	0.0952*	0.1059*	0.0448*
financial attitude	0.0991*	-0.0149	-0.0893*	-0.0188	-0.0069	0.0734*	0.0588*

Source : Author's calculation**.**

Table A3:(continued)

	behave2	**behave3**	**behave4**	**behave5**	**behave6**	**behave7**	**financial attitude**
behave2	1						
behave3	0.4140*	1					
behave4	0.3229*	0.4798*	1				
behave5	0.1036*	0.1122*	0.1335*	1			
behave6	0.0548*	0.0428*	0.1259*	0.0896*	1		
behave7	0.1555*	0.0990*	0.1181*	0.0468*	0.0964*	1	
financial attitude	-0.0409	0.0063	-0.0988*	0.0372	-0.0543*	-0.0500*	1

Source : Author's calculation.

Table A4: A Correlation (r) Between Selected Variables: Wealth Accumulation Model : Whole Sample

	net worth per head	**male**	**age**	**age square**	**year of schooling**	**married**
net worth per head	1					
male	0.008	1				
age	0.0636*	0.0234*	1			
age square	0.0567*	0.0307*	0.9841*	1		
year of schooling	0.0835*	0.0535*	-0.4605*	-0.4347*	1	
married	-0.0047	0.0927*	-0.0992*	-0.1476*	-0.0206*	1
central	-0.0007	0.0165	-0.0704*	-0.0637*	0.0493*	-0.0183
north	-0.0222*	0.0058	0.0623*	0.0598*	-0.0962*	-0.0196
northeast	-0.017	-0.0211*	0.0618*	0.0538*	-0.0828*	0.0385*
south	0.0168	-0.0087	-0.0409*	-0.0389*	0.0480*	0.0227*
municipal	0.0269*	-0.011	-0.0479*	-0.0358*	0.1852*	-0.0831*
lnlabor income	0.1234*	0.0653*	-0.2439*	-0.2541*	0.3993*	-0.0235
financial knowledge	0.0796*	0.0427*	-0.2208*	-0.2353*	0.4421*	0.0721*
behave 1	0.0336*	-0.0415*	0.0306*	0.0211*	0.0500*	0.0448*
behave2	0.0602*	-0.014	0.0271*	0.0210*	0.0753*	0.0422*

	net worth per head	male	age	age square	year of schooling	married
behave3	0.0457*	-0.0393*	0.0146	0.0062	0.0611*	0.0235*
behave4	0.0603*	-0.0141	-0.0032	-0.0096	0.0943*	0.0504*
behave5	0.0658*	-0.0146	-0.0399*	-0.0487*	0.1545*	0.0535*
behave6	0.0368*	0.0519*	-0.1372*	-0.1388*	0.2454*	0.0404*
behave7	0.0682*	0.0148	0.0891*	0.1004*	0.0775*	-0.0427*
financial attitude	-0.0062	-0.0272*	0.0440*	0.0417*	-0.0172	0.0076

Source : Author's calculation.

Table A4:(Continued)

	central	north	northeast	south	municipal	lnlabor income	Financial knowledge
central	1						
north	-0.3644*	1					
northeast	-0.3841*	-0.3386*	1				
south	-0.2632*	-0.2320*	-0.2446*	1			
municipal	-0.0576*	-0.0388*	0.0122	-0.0296*	1		
lnlabor income	0.1882*	-0.1212*	-0.2874*	0.1501*	0.1585*	1	
financial knowledge	0.0217*	0.0176	-0.1320*	0.0597*	0.0879*	0.2924*	1
behave 1	-0.0287*	0.0662*	-0.0355*	-0.0043	0.0029	0.0228	0.1372*
behave2	-0.0457*	0.0461*	-0.0168	0.0248*	0.0133	0.0820*	0.1600*
behave3	-0.0936*	0.0565*	0.0272*	0.0294*	-0.0001	0.0588*	0.1469*
behave4	-0.0748*	0.0558*	-0.0187	0.0572*	0.0358*	0.0854*	0.1424*
behave5	-0.0238*	-0.0204*	-0.0099	0.0283*	0.0464*	0.1324*	0.1412*
behave6	-0.008	-0.0258*	-0.0349*	0.0656*	0.0921*	0.1818*	0.2546*
behave7	-0.0073	0.0134	-0.0371*	0.0240*	0.0509*	0.1227*	0.0881*
financial attitude	0.012	0.0955*	-0.0404*	-0.0907*	-0.0104	-0.0035	0.0351*

Source : Author’s calculation.

Table A4:(Continued)

	behave 1	**behave2**	**behave3**	**behave4**	**behave5**	**behave6**	**behave7**	**financial attitude**
behave 1	1							
behave2	0.3313*	1						
behave3	0.4105*	0.4302*	1					
behave4	0.2645*	0.3555*	0.5086*	1				
behave5	0.0820*	0.0956*	0.1092*	0.1133*	1			
behave6	0.0397*	0.0791*	0.0739*	0.1267*	0.0690*	1		
behave7	0.0123	0.1288*	0.0506*	0.0914*	0.0425*	0.0847*	1	
financial attitude	0.0891*	-0.0413*	0.0117	-0.0948*	0.0168	-0.0682*	-0.0254*	1

Source : Author’s calculation.

Table A5: A Correlation (r) Between Selected Variables: Wealth Accumulation Model : Non-agricultural Sample

	net worth per head	**male**	**age**	**age square**	**year of schooling**	**married**
net worth per head	1					
male	0.0074	1				
age	0.1150*	-0.0118	1			
age square	0.1031*	-0.0003	0.9842*	1		
year of schooling	0.1716*	0.0897*	-0.4761*	-0.4605*	1	
married	0.0115	0.0760*	-0.1055*	-0.1524*	0.0182	1
central	-0.0420*	0.0380*	-0.0910*	-0.0920*	0.0141	0.0481*
north	-0.0111	-0.0254*	0.0831*	0.0848*	-0.0803*	-0.0466*
northeast	-0.0103	-0.019	0.0722*	0.0730*	-0.0611*	-0.0233
south	-0.0043	-0.0221	-0.0367*	-0.0355*	0.0354*	0.0207
municipal	0.0575*	0.0274*	-0.0796*	-0.0786*	0.1683*	-0.0247*
lnlabor income	0.2303*	0.1359*	-0.2083*	-0.2362*	0.3969*	0.0735*
financial knowledge	0.1679*	0.0405*	-0.2507*	-0.2707*	0.4861*	0.0799*
behave 1	0.0421*	-0.0576*	0.0335*	0.0217	0.0579*	0.0527*
behave2	0.1038*	-0.0266*	0.0346*	0.0286*	0.0838*	0.0365*

	net worth per head	male	age	age square	year of schooling	married
behave3	0.0921*	-0.0508*	0.0232	0.0137	0.0699*	0.0185
behave4	0.0958*	-0.0175	-0.0073	-0.0158	0.1064*	0.0512*
behave5	0.1393*	-0.0192	-0.0428*	-0.0548*	0.1670*	0.0581*
behave6	0.0843*	0.0541*	-0.1508*	-0.1557*	0.2723*	0.0432*
behave7	0.1191*	0.0082	0.0950*	0.1034*	0.0695*	-0.0408*
financial attitude	0.0018	-0.0215	0.0415*	0.0397*	-0.0123	0.0156

Source : Author's calculation.

Table A5:(Continued)

	central	north	northeast	south	municipal	lnlabor income	financial knowledge
central	1						
north	-0.3898*	1					
northeast	-0.3741*	-0.2814*	1				
south	-0.2871*	-0.2160*	-0.2072*	1			
municipal	-0.1375*	-0.0094	0.0288*	0.0046	1		
lnlabor income	0.0914*	-0.1390*	-0.1301*	0.0538*	0.1027*	1	
financial knowledge	0.0077	0.0217	-0.1157*	0.0293*	0.0874*	0.3123*	1
behave 1	-0.0352*	0.0645*	-0.0411*	0.0091	0.0064	0.0339*	0.1368*
behave2	-0.0504*	0.0431*	-0.0102	0.0267*	0.0164	0.0875*	0.1586*
behave3	-0.1083*	0.0711*	0.0413*	0.0261*	0.0091	0.0614*	0.1478*
behave4	-0.0877*	0.0643*	-0.0099	0.0616*	0.0458*	0.1046*	0.1557*
behave5	-0.0502*	-0.0139	-0.0113	0.0468*	0.0489*	0.1695*	0.1612*
behave6	-0.0229	-0.0112	-0.0186	0.0467*	0.1094*	0.2109*	0.2798*
behave7	-0.0187	0.0358*	-0.0192	-0.0071	0.0387*	0.1238*	0.0987*
financial attitude	0.0067	0.0888*	-0.0338*	-0.0918*	-0.0251*	0.0027	0.0406*

Source : Author’s calculation.

Table A5:(Continued)

	behave 1	**behave2**	**behave3**	**behave4**	**behave5**	**behave6**	**behave7**	**financial attitude**
behave 1	1							
behave2	0.3368*	1						
behave3	0.4207*	0.4370*	1					
behave4	0.2796*	0.3835*	0.5289*	1				
behave5	0.0871*	0.1090*	0.1172*	0.1199*	1			
behave6	0.0542*	0.0824*	0.0779*	0.1403*	0.0811*	1		
behave7	0.0144	0.1263*	0.0656*	0.0960*	0.0537*	0.0841*	1	
financial attitude	0.0804*	-0.0405*	-0.0008	-0.1040*	0.0107	-0.0609*	-0.0175	1

Source : Author’s calculation.

Table A6: A Correlation (r) Between Selected Variables: Wealth Accumulation Model : Self-employed Subsample

	net worth per head	**male**	**age**	**age square**	**year of schooling**	**married**
net worth per head	1					
male	0.0473*	1				
age	0.0537*	0.009	1			
age square	0.0449*	0.0204	0.9874*	1		
year of schooling	0.2095*	0.1121*	-0.4917*	-0.4763*	1	
married	-0.0254	0.1080*	-0.1315*	-0.1442*	0.0294	1
central	0.0019	0.0357	-0.0081	-0.0092	-0.0391	0.0189
north	0.0113	-0.0378	0.0798*	0.0786*	-0.0718*	-0.0576*
northeast	-0.0459*	-0.0258	-0.002	-0.0001	-0.0395	0.0063
south	0.0079	-0.0078	-0.0645*	-0.0620*	0.1042*	0.0598*
municipal	0.0585*	0.0342	-0.0049	-0.0042	0.1242*	-0.0601*
lnlabor income	0.2415*	0.1626*	-0.2493*	-0.2686*	0.3189*	0.1056*
financial knowledge	0.1937*	0.0422*	-0.1919*	-0.2046*	0.3585*	0.0475*
behave 1	0.0798*	-0.0548*	0.0239	0.0197	0.0409	0.0159
behave2	0.1284*	-0.018	0.0256	0.0279	0.0486*	0.0544*

	net worth per head	male	age	age square	year of schooling	married
behave3	0.1148*	-0.0377	0.008	0.0066	0.0474*	-0.0054
behave4	0.1226*	0.0394	-0.0131	-0.0147	0.0700*	0.0296
behave5	0.1609*	-0.0132	-0.0923*	-0.0935*	0.1942*	0.0264
behave6	0.1124*	0.0697*	-0.1334*	-0.1415*	0.1979*	0.03
behave7	0.1474*	0.0175	0.0439*	0.0483*	0.0446*	0.0013
financial attitude	0.0027	-0.0582*	0.0124	0.0157	0.0068	-0.0041

Source : Author's calculation.

Table A6 (continued)

	central	**north**	**northeast**	**south**	**municipal**	**lnlabor income**	**financial knowledge**
central	1						
north	-0.3641*	1					
northeast	-0.3691*	-0.3300*	1				
south	-0.2770*	-0.2477*	-0.2511*	1			
municipal	-0.1194*	0.0008	0.0294	0.0169	1		
lnlabor income	0.0651*	-0.1119*	-0.0933*	0.0876*	0.0980*	1	
financial knowledge	-0.0041	0.0095	-0.0540*	0.038	0.0515*	0.2666*	1
behave 1	-0.0460*	0.0725*	-0.0363	0.0155	0.0182	0.0445*	0.0863*
behave2	-0.0737*	0.0421*	0.023	0.0394	0.0104	0.0733*	0.1038*
behave3	-0.1052*	0.0775*	0.0405	-0.0025	0.0167	0.0814*	0.1266*
behave4	-0.0829*	0.0947*	-0.0138	0.0146	0.022	0.0951*	0.1158*
behave5	-0.0482*	-0.0293	-0.0023	0.0728*	0.033	0.1873*	0.1641*
behave6	-0.0531*	-0.0256	-0.0031	0.0916*	0.1064*	0.1810*	0.2031*
behave7	-0.0254	0.0295	-0.0038	-0.0007	0.0312	0.0952*	0.1059*

	central	north	northeast	south	municipal	lnlabor income	financial knowledge
financial attitude	0.0031	0.0991*	-0.0149	-0.0893*	-0.0188	-0.0069	0.0734*

Source : Author's calculation.

Table A6 (continued)

behave 1	behave2	behave3	behave4	behave5	behave6	behave7	financial attitude
behave 1	1						
behave2	0.3256*	1					
behave3	0.3969*	0.4140*	1				
behave4	0.2474*	0.3229*	0.4798*	1			
behave5	0.0905*	0.1036*	0.1122*	0.1335*	1		
behave6	0.0445*	0.0548*	0.0428*	0.1259*	0.0896*	1	
behave7	0.0448*	0.1555*	0.0990*	0.1181*	0.0468*	0.0964*	1
financial attitude	0.0588*	-0.0409	0.0063	-0.0988*	0.0372	-0.0543*	-0.0500*	1

Source : Author's calculation.

Table A7 A Correlation (r) Between Selected Variables: Earnings Model: Whole sample

	lnlabor income	**male**	**work experience**	**work experience square**	**year of schooling**	**married**
lnlabor income	1					
male	0.0653*	1				
work experience	-0.3182*	0.1101*	1			
Work experience square	-0.3221*	0.0970*	0.9476*	1		
year of schooling	0.3993*	0.0535*	-0.3312*	-0.4013*	1	
married	-0.0235	0.0927*	0.1664*	0.0999*	-0.0206*	1
central	0.1882*	0.0165	-0.0702*	-0.0725*	0.0493*	-0.0183
north	-0.1212*	0.0058	0.0499*	0.0598*	-0.0962*	-0.0196
northeast	-0.2874*	-0.0211*	0.0903*	0.0897*	-0.0828*	0.0385*
south	0.1501*	-0.0087	-0.0069	-0.0157	0.0480*	0.0227*
municipal	0.1585*	-0.011	-0.1156*	-0.1036*	0.1852*	-0.0831*
financial knowledge	0.2924*	0.0427*	-0.0251*	-0.0808*	0.4421*	0.0721*
behave 1	0.0228	-0.0415*	0.0341*	0.0320*	0.0500*	0.0448*
behave2	0.0820*	-0.014	0.0240*	0.0220*	0.0753*	0.0422*
behave3	0.0588*	-0.0393*	0.0406*	0.0345*	0.0611*	0.0235*

	lnlabor income	male	work experience	work experience square	year of schooling	married
behave4	0.0854*	-0.0141	0.0266*	0.0193	0.0943*	0.0504*
behave5	0.1324*	-0.0146	0.004	-0.0176	0.1545*	0.0535*
behave6	0.1818*	0.0519*	-0.0551*	-0.0839*	0.2454*	0.0404*
behave7	0.1227*	0.0148	-0.0561*	-0.0252*	0.0775*	-0.0427*
financial attitude	-0.0035	-0.0272*	0.0192	0.0240*	-0.0172	0.0076
trade industry	0.2062*	-0.004	0.1308*	0.0837*	0.1252*	0.0148
construction industry	0.0221	0.1397*	0.0842*	0.0495*	-0.0349*	0.0307*
service industry	0.1782*	-0.0350*	0.1184*	0.0485*	0.1526*	-0.0259*
manufacturing industry	0.1224*	0.0320*	0.0537*	0.0029	0.0951*	-0.0046

Source : Author's calculation.

Table A7 (continued)

	central	north	northeast	south	municipal	Financial knowledge	behave 1
central	1						
north	-0.3644*	1					
northeast	-0.3841*	-0.3386*	1				
south	-0.2632*	-0.2320*	-0.2446*	1			
municipal	-0.0576*	-0.0388*	0.0122	-0.0296*	1		
financial knowledge	0.0217*	0.0176	-0.1320*	0.0597*	0.0879*	1	
behave 1	-0.0287*	0.0662*	-0.0355*	-0.0043	0.0029	0.1372*	1
behave2	-0.0457*	0.0461*	-0.0168	0.0248*	0.0133	0.1600*	0.3313*
behave3	-0.0936*	0.0565*	0.0272*	0.0294*	-0.0001	0.1469*	0.4105*
behave4	-0.0748*	0.0558*	-0.0187	0.0572*	0.0358*	0.1424*	0.2645*
behave5	-0.0238*	-0.0204*	-0.0099	0.0283*	0.0464*	0.1412*	0.0820*
behave6	-0.008	-0.0258*	-0.0349*	0.0656*	0.0921*	0.2546*	0.0397*
behave7	-0.0073	0.0134	-0.0371*	0.0240*	0.0509*	0.0881*	0.0123
financial attitude	0.012	0.0955*	-0.0404*	-0.0907*	-0.0104	0.0351*	0.0891*
trade industry	0.0119	-0.0340*	-0.018	0.0409*	0.0833*	0.1040*	0.0147
construction industry	0.0207*	0.0109	-0.0138	-0.0081	-0.016	-0.0318*	-0.0195

	central	north	northeast	south	municipal	Financial knowledge	behave 1
service industry	0.0184	-0.0198	-0.0617*	0.0293*	0.1376*	0.1109*	0.0064
manufacturing industry	0.1746*	-0.0374*	-0.1032*	-0.0822*	0.0578*	0.0261*	-0.0036

Source : Author's calculation.

Table A7 (continued)

	behave2	**behave3**	**behave4**	**behave5**	**behave6**	**behave7**
behave2	1					
behave3	0.4302*	1				
behave4	0.3555*	0.5086*	1			
behave5	0.0956*	0.1092*	0.1133*	1		
behave6	0.0791*	0.0739*	0.1267*	0.0690*	1	
behave7	0.1288*	0.0506*	0.0914*	0.0425*	0.0847*	1
financial attitude	-0.0413*	0.0117	-0.0948*	0.0168	-0.0682*	-0.0254*
trade industry	0.0358*	0.0408*	0.0604*	0.0916*	0.0654*	0.0325*
construction industry	-0.0437*	-0.0428*	-0.0359*	-0.0227*	-0.0290*	-0.0603*
service industry	-0.0039	0.01	0.0036	0.0358*	0.0425*	-0.0260*
manufacturing industry	-0.0068	-0.0146	-0.0027	-0.0248*	0.0300*	0.0131

Source : Author's calculation.

Table A7 (continued)

	financial attitude	**Trade industry**	**construction industry**	**service industry**	**manufacturing industry**
financial attitude	1				
trade industry	-0.0175	1			
construction industry	0.0032	-0.0737*	1		
service industry	0.0065	-0.1724*	-0.0773*	1	
manufacturing industry	0.0044	-0.1435*	-0.0643*	-0.1505*	1

Source : Author's calculation.

Table A8 A Correlation (r) Between Selected Variables: Earnings Model: Non-agricultural Sample

	lnlabor income	**male**	**work experience**	**work experience square**	**year of schooling**	**married**
lnlabor income	1					
male	0.1359*	1				
work experience	-0.2937*	0.0731*	1			
Work experience square	-0.3231*	0.0429*	0.9439*	1		
year of schooling	0.3969*	0.0897*	-0.1990*	-0.2994*	1	
married	0.0735*	0.0760*	0.1308*	0.0740*	0.0182	1
central	0.0914*	0.0380*	0.0042	-0.0181	0.0141	0.0481*
north	-0.1390*	-0.0254*	0.0270*	0.0531*	-0.0803*	-0.0466*
northeast	-0.1301*	-0.019	0.004	0.0192	-0.0611*	-0.0233
south	0.0538*	-0.0221	-0.0042	-0.0122	0.0354*	0.0207
municipal	0.1027*	0.0274*	0.0075	-0.0033	0.1683*	-0.0247*
financial knowledge	0.3123*	0.0405*	0.0422*	-0.0252*	0.4861*	0.0799*
behave 1	0.0339*	-0.0576*	0.0376*	0.0360*	0.0579*	0.0527*
behave2	0.0875*	-0.0266*	0.0255*	0.0292*	0.0838*	0.0365*
behave3	0.0614*	-0.0508*	0.0521*	0.0520*	0.0699*	0.0185

	lnlabor income	male	work experience	work experience square	year of schooling	married
behave4	0.1046*	-0.0175	0.0397*	0.0310*	0.1064*	0.0512*
behave5	0.1695*	-0.0192	0.0350*	0.0082	0.1670*	0.0581*
behave6	0.2109*	0.0541*	-0.0103	-0.0473*	0.2723*	0.0432*
behave7	0.1238*	0.0082	-0.0559*	-0.0309*	0.0695*	-0.0408*
financial attitude	0.0027	-0.0215	0.0072	0.0103	-0.0123	0.0156
trade industry	0.0738*	0.0226	0.3283*	0.2685*	0.0762*	0.0795*
construction industry	-0.0839*	0.1825*	0.1750*	0.1331*	-0.0687*	0.0625*
service industry	0.008	-0.015	0.3214*	0.2282*	0.1049*	0.0341*
manufacturing industry	-0.0376*	0.0638*	0.2069*	0.1364*	0.0497*	0.0482*

Source : Author's calculation.

Table A8 (continued)

	central	north	northeast	south	municipal	Financial knowledge	behave 1
central	1						
north	-0.3898*	1					
northeast	-0.3741*	-0.2814*	1				
south	-0.2871*	-0.2160*	-0.2072*	1			
municipal	-0.1375*	-0.0094	0.0288*	0.0046	1		
financial knowledge	0.0077	0.0217	-0.1157*	0.0293*	0.0874*	1	
behave 1	-0.0352*	0.0645*	-0.0411*	0.0091	0.0064	0.1368*	1
behave2	-0.0504*	0.0431*	-0.0102	0.0267*	0.0164	0.1586*	0.3368*
behave3	-0.1083*	0.0711*	0.0413*	0.0261*	0.0091	0.1478*	0.4207*
behave4	-0.0877*	0.0643*	-0.0099	0.0616*	0.0458*	0.1557*	0.2796*
behave5	-0.0502*	-0.0139	-0.0113	0.0468*	0.0489*	0.1612*	0.0871*
behave6	-0.0229	-0.0112	-0.0186	0.0467*	0.1094*	0.2798*	0.0542*
behave7	-0.0187	0.0358*	-0.0192	-0.0071	0.0387*	0.0987*	0.0144
financial attitude	0.0067	0.0888*	-0.0338*	-0.0918*	-0.0251*	0.0406*	0.0804*
trade industry	-0.0375*	-0.0235	0.0378*	0.0607*	0.0116	0.1090*	0.0229
construction industry	0.0013	0.0219	0.0090	-0.0059	-0.0626*	-0.0444*	-0.0210

service industry	-0.0325*	-0.0046	-0.0173	0.0467*	0.0780*	0.1170*	0.0131
manufacturing industry	0.1606*	-0.0300*	-0.0826*	-0.0946*	-0.0093	0.0170	-

Source : Author's calculation.

Table A8 (continued)

	behave2	**behave3**	**behave4**	**behave5**	**behave6**	**behave7**
behave2	1					
behave3	0.4370*	1				
behave4	0.3835*	0.5289*	1			
behave5	0.1090*	0.1172*	0.1199*	1		
behave6	0.0824*	0.0779*	0.1403*	0.0811*	1	
behave7	0.1263*	0.0656*	0.0960*	0.0537*	0.0841*	1
financial attitude	-0.0405*	-0.0008	-0.1040*	0.0107	-0.0609*	-0.0175
trade industry	0.0505*	0.0564*	0.0745*	0.1020*	0.0636*	0.0186
construction industry	-0.0485*	-0.0470*	-0.0424*	-0.0299*	-0.0427*	-0.0835*
service industry	0.0027	0.0197	0.0049	0.0348*	0.0344*	-0.0564*
manufacturing industry	-0.0021	-0.0113	-0.0029	-0.0364*	0.0216	-0.0030

Source : Author's calculation.

Table A8 (continued)

	financial attitude	**Trade industry**	**Construction industry**	**service industry**	**manufacturing industry**
financial attitude	1				
trade industry	-0.0193	1			
construction industry	0.0049	-0.1093*	1		
service industry	0.0106	-0.2643*	-0.1151*	1	
manufacturing industry	0.0074	-0.2172*	-0.0946*	-0.2287*	1

Source : Author's calculation.

Table A9 A Correlation (r) Between Selected Variables: Earnings Model: Self-employed Subsample

	lnlabor income	**male**	**work experience**	**work experience square**	**year of schooling**	**married**
lnlabor income	1					
male	0.1626*	1				
work experience	-0.3002*	-0.0267	1			
Work experience square	-0.3241*	-0.0111	0.9689*	1		
year of schooling	0.3189*	0.1121*	-0.7043*	-0.6561*	1	
married	0.1056*	0.1080*	-0.1161*	-0.1408*	0.0294	1
central	0.0651*	0.0357	0.0053	0.0023	-0.0391	0.0189
north	-0.1119*	-0.0378	0.0868*	0.0864*	-0.0718*	-0.0576*
northeast	-0.0933*	-0.0258	0.0103	0.01	-0.0395	0.0063
south	0.0876*	-0.0078	-0.0842*	-0.0766*	0.1042*	0.0598*
municipal	0.0980*	0.0342	-0.0417	-0.0385	0.1242*	-0.0601*
financial knowledge	0.2666*	0.0422*	-0.2652*	-0.2740*	0.3585*	0.0475*
behave 1	0.0445*	-0.0548*	0.0071	0.0045	0.0409	0.0159
behave2	0.0733*	-0.018	0.0061	0.015	0.0486*	0.0544*

	lnlabor income	male	work experience	work experience square	year of schooling	married
behave3	0.0814*	-0.0377	-0.0079	-0.0033	0.0474*	-0.0054
behave4	0.0951*	0.0394	-0.0319	-0.029	0.0700*	0.0296
behave5	0.1873*	-0.0132	-0.1342*	-0.1268*	0.1942*	0.0264
behave6	0.1810*	0.0697*	-0.1688*	-0.1727*	0.1979*	0.03
behave7	0.0952*	0.0175	0.0222	0.0328	0.0446*	0.0013
financial attitude	-0.0069	-0.0582*	0.008	0.0128	0.0068	-0.0041
trade industry	0.1149*	-0.0069	-0.0158	0.0006	0.0272	0.0646*
construction industry	0.0138	0.1464*	-0.0042	-0.0146	-0.0132	0.0451*
service industry	-0.0061	-0.0312	-0.0835*	-0.0971*	0.0552*	-0.0626*
manufacturing industry	-0.1594*	-0.0119	0.1399*	0.1402*	-0.1092*	-0.0246

Source : Author's calculation.

Table A9 (Continued)

	central	north	northeast	south	municipal	Financial knowledge	behave 1
central	1						
north	-0.3641*	1					
northeast	-0.3691*	-0.3300*	1				
south	-0.2770*	-0.2477*	-0.2511*	1			
municipal	-0.1194*	0.0008	0.0294	0.0169	1		
financial knowledge	-0.0041	0.0095	-0.0540*	0.038	0.0515*	1	
behave 1	-0.0460*	0.0725*	-0.0363	0.0155	0.0182	0.0863*	1
behave2	-0.0737*	0.0421*	0.023	0.0394	0.0104	0.1038*	0.3256*
behave3	-0.1052*	0.0775*	0.0405	-0.0025	0.0167	0.1266*	0.3969*
behave4	-0.0829*	0.0947*	-0.0138	0.0146	0.022	0.1158*	0.2474*
behave5	-0.0482*	-0.0293	-0.0023	0.0728*	0.033	0.1641*	0.0905*
behave6	-0.0531*	-0.0256	-0.0031	0.0916*	0.1064*	0.2031*	0.0445*
behave7	-0.0254	0.0295	-0.0038	-0.0007	0.0312	0.1059*	0.0448*
financial attitude	0.0031	0.0991*	-0.0149	-0.0893*	-0.0188	0.0734*	0.0588*
trade industry	0.0246	-0.0620*	0.0392	0.0462*	-0.0765*	0.0520*	-0.0067
construction industry	-0.0367	0.0600*	-0.0241	0.0117	-0.0577*	-0.0345	0.0141

	central	north	northeast	south	municipal	Financial knowledge	behave 1
service industry	0.0275	-0.0134	-0.0488*	-0.0052	0.0896*	0.0158	-0.0022
manufacturing industry	-0.0566*	0.0796*	0.0228	-0.0633*	0.0095	-0.0801*	0.0062

Source : Author's calculation.

Table A9 (continued)

	behave2	**behave3**	**behave4**	**behave5**	**behave6**	**behave7**
behave2	1					
behave3	0.4140*	1				
behave4	0.3229*	0.4798*	1			
behave5	0.1036*	0.1122*	0.1335*	1		
behave6	0.0548*	0.0428*	0.1259*	0.0896*	1	
behave7	0.1555*	0.0990*	0.1181*	0.0468*	0.0964*	1
financial attitude	-0.0409	0.0063	-0.0988*	0.0372	-0.0543*	-0.0500*
trade industry	0.0443*	0.0325	0.0852*	0.0958*	0.0474*	0.0503*
construction industry	-0.0454*	-0.0176	-0.0193	-0.0269	-0.0450*	-0.0724*
service industry	-0.0354	-0.0388	-0.0869*	-0.0594*	-0.0134	-0.0348
manufacturing industry	0.0065	0.0157	0.0085	-0.0412	-0.0285	0.0091

Source : Author's calculation.

Table A9 (continued)

	Financial attitude	**Trade industry**	**Construction industry**	**service industry**	**Manufacturing industry**
financial attitude	1				
trade industry	-0.0226	1			
construction industry	0.0056	-0.1428*	1		
service industry	0.0283	-0.7098*	-0.1268*	1	
manufacturing industry	-0.0097	-0.3671*	-0.0656*	-0.3260*	1

Source : Author's calculation.

APPENDIX B

QUESTIONNAIR

THE ROLE OF FINANCIAL LITERACY ON EARNINGS AND OLD AGED SAVING AMONG SELF-EMPLOYED WORKERS

This questionnaire is a part of a PhD Dissertation undertaken by Miss Praewpailin Janposri, a PhD Candidate at the school of Development Economics, National Institute of Development Administration (NIDA)

Instructions: There are six sections in the questionnaire. Respondents must answer each question by themselves (and not with help from anyone else). The data will be kept confidential and treated with extreme confidentiality in the analysis.

Section 1: Demographics and household characteristics

1. Gender ❑ Male ❑ Female
2. Age _____
3. Marital Status ❑ Single ❑ Married
   ❑ Divorced ❑ Widowed
   ❑ Other (specify) _____
4. Level of education ❑ Primary education
   ❑ Secondary education
   ❑ Vocational certificate/ diploma
   ❑ Bachelor degree
   ❑ Master's degree
   ❑ PhD degree
   ❑ Other (specify) _____
5. Major field of study _____

6. Study of business or related to business majors

❑ Never

❑ Yes (how were your grades?) ❑ Very good ❑ Good ❑ Fair ❑ Poor

7. Level of mathematical performance

❑ Very good ❑ Good ❑ Fair ❑ Poor

8. English communication level

❑ Cannot communicate ❑ Just a few words

❑ Sentences ❑ Fluency

9. Number of young children (less than 15 years old) in household (0 for none) _____

10. Number of elderly (more than 60 years old) in household (0 for none) _____

Household members are people who live in the same residence as you and may or may not have a blood connection with you

11. Number of working household members _____

Number of household members _____

12. Parents' occupation Father_____

Mother_____

13. Level of father's education ❑ Below undergrad

❑ Undergrad or above

Level of mother's education ❑ Below undergrad

❑ Undergrad or above

14. Level of spouse 's education ❑ Below undergrad

(none, skip to #15) ❑ Undergrad or above

Section 2 Income, expenses, assets held, personal liability information

15 Specify your currently source(s) of income.

Profits from business operation	❑Daily ❑Monthly ❑Yearly (average) _____Baht
Extra work 1 (1) _____	❑Daily ❑Monthly ❑Yearly (average) _____Baht
Extra work 2 (2) _____	❑Daily ❑Monthly ❑Yearly (average) _____Baht
Property rental	❑Daily ❑Monthly ❑Yearly (average) _____Baht
Interest rate from investment	❑Daily ❑Monthly ❑Yearly (average) _____Baht
Assistance from government	❑Daily ❑Monthly ❑Yearly (average) _____Baht
Cash assistance from another person	❑Daily ❑Monthly ❑Yearly (average) _____Baht
Inheritance	❑Daily ❑Monthly ❑Yearly (average) _____Baht
Bonuses/Gifts (e.g., from lottery)	❑Daily ❑Monthly ❑Yearly (average) _____Baht
Other (specify)	❑Daily ❑Monthly ❑Yearly (average) _____Baht

16. According to the following categories, how much do you spend on average per month?

Consumption expenses (food, medicine, travel expenses, recreational activities, etc.)	❑ Daily ❑ Monthly❑ Yearly average _____Baht
Installment payments	❑ Daily ❑ Monthly❑ Yearly average _____Baht
Transfer money to parents/children/relatives	❑ Daily ❑ Monthly❑ Yearly average _____Baht
Rental money for house/dormitory/apartment	❑ Daily ❑ Monthly❑ Yearly average _____Baht
Lottery/other gambling	❑ Daily ❑ Monthly❑ Yearly average _____Baht
Alcohol/Tobacco	❑ Daily ❑ Monthly❑ Yearly average _____Baht
Overall	❑ Daily ❑ Monthly❑ Yearly average _____Baht

17 Do you have your own house(s)/land(s)/building(s)?

❑ Yes (please identify the value)

❑ Less than 100,000 baht

❑ 100,000–500,000 baht

❑ 500,001–1,000,000 baht

❑ 1,000,001–1,500,000 baht

❑ 1,500,001–2,000,000 baht

❑ 2,000,001–3,000,000 baht

❑ more than 3,000,000 baht

❑ No

18. Do you have your own vehicles such as car(s), motorcycle(s), tractor(s)?

❑ Yes (please identify the total value of your own vehicle(s))

❑ Less than 100,000 baht

❑ 100,000–500,000 baht

❑ 500,001–1,000,000 baht

❑ 1,000,001–1,500,000 baht

❑1,500,001–2,000,000 baht

❑ 2,000,001–3,000,000 baht

❑ more than 3,000,000 baht

❑ No

19. Which of the following financial assets do you have (can select more than one answer)?

❑ Savings with bank

❑ Bonds/stocks

❑Mutual funds

❑ RMF/LMF

❑ Lottery savings

❑ Life insurance

❑ Cash, gold, jewelry, antiques, etc.

❑ Savings with village bank, savings with cooperative

❑ Other, please specify_____

20. If you have financial assets from #19, please specify total value (approximately).

❑ Less than 10,000 baht

❑10,000–50,000 baht

❑ 50,001–100,000 baht

❑ 100,001–150,000 baht

❑150,001–200,000 baht

❑ 200,001–250,000 baht

❑ 250,001–300,000 baht

❑300,001–350,000 baht

❑ 350,001–400,000 baht

❑ 400,001–450,000 baht

❑450,001–500,000 baht

❑ more than 500,000 baht

21. Have you ever borrowed money to spend on any of the following items (including spending via credit card)?

❑ To buy/rent a house or land

❑ Entertainment/ travelling

❑ Buy furniture/electrical appliances

❑ Education

❑ Buy vehicle(s)

❑ Buy jewelry or valuable items

❑ Health

❑ Support family

❑ Everyday expenses

❑ Business

❑ Other, please specify _____

❑ Have never borrowed money (skip to #23)

22. According to #21, your loan source was

❑ Formal source

❑ Informal source

❑ Both sources

23. At present, you have total liabilities of approximately _____baht

❑ No liability (skip to #26)

24. What is your current debt burden situation compared to last year?

❑Increased ❑ Decreased ❑ Same

25. What is your level of concern toward your current debt situation?

❑ Very low concern ❑ Low concern

❑ Fair ❑ High concern ❑ No concern

26. Have you ever refinanced?

❑Yes ❑ No, but I understand the refinance process

❑ Do not understand refinance

Section 3 Planning and saving for retirement

27. Are you a member of National Savings Fund (NSF)?

❑ Yes (how long?) _____

❑ No

28. In the last 12 months, which of the following activities have you participated in/performed (can select more than one)?

❑ Seminar(s)/event(s) related to savings topics

❑ Asked for advice from financial experts about savings

❑ Researched savings topics

❑ Discussed savings topics with people around you

❑ Did not participate in any activities about savings topics

29. Currently, do you have a savings plan for retirement?

❑ Haven't thought about it yet (skip to #32)

❑ Thinking about saving for old age but have not started a plan yet (skip to #32)

❑ Thinking and planning to set up a savings plan

❑ Thinking and implementing a plan successfully

30. In the last 12 months, how much savings have you accumulated for your old age (including cash/assets of various forms)?

❑ Less than 50,000 baht

❑50,001–100,000 baht

❑100,001–300,000 baht

❑ 300,001–500,000 baht

❑500,001–700,000 baht

❑ 700,001–1,000,000 baht

❑1,000,001–1,500,000 baht

❑1,500,001– 3,000,000 baht

❑ more than 3,000,000 baht

31. What kind of savings forms do you currently have (can select more than one)?

❑ Savings with commercial bank/ government bank

❑ Real estate

❑ Compulsory savings such as National Savings Funds

❑ Government bonds, debentures

❑ Savings with cooperative

❑ Savings with family

❑ Valuable items

❑ Hold cash/keep cash at home

❑ Equity/stocks

❑ Mutual funds: RMF/LMF

❑ Insurance

❑ Other, please specify _____

32. What top three factors influence successful or unsuccessful savings and planning for retirement (write "1" as the most important)?

[___] Own financial discipline

[___] Unstable income

[___] Knowledge of your own financial planning

[___] Economic and social conditions

[___] Family

[___] Other, please specify_____

33. If the government had a policy to promote savings such as an automatic deduction of your monthly income in order to save for your old age, would you participate?

❑Yes ❑ No

34. Do you think that saving for old age should be compulsory or voluntary?

❑ Compulsory ❑ Voluntary

35. Do you know the amount of money that you need to meet your expenses after you retire?

❑ Yes, specify amount: _____baht ❑ No

36. If the government had a financial planning assistance program for old age saving (such as having financial experts help you plan your savings), and if it were free, would you be interested in participating?

❑Yes ❑No ❑Unsure

37. Specify the top three main source(s) of income for your old age support

[___] Private savings or property sales

[___] Government benefits

[___] Family

[___] Still working to support myself

[___] Other, please specify _____

38. Are you worried about your saving for old age?

❑ Not very worried ❑ A little worried ❑ Moderately worried

❑ Very worried ❑ Greatly worried

❑ Not worried

because (can choose 1 item)

(__) Believe in government will not abandon old people

(__) Believe I have sufficient savings for old age

(__) Think that I can work and support myself even when I am old.

(__) Other, please specify _____

39. Is the elderly subsistence allowance provided by the government sufficient?
    - ❑ Sufficient
    - ❑ Insufficient
    - ❑ Not sure/unknown amount of old age allowance

40. Specify the top three problems you currently face with regard to savings (rank 1 to 3).
    - [___] Difficult to access financial institutions
    - [___] Savings return is too low
    - [___] Lack information on various forms of saving
    - [___] Not enough income to save
    - [___] Do not know the correct way to save
    - [___] Other, please specify _____

Section 4 Business operation information

41. Have you had previous business experience?
    ❑Yes ❑ Never (skip to #43)

42. If yes, is your previous business related to your current business?
    ❑ Yes ❑No

43. How long have you run your current business? _____
    If less than a year, specify the number of months. _____ months)
    How much did you initially invest? _____ baht

44. Do you have a business partner?
    ❑ No ❑ Yes, specify your shares as a percentage ___

45. Is your business registered or not?
    ❑ Yes ❑ In progress

❑ No, because (__) The process is complicated.
(__) Do not understand the process of applying for commercial registration
(__) It's a small business (no need to register)
(__) Other, please specify _____

46. Did your previous job(s) relate to operating a business?
❑ Yes, specify previous job (__) Government officer
(__) State enterprise employee
(__) Private employee
(__) General contractor/freelance
(__) Other, please specify _____
❑ Never

47. Has your business ever been faced with a financial problem?
❑No ❑ Sometimes ❑ Always

48. How has your business performed in the past 12 months?

Changes in sales/production	❑ Increase	❑Decrease	❑same
	Specify percent _____	Specify percent _____	❑same
Change in net income/profits	❑ Increase	❑Decrease	❑same
	Specify percent _____	Specify percent _____	❑same

49. Specify your main funding sources for your business (can select more than one).

❑ Personal savings ❑ Formal funds ❑ Family funds

❑ Informal funds ❑ Inheritance ❑ Other, please specify _____

50. What is your opinion of current credit loaning access for entrepreneurs?

❑ Covers all needs and is accessible

❑ Not enough and difficult to access

❑ Covers all needs but difficult to access

❑ Not sure

Section 5 Financial services, products, and technology

51.	Have you ever known about or used any of the following financial services? (For those who don't know, do not answer frequency of use.)		Frequency of use 0 = never used / 1 = infrequently / 5 = Regular					
			0	**1**	**2**	**3**	**4**	**5**
	Deposit/withdraw money at banks	❑Know ❑Don't know						
	Open a savings account	❑Know ❑Don't know						
	Open a fixed deposit account	❑Know ❑Don't know						
	Open a fund investment account	❑Know ❑Don't know						
	Open an investment account in equity	❑Know ❑Don't know						

51.	Have you ever known about or used any of the following financial services? (For those who don't know, do not answer frequency of use.)		Frequency of use 0 = never used / 1 = infrequently / 5 = Regular					
			0	**1**	**2**	**3**	**4**	**5**
	Cheque deposit	❑Know ❑Don't know						
	Buy/issue cashier's cheque	❑Know ❑Don't know						
	Send a money order	❑Know ❑Don't know						
	Withdraw cash from an ATM	❑Know ❑Don't know						
	Credit card	❑Know ❑Don't know						
	Debit card	❑Know ❑Don't know						
	Deposit cash via cash deposit machine	❑Know ❑Don't know						
	Transfer money between accounts via bank counters	❑Know ❑Don't know						
	Pay utility bills through bank counters	❑Know ❑Don't know						
	Pay utility bills by automatically deducting money from the account.	❑Know ❑Don't know						
	Pay utility bills through convenience stores	❑Know ❑Don't know						
	Use electronic payment cards; for example,	❑Know ❑Don't know						

51.	Have you ever known about or used any of the following financial services? (For those who don't know, do not answer frequency of use.)		Frequency of use 0 = never used / 1 = infrequently / 5 = Regular					
			0	**1**	**2**	**3**	**4**	**5**
	Rabbit Card							
	Transfer money through the PromptPay service	❑Know ❑Don't know						
	Receive money from other people through the PromptPay service	❑Know ❑Don't know						
	Conduct financial transactions via online banking; for example, internet banking	❑Know ❑Don't know						
	Conduct financial transactions via mobile phone; for example, mobile banking	❑Know ❑Don't know						
	Perform transactions by transferring money via QR code	❑Know ❑Don't know						
	Use the application to transfer money: for example, Airpay, Line Pay	❑Know ❑Don't know						
	Use an application to record income – expenses	❑Know ❑Don't know						
	Use an application for financial management / saving	❑Know ❑Don't know						

51.	Have you ever known about or used any of the following financial services? (For those who don't know, do not answer frequency of use.)		Frequency of use 0 = never used / 1 = infrequently / 5 = Regular					
			0	**1**	**2**	**3**	**4**	**5**
	Use an application for tax calculation	❑Know ❑Don't know						
	Use an application for investment	❑Know ❑Don't know						
	Use an application for shopping or trading	❑Know ❑Don't know						

	Statements	**Yes**	**No**
52.	Do you use social media such as Line, Facebook, Instagram, etc. for promoting your business?		
53.	Does your business have online payment services (such as QR codes, credit cards, debit cards, m-banking)?		
54.	Do you use computer software or applications to help manage your business, such as accounting for income and expenses. Stock recording, etc.		
55.	Do you have an email or other contact method specifically for doing business?		

Section 6 Entrepreneurial skills and financial literacy

	Statements	Strongly agree	Agree	Moderat	Disagree	Strongly disagree
56.	You manage your business budget and expenses by yourself.					
57.	You have a lot of expertise in the type of business you do.					
58.	You always plan with regard to your own business.					
59.	You have a short-term and long-term business plan.					
60.	You pay attention to strategic planning such as product and service development, customer services, transport channels, etc.					
61.	You always advise your customers regarding your products and services.					
62.	You always set goals for your business and follow up to achieve the goals.					
63.	Your products and services are different from the products and services of the same business group.					
64.	After selling products or services, you always track customer satisfaction.					
65.	You always have a plan to handle financial risks.					
66.	You study or experiment to produce new products and services for better quality.					

	Statements	Strongly agree	Agree	Moderat	Disagree	Strongly disagree
67.	You have to buy modern machinery or equipment for use in the business.					
68.	You are a member of a group, club or association that is related to your business in order to receive news or benefits from club members.					
69.	When you receive feedback from customers you will immediately respond to fix any problems.					
70.	You believe that entrepreneurs who are starting a new business can be successful in doing business.					

71. If there are two options as follows, which would you choose?
A) You have a 100% chance of getting a certain amount of 1,000 baht.
B) You have a 25% chance of getting 1,500 baht and a 75% chance that you will not get anything.
❑ Option A ❑ Option B

72. If there are two options as follows, which would you choose?
A) You have a 100% chance of getting a certain amount of 1,000 baht.
B) You have a 50% chance of getting 1,500 baht and a 50% chance that you will not get anything.
❑ Option A ❑ Option B

73. If there are two options as follows, which would you choose?
A) You have a 100% chance of getting a certain amount of 1,000 baht.
B) You have a 75% chance of getting 1,500 baht and a 25% chance that

you will not get anything.

❑ Option A ❑ Option B

Financial Literacy

74. If you have 1,000 baht and would like to divide it between your 5 sisters, how much would each person receive? Answer _____ baht
❑ Don't know / Not sure

75. According to #74, if you and your sisters have to wait one year to receive this share of the money and if the inflation rate is 2% per year, what do you think the share will be in another year?
❑ Greater than the current year
❑ Less than the current year
❑ Same
❑ Do understand an inflation rate
❑ Other, please specify_____
❑ Don't know

76. If you borrow 100 baht from your friend today with a repayment of 120 baht next year, you will be paying an interest on your friend's loan in the amount of _____ baht or _____ percent per year. ❑ Don't know

77. If you deposit 100 baht in a savings account with an interest rate of 2% per year and during the year you do not deposit any additional money or withdraw money from that account at the end of one year, you will have how much money in the account? _____baht ❑ Don't know

78. From the previous scenario, after 5 years, how much money will be in your account, including interest (with no additional deposits or withdrawals at all)?

❑ More than 110 baht

❑110 baht

❑ Less than 110 baht

❑ Not enough information to answer the question

❑ Don't know

79. If you invest money in bank accounts, life insurance, or gold, (Investment across various financial instruments) the risk of losing your deposit will be reduced. Is this message right or wrong?

❑ Correct ❑ Incorrect ❑ Unsure

80. High risk investments will return high returns, this statement is right or wrong?

❑ Correct ❑ Incorrect ❑ Unsure

81. The Bank of Thailand's main function is to provide services just like general commercial banks do.

❑ Correct ❑ Incorrect ❑ Unsure

82. If you have defaulted on a loan from a bank, do you think other banks will know?

❑ Will know ❑ Won't know ❑ Unsure

83. Did you know that the government now has a policy to protect/guarantee deposits for deposit accounts opened with commercial banks?

❑ Know ❑ Don't know ❑ Unsure

84. If the Thai baht depreciates against the US dollar, what do you think the price of imported products in US dollars will be?

❑ Price of import goods will be lower

❑ Price of import goods will be higher

❑ Price will be the same

❑ Don’t know

85. If you read the news that the country's GDP forecast will increase by 10%, what do you think the country's economic situation will be?

❑ Better

❑ Worse

❑ Does not change

❑ Do not understand the word GDP, so cannot answer

❑ Unsure

86. If you have a credit card and you are the primary cardholder, if you allow other people to be joint cardholders, how will you be responsible if a joint cardholder incurs a debt on your credit card (can select only one answer)?

❑ You must be responsible for all credit card debt.

❑ You and the joint cardholders are each responsible for an equal share of the debt each and every half of the debt on the credit card.

❑ You will be responsible for all debt incurred on the credit card if the joint cardholder is under 18 years old.

❑ You are not responsible for the debt on the credit card that the cardholders create.

❑ Unsure

87. If you and your friends together make a loan, which of the following is correct (choose only one answer)?

❑ You and your friends have a shared responsibility for all of their obligations.

❑ Only one person is responsible for all the debt.

❑ You and your friend are responsible for an equal share of the debt.

❑ Older people are responsible for all debt.

❑ Not sure

88. Service providers/sellers of financial products, such as life insurance salespeople, are required by law to provide customers with accurate and complete information regarding financial products/services. Do you agree with this statement?

❑ Strongly disagree
❑ Disagree
❑ Not sure
❑ Agree
❑ Strongly agree

89. Insurance companies should have the right to refuse compensation for those they insure in the event that the insurance buyer does not truthfully answer questions on the insurance application or the answer is not clear, especially with regard to questions related to damages sustained. Do you agree with this statement?

❑ Strongly disagree
❑ Disagree
❑ Not sure
❑ Agree
❑ Strongly agree

90. If you keep your ATM card code together with the card, in the event that you lose your card and the collector has to press to cash, who should be responsible for the lost money (select only one)?

❑ ATM cardholder
❑ The owner of the ATM card and the bank that issued the card are each half responsible.
❑ The bank that issued the card is entirely responsible.
❑ Not sure.

91. Which of the following describes the working role of the Stock Exchange (select only one)?

❑ The stock market helps to predict the financial results of securities.

❑ The stock market has helped to increase the price of securities.

❑ The Stock Exchange of Thailand acts as a trading center for registered securities between those who want to buy securities and want to sell securities.

❑ None is correct.

❑ Don't know

92. Mr. A bought shares in Company B in the stock market. This means that Mr. A (select only one).

❑ Owns a part of Company B

❑ Allows Company B to borrow money

❑ Is also responsible for Company B's debt

❑ Don't know

93. Which type of asset is usually most volatile?

❑ Savings account ❑ Bond ❑Stock ❑ Don't know

94. Money in mobile banking is a digital currency. Do you agree with this statement?

❑ Agree ❑ Disagree ❑ Not sure

95. Do you know the word "bitcoin"?

❑ Never heard ❑ Heard, but do not understand

❑ Heard and know its function ❑ Not sure

96. What does the following sentence mean? "I've reached the maximum limit on my credit cards."

You understand that this sentence means _____.

❑ Don't know

97 Do you separate business accounts and personal spending accounts?

❑ Separate ❑ Don't separate ❑ Sometime

98. You check the accuracy of your credit card transactions or financial accounts by infrequently checking your account balance.
    - ❑ Strongly disagree
    - ❑ Disagree
    - ❑ Moderately agree
    - ❑ Agree
    - ❑ Strongly agree

99. Regarding checking your credit card bills or invoices (such as telephone bills, water bills, and electricity bills), which of the following is closest to what you usually do (select only one)?
    - ❑ Check very thoroughly on a regular basis
    - ❑ Check only the items and balances that must be paid as correct on a regular basis
    - ❑ Just check the amount that has to be paid as correct on a regular basis
    - ❑ Check sometimes
    - ❑ Never check

100. You regularly check your own expenses.
    - ❑ Strongly disagree
    - ❑ Disagree
    - ❑ Moderately agree
    - ❑ Agree
    - ❑ Strongly agree

101. I always spend more money than I have.
    - ❑ Strongly disagree
    - ❑ Disagree
    - ❑ Moderately agree
    - ❑ Agree
    - ❑ Strongly agree

102. I always pay utility bills, telephone bills, etc. on time.
    - ❑ Strongly disagree
    - ❑ Disagree

❑ Moderately agree

❑ Agree

❑ Strongly agree

103. I have planned my financial goals and try my best to achieve my goals.

❑ Strongly disagree

❑ Disagree

❑ Moderately agree

❑ Agree

❑ Strongly agree

104. When I need a loan to buy high priced products, I always look for loan sources to compare the offers and benefits and always examine the details before making a decision.

❑ Strongly disagree

❑ Disagree

❑ Moderately agree

❑ Agree

❑ Strongly agree

105. Which of the following describes your purchasing behavior regarding your vehicle insurance? How did you choose to buy?

❑ Considered insurance policy proposals from different companies and compared them

❑ Considered the various insurance policy proposals of a single company

❑ Chose only the existing insurance policy proposal or the one that people around me recommended (and did not look for additional comparative information)

❑Not sure

106. Which of the following sources of financial information have you read/followed in the past 12 months (can select more than one)?

❑ Financial columns from newspapers or magazines

❑ Government publications

❑ Financial seminar

❑ Various websites, social media related to finance

❑ Publications from community organizations

❑ Publications from financial institutions

❑ Not following at all

❑ Other, please specify _____

107. Have you ever received/or requested financial advice from any of the following people (can select more than one)?

❑ General accountant

❑ Family member or close friend

❑ Financial Information Center officer

❑ Tax accountant

❑ Fund manager

❑ Bank officer/Bank manager

❑ Credit officer

❑ Community finance organization

❑ Financial expert / Financial planner

❑ Insurance seller

❑ Broker

❑ Never asked for advice

❑ Other, please specify _____

Statements		Strongly agree	Agree	Moderately agree	Disagree	Strongly disagree
108.	I am more than happy to buy a product with credit rather than first saving enough money to buy.					
109.	Financial planning is needed only for rich people.					
110.	Long-term financial planning is					

Statements		Strongly agree	Agree	Moderately agree	Disagree	Strongly disagree
	necessary for me.					
111.	Short-term financial planning (1 year) is necessary for me.					
112.	I try to follow the news and co keep abreast of the financial climate.					
113.	I trust professional financiers and am always willing to follow their advice if there is an opportunity to do so.					
114.	If I experience problems and lose regular income, I can still handle daily expenses for at least 3 months.					
115.	I consider myself a high level of financial risk taker.					
116.	I can't do anything to change my financial status.					
117.	Money management is a stressful matter and too heavy for me.					
118.	Although my financial situation is not a problem right now, whenever I think about money, it always makes me feel stressed.					
119.	I agree that I buy goods and services to please other people (for others to admire me).					

Statements		Strongly agree	Agree	Moderately agree	Disagree	Strongly disagree
120.	I tend to hesitate in spending money unless it's really necessary.					
121.	I am more than happy to divert more money to save for the future					
122.	Money is for spending, not for saving.					
123.	I choose to be happy with the present and let the future take care of itself.					
124.	I was often taught about savings when I was a child.					
		5	**4**	**3**	**2**	**1**
125.	Please rate your financial literacy level.					

End of questionnaire

**** Thank you very much for your cooperation in answering the questionnaire ****

BIOGRAPHY

NAME	Praewpailin Janposri
ACADEMIC BACKGROUND	2002-2005 Khon Kaen University, Thailand Bachelor of Economics (Second Class Honors) 2007- 2008 Chulalongkorn University, Thailand Master of Science in Environmental and Natural Resource Economics (international program)
EXPERIENCES	2008 - present Lecturer in Business Economics at Mahasarakham Business School, Mahasarakham University, Thailand