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Membership in Saving Funds and Preparation for Healthy Retired Life: Evidence from Thailand

Supaporn Kumruangrit¹

Pataporn Sukontamarn²

Abstract

The focus of this study is the relationship between membership in savings funds and preparation for old age in the area of physical health among the Thai population aged 50-59 years. Data were taken from the 2011 Survey of Older Persons in Thailand. The sample size for the study was 18,866, and probit regression was employed for the analysis. In this study, it was discovered that the highest proportion of the sample (76%) did not have any savings. About 11 percent were members of mandatory savings funds alone, and another 11 percent were members of voluntary savings funds alone, while 2 percent were members of both types of funds. The results of the analysis showed that 55 percent of the respondents were preparing for their old age in the area of physical health. Membership in both mandatory and voluntary savings funds was significantly related to the preparation for old age in the area of physical health (respondents were asked specifically whether or not they had prepared for their old age in the area of physical health). Membership in both types of savings funds was reported, with an equal proportion of the respondents being members of both the voluntary and mandatory types of savings funds. The government should encourage membership in both mandatory and voluntary savings funds to increase the expectation of future benefits among older adults, and motivate individuals to be physically prepared for their old age.

Keywords: savings fund, preparation for old age, physical health, Thailand

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การเป็นสมาชิกกองทุนการออมกับการเตรียมความพร้อมเพื่อวัยสูงอายุ ด้านสุขภาพกาย: หลักฐานเชิงประจักษ์จากประเทศไทย

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บทคัดย่อ

การศึกษานี้มีวัตถุประสงค์เพื่อศึกษาอิทธิพลของการเป็นสมาชิกของกองทุนการออมต่อการเตรียมความพร้อมเพื่อวัยสูงอายุด้านสุขภาพกายของประชากรไทยผู้มีอายุ 50-59 ปี เป็นงานวิจัยเชิงปริมาณโดยใช้ข้อมูลจากการสำรวจประชากรสูงอายุในประเทศไทย พ.ศ.2554 มีจำนวนตัวอย่าง 18,866 ราย และในการหาความสัมพันธ์ระหว่างการเป็นสมาชิกกองทุนการออมกับการเตรียมความพร้อมเพื่อวัยสูงอายุด้านสุขภาพกาย ผู้วิจัยทำการวิเคราะห์ข้อมูลด้วย Probit Regression Analysis

ผลการศึกษาพบว่าสัดส่วนของผู้ที่ไม่ได้เป็นสมาชิกในทั้งกองทุนการออมภาคบังคับและแบบสมัครใจมีอยู่มากถึงร้อยละ 76 ผู้ที่เป็นสมาชิกกองทุนการออมภาคบังคับเพียงอย่างเดียวมีสัดส่วนอยู่เพียงร้อยละ 11 ซึ่งเท่ากับสัดส่วนของผู้ที่เป็นสมาชิกกองทุนการออมแบบสมัครใจเพียงอย่างเดียว และอีกร้อยละ 2 คือผู้ที่เป็นสมาชิกกองทุนทั้งสองประเภท และกลุ่มตัวอย่างมีผู้ที่เตรียมความพร้อมด้านสุขภาพกายอยู่ร้อยละ 55 และจากการศึกษาความสัมพันธ์ระหว่างการเป็นสมาชิกกองทุนการออมกับการเตรียมความพร้อมเพื่อวัยสูงอายุด้านสุขภาพกาย พบว่าตัวแปรทั้งสองมีความสัมพันธ์กันอย่างมีนัยสำคัญทางสถิติที่ระดับ 0.05 โดยผู้ที่เป็นสมาชิกกองทุนการออมแบบใดแบบหนึ่ง หรือทั้งสองแบบ มีแนวโน้มที่จะเตรียมความพร้อมด้านสุขภาพกายมากกว่าผู้ที่ไม่ได้เป็นสมาชิกกองทุนการออมใดๆเลย โดยอิทธิพลของการเป็นสมาชิกกองทุนการออมแบบสมัครใจจะมีมากกว่าภาคบังคับอยู่เล็กน้อย และหากกลุ่มตัวอย่างเป็นสมาชิกในทั้งสองกองทุน อิทธิพลที่แสดงต่อการเตรียมความพร้อมด้านสุขภาพกายจะมีมากกว่าการเป็นสมาชิกกองทุนการออมเพียงแบบใดแบบหนึ่ง

งานวิจัยนี้ชี้ให้เห็นว่าการสนับสนุนให้ประชากรวัยแรงงานเข้าเป็นสมาชิกกองทุนการออมแบบสมัครใจ จะมีส่วนกระตุ้นให้ประชากรคาดหวังผลตอบแทนในอนาคต และนำไปสู่การเตรียมความพร้อมเพื่อวัยสูงอายุด้านสุขภาพกายที่เพิ่มขึ้น

คำสำคัญ: กองทุนการออม การเตรียมความพร้อมเพื่อวัยสูงอายุ สุขภาพกาย ประเทศไทย

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1. Introduction

Thailand is an aging society, with 17 percent of the current Thai population having already reached 60 years of age or older as of 2018. It is predicted that Thailand will become a completely aged society in 2021 when the proportion of those aged 60 or older reaches 20 percent of the total population. The figure is predicted to reach 31 percent by 2040, according to a calculation by the Office of the National Economic and Social Development Board (NESDB, 2013). Maintaining health and well-being are important for the elderly through the promotion and prolongation of self-reliance. Therefore, it is equally necessary that strategies for aging be formulated early (2010, pp. 9-14; 2007, pp. 57-68; 1997, pp. 11-30). A 2011 public opinion poll on knowledge and attitudes toward the elderly among respondents between the ages of 18 and 59 years of age revealed that the majority believed that preparation for old age should begin between the ages of 50 and 59 years. While preparation in the area of physical health was considered in second place following financial preparation, only 45 percent reported as having been prepared in this area (National Statistical Office, 2011). This number is lower than the targeted 50 percent under the Second National Plan on the Elderly (NPE) (2002–2021) (Prachuabmoh, et al., 2013), and is in line with the findings by Yommana et al. (2008), who reported that, despite their positive attitudes toward preparation for old age in the area of physical health, only a small proportion of middle-aged respondents actually take the necessary action.

Preparation for old age on a personal basis entails deliberate planning toward becoming an elderly person with a happy, and good quality of life (Kornadt and Rothermund, 2013; Apouey, 2017). These outcomes are attainable with at least 10 years of conscientious preparation (Siriphanit, 2010). In Thailand's context, strategies for aging involve six important facets: physical health, mental health, financial health, living conditions, caregiving, and post-retirement activities (Jitapunkul and Chayovan, 2001; Thanakwang et al., 2014, Pothisiri and Nekehia, 2016). The present study is focused on one important facet, physical health, in that the elderly who are physically healthy can be self-reliant and less dependent on others. Maintaining good physical health involves continued and consistent exercise, continual prevention and treatment of diseases, and careful attention to diet and

nutritional composition of food. These aspects also include avoidance of narcotics and diets that are either too salty or too sweet (Siriphanit, 1997; 2007; 2010). Moreover, research by Apouey (2017) investigated the roles of preferences and expectations in preparation for old age in France, and confirmed that healthy behaviors include healthy diet, physical activity, and efforts to maintain intellectual skills. Preferences variables (planning, social altruism score, farsightedness) are positively correlated with diet, physical activity, and intellectual skills. Similarly, time preferences are associated with self-assessed health (Van Der Pol, 2011). Moreover, the willingness to take risks in five contexts (driving a car, financial matters, sports/leisure, career and health) are associated with the probability of owning stocks, shares, or stock options (Dohmen et al., 2011).

A population projection by NESDB (Population Projections for Thailand 2010-2040, 2013) in 2017 estimated that the population aged between 50 and 59 years, considered part of the labor force, will reach a total of 9.7 million. Of that number, 7.8 million will be continuing workers, composed of 32 percent of formal workers, and 68 percent of informal workers (National Statistical Office, 2016). Formal workers (e.g. employees — government, state enterprise employees and private company employees) receive welfare benefits, such as medical fee, child benefits, old-age benefit pension, from their membership in mandatory pension funds, such as that provided for under the Social Security Act (Article 33) or the Government Pension Fund (GPF). On the other hand, the lack of similar support for informal workers (e.g. farmers, own-account workers, unpaid family workers and members of co-operative groups) results in lack of life stability. Such conditions as fluctuating or inconsistent income, overwork caused by the lack of holidays, and long working hours, or unfixed annual leave, adversely affect the health of informal workers. A study by Kumruangrit (2014), which was based on the *Report on the 2007 Survey of the Older Persons in Thailand*, revealed that the population aged between 50 and 59 years with membership in either a mandatory or voluntary pension system is more inclined to prepare for old age than non-members. The aim of this study was to answer three important questions: Does membership in either type of savings fund correlate with the tendency to be physically prepared for old age; and if so, how? Does membership in mandatory or voluntary savings

funds influence the preparations for old age in the area of physical health; and if so, how? Are participants with memberships in both types of savings funds more inclined to be prepared for old age in terms of physical health than participants with membership in only one of the systems?

The study employed data from the 2011 Survey of Older Persons in Thailand to investigate the above questions. The dataset contained information on individuals aged 50 and older. In Thailand, older persons are defined as those aged 60 and older. The study was focused on respondents aged between 50 and 59 years. The main reason this age range was chosen is that those aged 50 to 59 are approaching old age, and should be thinking and preparing for their old age. The authors therefore investigated whether respondents in this age group were preparing for old age in the area of physical health. Selected as the main dependent variable was preparation for old age in the area of physical health, while the independent variables of interest were membership in a mandatory savings fund or a voluntary savings fund. They also provided a conceptual framework, arguing that savings fund membership should motivate preparation for old age in the area of physical health. The findings of the study have policy implications for the government to encourage membership in a savings fund among both formal and informal workers.

2. Conceptual framework

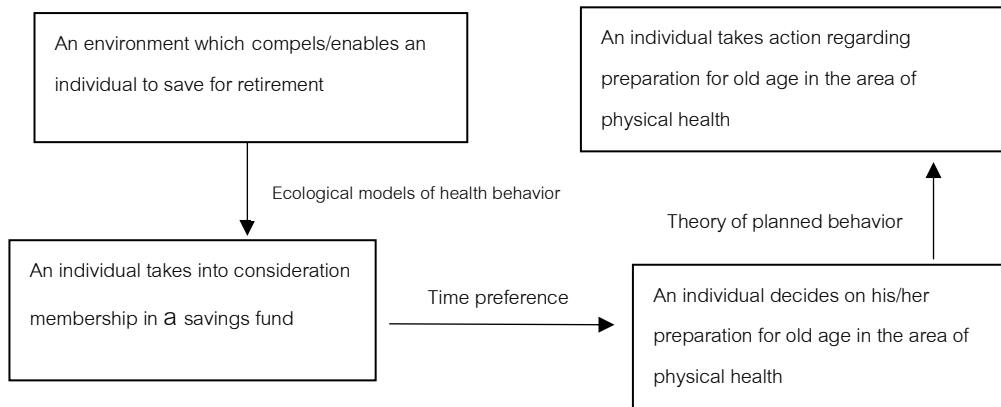
The conceptual framework of this paper, as shown in Figure 1, is based on three theories: (1) ecological models of health behavior; (2) time preference theory; and (3) theory of planned behavior. As Figure 1 shows, being a member of a compulsory savings fund, or having access to and becoming a member of a voluntary savings fund, can be considered an environment which enables/compels an individual to save for retirement. Ecological models of health behavior state that health behavior has multiple levels of influence, including intrapersonal (biological, psychological), interpersonal (social, cultural), organizational, community, physical environmental and public policy. Ecological models of health behavior emphasize the physical environment and public policy contexts of behavior, while taking into consideration social and psychological influences (Sallis, Owen and Fisher, 2008).

Several studies have applied ecological models to the analysis of the influence of public policy and social environment on health behavior. For example, in the case of physical activity promotion, Spence and Lee (2003) presented a theoretical background of ecological models of health behavior and analyzed physical activity behavior as being influenced by environmental settings as well as biological and psychological factors. Matsudo et al. (2004) discussed the experience and evaluation of physical activity promotion in Brazil using an ecological model as the main framework, while Fleury and Lee (2006) applied a social ecological model to understand physical activity among African-American women. Satariano and McAuley (2003) used an ecological model to analyze the promotion of physical activity among older adults. For studies regarding policy and healthy lifestyle, Fitzgerald and Spaccarotella (2009) used an ecological framework and reviewed common barriers to healthful eating and being physically active, which include barriers at the public policy level. Lohrman and Fasha (2008) proposed a complementary ecological model of a coordinated school health program aimed at influencing students' health-related behaviors. Golden et al. (2015) built on the social ecological model and placed health-related and other social policies at the center of their analysis. Studies aimed at finding ways to prevent diabetes and promote self-control also used the ecological model (Fisher et al., 2002; Fisher et al., 2005). For example, Fisher et al. (2005) placed diabetes self-management in the context of social and environmental influences. Based on the existing literature regarding ecological models of health behavior, being a member of either a compulsory savings fund or a voluntary savings fund can be viewed as being in an environment which influences an individual's health behavior. To the authors' knowledge, there are no existing studies which use ecological models to discuss preparedness for old age; however, there are related studies which utilize ecological models to analyze retirement transition (Kim and Moen, 2002) and the promotion of ageing in place (Greenfield, 2012).

As an individual takes his/her membership in a savings fund into consideration and plans for actions regarding preparation for old age in the area of physical health, the time preference theory can be utilized to explain the individual's thinking process. The time preference theory places importance on an interest rate which determines a relative

valuation between present and future consumption. The present and the future consumption of goods or services are rated with different degrees of satisfaction by each individual. In turn, the opportunity cost for the investment of present money or assets (i.e. the sacrifice of present consumption) must be viewed by an individual as being compensated by the future value of such an investment. If an individual places more value on future time periods, it would be in the interest of the individual to forego the present consumption in order to receive the future consumption of goods and services (Herbener, 2011). Time preference theory has been used by researchers (for example, see Eriksson and Hermansson, 2014) to explain savings behavior. Weiss (1991) discussed the role of time preference and myopia, which provides the rationale for the government to provide mandatory savings plans, as many people will not save enough for their old age if left to own devices. In a similar manner, given that one has a savings fund which will pay off in the future, maintaining good physical health assumes that individuals will live long enough to receive a return on investment and not lose opportunity. Time preference theory therefore demonstrates the relationship between savings fund membership and an individual's tendency to prepare for old age in the area of physical health. Once an individual decides that he/she should maintain good physical health, the theory of planned behavior helps to explain the link between the intention to prepare for old age in the area of physical health, and the actual actions that follow from that intention. The theory states that attitude toward behaviour and subjective norms, as well as perceptions of behavioral control, together shape an individual's intention to perform certain behaviors. Such intention, in turn, can explain considerable variations in actual behavior (Ajzen, 1991). In sum, membership in either a mandatory or voluntary savings fund, which requires monthly or yearly contributions over a long period of time, should influence an individual's expectation concerning the future return on investment, and consequently the individual's motivation to maintain good physical health so that he/she can be rewarded with benefits later on. Their actions should then follow from their intention, and they should take action to prepare for old age in the area of physical health.

Figure 1: Conceptual framework



3. Literature review

Kumruangrit (2014) used a social ecological model, together with human capital theory and theory of intergenerational solidarity, to form the conceptual framework to investigate the determinants of preparation for old age. The main finding was that human capital as a latent variable, particularly status, such as being formal workers or informal workers, correlates positively with an individual's tendency to prepare for old age in the area of physical health. Kumruangrit (2013) used a similar framework and discovered that individuals who were members of a savings fund — whether it is the Social Security Fund, Provident Fund, or other types of insurance funds for old age — are more inclined to be physically prepared for old age than non-members. Other variables that correlate with an individual's motivation to prepare for old age in the area of physical health at a significance level of 0.05 include sex, age, marital status, number of surviving children, region, highest level of education, annual income and financial support from their adult children. Apouey's study (2017) included the roles of preferences and expectations into the framework to analyze preparation for old age, and found that time preference is correlated with preparation for old age in the area of diet and physical activity. The study also found that sex, age, education, labor market status and the logarithm of income are correlated with preparations for old age in the area of diet and physical activity. Moreover, research by Kim, Kwon and Anderson (2005) confirmed that variables, such as retirement fund calculation, savings amount, confidence in government

programs, gender, education, marital status and household income, show a significant correlation with an individual's retirement confidence. These findings also corroborated Luangkae's study (2003), which stated that there is a positive correlation between requirements for dental welfare and the willingness to prepare for old age at a significance level of 0.05. In addition, research by Yommana et al.(2008) Confirmed that such variables as sex, highest level of education, marital status and annual income also have a positive correlation with the willingness to prepare for old age in the area of physical health at a significance level of 0.05. For the present study, independent variables are savings fund membership, sex, age, marital status, number of surviving offspring, highest level of education, annual income, income sufficiency, work status, area of residence and region.

4. Data and methodology

Data and sampling procedure

This study used data from the 2011 Survey of Older Persons in Thailand (National Statistical Office, 2011). The population for this study are defined as Thai citizens aged between 50 and 59 years. Selection of samples required two steps: first, an area sampling was performed in Bangkok and all provinces, producing 76 strata. Each stratum was further divided into two strata based on the type of administrative division. This yielded a municipal area called *block* and a non-municipal area called *village*. These blocks and villages collectively constituted a total of 5,769 samplings. Subsequently, 15 private households were selected from each block and 12 private households from each village, which formed a total sample of 79,560. Samplings were selected from respondents in the specified age range who once personally participated in the 2011 Survey of Older Persons in Thailand, and had answered all the questions required by the researchers to be applied as dependent variables and independent variables. This resulted in a total sample size of 18,866. It should be mentioned that this study was approved by Mahidol University's Center of Ethical Reinforcement for Human Research.

Definition of terms and measurements of variables

Mandatory savings funds include the Social Security Fund, Old Civil Service Scheme and Private Teacher Aid Fund. Voluntary savings funds include PVD, Retirement Mutual Fund, Long-term Equity Fund and other funds that are related to welfare for life security and old-age pensions.

The dependent variable in this study is preparedness for old age in the area of physical health, which translates into care and support in the area of physical health that continues to the final stage of life. This tendency consequently promoted and prolonged self-reliance in the elderly. Healthy behaviors include exercise, an annual physical examination, a balanced diet covering the five food groups, and abstinence from both alcohol and tobacco (National Statistical Office, 2011; Apouey, 2017). This variable was constructed from answers to the question: "Have you ever thought of and prepared for old age in the area of physical health?" The responses could be "Yes, I have prepared for old age in the area of physical health," "No, I have not prepared for old age in the area of physical health, although I have thought about it," and "No, I have not prepared for old age in the area of physical health and I have not thought about it." The authors took the answer "Yes" as an indication of the respondent having prepared for old age, and the answers "No" to both types as not having prepared for old age. These responses were measured in a nominal scale: prepared or unprepared.

From related research, three influencing factors with regard to preparedness for old age in the area of physical health were derived from: population factors (sex, age, marital status, number of surviving offspring), social and economic factors (highest level of education, annual income, income sufficiency, work status, area of residence, region), and a public policy factor (savings fund membership). These factors were employed as independent variables. Sex was evaluated on a nominal scale as male or female. Age was evaluated on a ratio scale varying from 50 to 59 years. Marital status was evaluated on a nominal scale as single, married (either residing together, or separately), previously married (widowed, divorced or separated). Number of surviving offspring — immediate biological descendants

in this case — were measured as a ratio scale varying from 0 to 14. Highest level of education was measured on a six-point ordinal scale: uneducated, elementary education, junior high school, senior high school, high vocational certificate/technical certificate/diploma and bachelor's degree or higher. Annual income was measured on a five-point ordinal scale: less than 50,000 baht; 50,000 to 99,999 baht; 100,000 to 299,999 baht; 300,000 to 499,999 baht; and more than 500,000 baht. Income sufficiency was measured on a nominal scale as sufficient or insufficient. In addition, work status was measured on a nominal scale as follows: government, private, or government enterprise employee; employer; self-employed; contributing family worker; member of producers' cooperative; or unemployed. Area of residence was evaluated on a nominal scale as rural or urban. Region was evaluated on a nominal scale as central, north, northeast, south and Bangkok. Membership in a savings fund was similarly measured on a nominal scale as non-members, membership¹ in a mandatory savings fund only, membership in a voluntary savings fund only, or membership in both mandatory and voluntary savings funds.

5. Data analysis

The general characteristics of the sample group (hereafter referred to as “participants”) were analyzed using descriptive statistics in the form of frequency distributions, percentage and average. The correlation between savings fund membership and participants' preparedness for old age in the area of physical health was explored using probit regression analysis. This enabled exploration of both the statistical significance and the direction of correlation between independent variables and dependent variables. Marginal effects were

¹ Membership in the Social Security Fund could be either mandatory as insured persons under Article 33 or voluntary as insured persons under Article 39 or under Article 40. However, it was not possible for this study to clearly distinguish if participants' membership was mandatory or voluntary. Operating on the fact that there are a much greater number of insured persons under Article 33 than insured persons under Article 39 and Article 40 combined (around 75% are insured persons under Article 33, based on 2017 statistics provided by the government at <http://social.nesdb.go.th/social/>), this research consequently defined any participants with a positive response to a question with regard to their Social Security Fund membership as insured persons under Article 33, and members of the mandatory savings fund in turn.

reported. In the study, the sample was not weighted, as the authors were interested mainly in understanding the relationship among the sample between savings fund membership and preparation for old age in the area of physical health. The descriptive statistics therefore explain the sample, and are not representative of the Thai population in the same age group.

6. Results

Characteristics of sample

About 40 percent of the sample were females; the average age was 54 years. The majority (77%) were married, 17 percent were widowed, divorced, or separated, and 6 percent were single. The average number of children they had was two. As high as 70 percent of the sample had completed elementary education, followed by 10 percent who had completed a bachelor's degree or higher. In terms of annual income, 42 percent of the sample earned less than 50,000 baht, and 33 percent earned between 50,000 and 99,999 baht. Almost two-thirds (64%) of the participants reported earning sufficient income. In terms of working status, 38 percent were self-employed; 23 percent were employees of the government, and private or government enterprises; and 20 percent were unemployed. In terms of area, 59 percent were living in urban areas. In terms of region, 30.7 percent lived in the central region; 26.1 percent lived in the northern region (Table 1).

Savings fund membership

The study revealed that as high as 76 percent of the sample had no membership in either type of savings fund. A total of 11 percent of the participants were members of a mandatory savings fund; and 11 percent were members of a voluntary savings fund. Only 2 percent of the sample were members of both types of savings funds. It can also be calculated that 24 percent of the sample, or a total of 4,546 persons, were members of the two types of savings funds (Table 2).

Table 1: Characteristics of sample (n=18,886)

Variable	Average	Variable	Average
Female (%)	39.85	Sufficient income (%)	64.05
Age (years) (SD.=2.80)	54.41	Government, private, or government enterprise employee (%)	23.42
Single (%)	6.42	Employer (%)	2.43
Married (%)	76.87	Self-employed (%)	38.06
Previously married (widowed, divorced, or separated) (%)	16.71	Contributing family worker, or member of producers' cooperatives (%)	16.00
Number of surviving offspring (person)(SD.=1.31)	2.13	Unemployed (%)	20.09
Uneducated (%)	4.51	Urban area (%)	58.53
Elementary school, graduated (%)	70.49	Bangkok (%)	5.08
Junior high school, graduated (%)	6.18	Central (%)	30.70
Senior high school, graduated (%)	6.51	North (%)	26.09
High vocational certificate, technical certificate, or diploma; graduated (%)	2.03	Northeast (%)	24.59
Bachelor's degree or higher, graduated (%)	10.28	South (%)	13.54
Annual income of less than 50,000 baht (%)	42.00		
Annual income from 50,000 to 99,999 baht (%)	33.19		
Annual income from 100,000 to 299,999 baht (%)	15.69		
Annual income from 300,000 to 499,999 baht (%)	5.81		
Annual income higher than 500,000 (%)	3.31		

Table 2: Membership in mandatory savings fund categorized by membership status

(n=18,866)

Mandatory savings fund membership	Voluntary savings fund membership: Frequency (percentage)		Total frequency (percentage)
	Non-members	Current members	
Non-members	14,320 (75.91)	2,106 (11.16)	16,426 (87.07)
Current members	2,078 (11.01)	362 (1.92)	2,440 (12.93)
Total frequency (%)	16,398 (86.92)	2,468 (13.08)	18,866(100.00)

Categorically, in terms of the mandatory savings fund, 52 percent of the sample were in the Government Pension Fund (GPF), 35 percent were in the Social Security Fund, and 13 percent were in the Private Teacher Aid Fund. In contrast, in terms of voluntary savings funds, 15 percent were in PVD, 6 percent were in LTF, 5 percent were in RMF, and 73 percent were in others (Table 3).

Table 3: Savings fund memberships categorized by type

Membership in mandatory savings fund (n=2,440)	Percentage	Membership in voluntary savings fund (n=2,468)	Percentage
Government Pension Fund (GPF)	51.58	Provident Fund (PVD)	15.44
Social Security Fund	35.35	Long-Term Equity Fund (LTF)	5.96
Private Teacher Aid Fund	13.07	Retirement Mutual Fund (RMF)	5.44
		Others	73.16

Preparation for old age in the area of physical health

Preparedness for old age in the area of physical health through healthy behaviors, such as exercise, annual physical examination, a balanced diet covering the five food groups, and abstinence from alcohol and tobacco, were observed in 55 percent of the sample. However, the other 45 percent were unprepared (Table 4).

Preparation for old age in the area of physical health as categorized by membership in savings funds

A total of 53 percent of non-members were reported as being prepared for old age in the area of physical health. In terms of the participants who were members in voluntary savings funds, 56 percent reported that they were prepared. On the other hand, 68 percent of participants who were members of mandatory savings funds and 74 percent of participants who were members of both types of savings funds were reported as being prepared. In terms of chi-squared tests, it was found that significant correlations exist between membership in savings funds and preparedness for old age in the area of physical health at 0.001 significance level (Table 4).

Table 4: Preparation for old age in the area of physical health, categorized by membership in mandatory and voluntary savings funds (n=18,866)

Preparation for old age in the area of physical health	Membership in savings funds, shown as frequency (percentage)				
	Non-members	Only mandatory savings fund membership	Only voluntary savings fund membership	Both mandatory and voluntary savings fund membership	Total
Unprepared	6,765 (47.24)	659 (31.71)	934 (44.35)	96 (26.52)	8,454 (44.81)
Prepared	7,555 (52.76)	1,419 (68.29)	1,171 (55.65)	266 (73.48)	10,412 (55.19)
Total	14,320 (100.00)	2,078 (100.00)	2,106 (100.00)	362 (100.00)	18,866 (100.00)
Chi-squared tests: Pearson chi-square=227.51; P-value = <0.001**					

Redundant independent variables were checked by variance inflation factor (VIF) test, a collinearity diagnostic test was conducted using VIF values larger than 10 as an indicator to assess the collinearity problem. The result shows no sign of multicollinearity between two or more independent variables. The authors used probit regression analysis to construct three statistical models. The first model does not include savings fund membership while the second and third models do. The test of heteroskedasticity for the probit model shows that

chi-square is larger than 0.05 for all the models. Therefore, the authors can conclude that heteroskedasticity is not a problem in all three models. Standard errors have been clustered at the sub-provincial level (for each province, they further divided the area into rural and urban areas). All three models share similar characteristics in both their statistical significance and the direction of relationship between independent and dependent variables (Table 5). Using probit regression analysis, the effect of independent variables on the preparation for old age in the area of physical health was investigated through its marginal effect (dx/dy). With other independent variables controlled for, this study showed that membership in savings funds, sex, age, marital status, number of surviving children, highest level of education, annual income and income sufficiency correlate with the preparedness for old age in the area of physical health at a significance level of 0.05. Work status, area of residence and region, on the contrary, show no correlation. Details are further explained below.

In terms of membership in savings funds, compared with non-members, participants with membership in mandatory savings funds only had 3 percent higher probability of being physically prepared for old age. Similarly, compared with non-members, participants with membership in voluntary savings funds only had a 4 percent higher probability of being physically prepared for old age, while participants with membership in both types of savings funds had 9 percent higher probability of being physically prepared for old age (Model 2). The effects of savings fund membership as categorized by type on preparation for old age in the area of physical health are as follows. Participants who were members of the Government Pension Fund (GPF) had a 6 percent higher probability of being physically prepared for old age compared with non-members. Similarly, compared with non-members, participants with membership in the Provident Fund had a 5 percent higher probability of being physically prepared for old age, whereas participants who were members in other funds had a 4 percent higher probability of being physically prepared for old age (Model 3).

In terms of such demographic variables as sex, age, marital status and the number of surviving children, it was found that significant correlations exist between each of these

variables and preparedness for old age in the area of physical health at 0.05 significance level. Females had an 8 percent higher probability of being more prepared in comparison with males. Age-wise, a one-year increase in age was associated with a 1 percent higher probability of being more prepared. Single or previously married participants (widowed, divorced, or separated) were less likely to be prepared when compared with married participants, that is, single participants were 6 percent less likely to be prepared, and previously married participants (widowed, divorced, or separated) were 4 percent less likely to be prepared compared with the married group. The number of surviving children, on the other hand, had a negative correlation with the tendency to be physically prepared for old age. In other words, the addition of one child reduced the tendency to be physically prepared for old age by 1 percent in all three models (Table 5).

Concerning social and economic factors, such variables as highest level of education, annual income and income sufficiency were observed to correlate significantly with preparedness for old age in the area of physical health at a 0.01 significance level. Educated participants were more prepared for old age in the area of physical health than uneducated participants. This effect became evidently prominent with a higher level of education. This tendency was also observed with regard to the independent variable, annual income, in which participants with a higher annual income were observed to be more prepared for old age in the area of physical health than participants with a lower annual income. In terms of income sufficiency, participants with a sufficient income had a 12 percent tendency to be more prepared in comparison with participants whose income was insufficient. On the other hand, work status showed no significant correlation with preparedness for old age in the area of physical health at the 0.05 significance level (Table 5).

Table 5: Study on the correlation between independent variables and preparedness for old age in the area of physical health

Independent variables (n=18,866)	Model 1		Model 2		Model 3	
	Robust Std. Err.	dy/dx	Robust Std. Err.	dy/dx	Robust Std. Err.	dy/dx
Public policy factors						
Membership in savings funds (Reference group: non-members)						
Only mandatory savings fund membership	-	-	0.0425	0.0344**	-	-
Only voluntary savings fund membership	-	-	0.0491	0.0413**	-	-
Both mandatory and voluntary savings fund memberships	-	-	0.0695	0.0890**	-	-
Types of savings fund						
Government Pension Fund (GPF) (Reference group: non-members)	-	-	-	-	0.0495	0.0587***
Social Security Fund (Reference group: non-members)	-	-	-	-	0.0537	0.0031
Private Teacher Aid Fund (Reference group: non-members)	-	-	-	-	0.0929	-0.0269
Provident Fund (PVD) (Reference group: non-members)	-	-	-	-	0-8	0.0490*
Long-term Equity Fund (LTF) and Retirement Mutual Fund (RMF) (Reference group: non-members)	-	-	-	-	0.1217	-0.0684
Others (Reference group: non-members)	-	-	-	-	0.0494	0.0366*

Table 5: Study on the correlation between independent variables and preparedness for old age in the area of physical health

Independent variables (n=18,866)	Model 1		Model 2		Model 3	
	Robust Std. Err.	dy/dx	Robust Std. Err.	dy/dx	Robust Std. Err.	dy/dx
Population factors						
Female (Reference group: male)	0.0233	0.0768***	0.0233	0.0779***	0.0232	0.0775***
Age (in years)	0.0035	0.0094***	0.0035	0.0094***	0.0035	0.0092***
Marital status (Reference group: married)						
Single	0.0470	-0.0661***	0.0471	-0.0630**	0.0472	-0.0634***
Previously married (widowed, divorced, or separated)	0.0270	-0.0452***	0.0269	-0.0448***	0.0268	-0.0447***
Number of surviving children	0.0100	-0.0112**	0.0100	-0.0109**	0.0100	-0.0111***
Highest level of education (Reference group: uneducated)						
Elementary education	0.0544	0.0686**	0.0551	0.0653**	0.0549	0.0664***
Junior high school	0.0671	0.1356***	0.0670	0.1312***	0.0672	0.1309***
Senior high school	0.0688	0.1681***	0.0695	0.1613***	0.0698	0.1612***
High vocational certificate/technical certificate /diploma	0.0884	0.1426***	0.0882	0.1360***	0.0890	0.1342***
Bachelor's degree or higher	0.0721	0.2106***	0.0755	0.1958***	0.0762	0.1917***
Social and economic factors						
Annual income (Reference group: less than 50,000 baht)						
50,000 to 99,999 baht	0.0316	0.0324**	0.0315	0.0319**	0.0317	0.0326***
100,000 to 299,999 baht	0.0416	0.0867***	0.0414	0.0841***	0.0416	0.0836***
300,000 to 499,999 baht	0.0571	0.1344***	0.0559	0.1292***	0.0564	0.1251***
500,000 baht and higher	0.0729	0.1824***	0.0729	0.1788***	0.0730	0.1781***

Table 5: Study on the correlation between independent variables and preparedness for old age in the area of physical health

Independent variables (n=18,866)	Model 1		Model 2		Model 3	
	Robust Std. Err.	dy/dx	Robust Std. Err.	dy/dx	Robust Std. Err.	dy/dx
Income sufficiency (Reference group: insufficient)	0.0294	0.1201***	0.0295	0.1210***	0.0294	0.1203***
Work status (Reference group: government, private , or government enterprise employee)						
Employer	0.0651	-0.0003	0.0649	0.0115	0.0647	0.0117
Self-employed	0.0271	-0.0022	0.0306	0.0074	0.0291	0.0052
Contributing family worker, or member of producers' cooperatives	0.0391	-0.0168	0.0412	-0.0066	0.0402	-0.0086
Unemployed	0.0336	-0.0167	0.0359	-0.0066	0.0349	-0.0092
Urban (Reference group: rural)	0.0515	0.0084	0.0514	0.0105	0.0513	0.0104
Region (Reference group: Bangkok)						
Central	0.0467	-0.0257	0.0464	-0.0239	0.0458	-0.0298
North	0.0602	-0.0097	0.0600	-0.0108	0.0601	-0.0174
Northeast	0.0595	0.0144	0.0596	0.0130	0.0595	0.0062
South	0.0542	0.0113	0.0548	0.0148	0.0557	0.0087
Likelihood ratio chi-square		=1140.65		=1162.74		=1164.08
Prob> chi-square = 0.0000 PseudoR ²		= 0.044		= 0.045		= 0.045

* 0.10 significance level,

** 0.05 significance level.

*** 0.01 significance level.

7. Empirical results

A study by Kumruangrit (2014) discovered that members of either mandatory or voluntary pension funds are more inclined to prepare for old age than non-members. However, since that study did not distinguish between mandatory pension systems and voluntary pension systems, it is not possible to observe a clear correlation in respect of each type of pension system. Given this limitation, the aim of the present study is to clearly distinguish how membership in mandatory savings funds and voluntary savings funds are correlated with preparation for old age in the area of physical health.

Membership in a mandatory savings fund requires monetary contributions from each member. This provides old age security, such as an old-age pension, as well as other forms of welfare to guarantee life stability, such as medical benefits, maternity benefits, child allowance, compensation for loss of income, unemployment benefit, and death benefit. A voluntary savings fund, on the other hand, is personally financed, although sometimes this type of savings fund can also be financed by tripartite contributions. Much like a mandatory savings fund, this also guarantees life stability and old-age security (Social Security Office, 2014). Of great concern is the revelation that 76 percent of the Thai population aged between 50 and 59 years are not members of either a mandatory or voluntary savings fund. Consequently, these persons approaching retirement are not protected under the Labour Law, nor are they guaranteed the type of welfare benefits meant to establish life stability. However, they each still receive a non-contributory old-age allowance (Thai Provident Fund, 2010). Nonetheless, without other forms of savings, this allowance alone is insufficient to sustain life. Similarly, without basic welfare, as provided by membership in a mandatory or voluntary savings fund, non-retirees could lack stability in life as much as retirees.

Based on this study, it is possible that most of the Thai population, particularly informal workers or self-employed individuals, still lack knowledge, understanding, and awareness of voluntary savings funds, such as a voluntary social insurance scheme under Article 40 of the Social Security Act and the National Savings Fund (NSF). This could explain the high

percentage (76%) of the Thai population aged between 50 and 59 years with neither voluntary nor mandatory savings fund membership. Becoming an insured person under Article 40 not only guarantees individuals an old-age pension at age 60, but it also offers compensation for loss of income, invalidity benefits, and death benefits, such as a funeral grant. In addition, self-employed individuals can apply for NSF membership to receive an old-age pension after the age of 60, as well as invalidity benefits. Similarly, upon their death, all deposits, contributions and benefits which belong to such person shall be paid from the Fund to their heir. Knowledge and understanding of this are not widely known. In turn, it is advised that the public sector keep both informal workers and self-employed individuals informed of the aforementioned savings funds, inspire confidence and encourage membership in such funds (Social Security Office, 2014; National Savings Fund, 2017a).

The present study shows that only 55 percent of the Thai population aged between 50 and 59 years are prepared for old age in the area of physical health. Despite the number being higher than the targeted 50 percent, as projected by the Second National Plan on the Elderly (2002-2021) (Prachuabmoh, et al., 2013), the situation is still considered unsatisfactory. In fact, a research study by Kumruangrit (2013) revealed a drop from 67 percent in 2007 in terms of the correlation between the studied population and preparedness for old age in the area of physical health. This outcome suggests that preparation for old age in the area of physical health has actually declined in importance. Therefore, awareness and support from the public sector are important to encourage good attitudes concerning health promotion, which prioritizes healthy living among persons approaching retirement.

This study reveals that both mandatory and voluntary savings fund membership correlates positively with preparedness for old age in the area of physical health. Members of mandatory savings funds are formal workers with steady income, steady employment, and consistent and reasonable working hours. These conditions provide them with time and capabilities to manage their health: for instance, time to exercise; money to purchase a high-quality and healthful diet; or resources to receive an annual physical examination, and continued prevention and treatment of diseases. It is probably for these reasons that

members of savings funds are more likely to be physically prepared for old age than non-members. Membership in voluntary savings funds for informal workers is usually a medium to long-term arrangement which requires continuous contributions over a period of time. A longer savings period increases the amount of the deposit, and the expectation about the return on investment. In turn, this future return is expected to heighten an individual's motivation to maintain good physical health so that he/she can be rewarded with the expected benefits later on. Continued and consistent information dissemination increases awareness, knowledge and understanding with regard to voluntary savings funds among informal workers, and therefore is crucial. This also includes provision of incentives in the form of a voluntary savings fund with returns, such as an old-age pension, or similar pensions for informal workers. Examples of these funds are the voluntary social insurance scheme under Article 40 of the Social Security Act, NSF, LTF, RMF, all of which involve a long-term return on investment, which should partially encourage individuals to maintain good physical health.

A greater effect is observed in the relationship between voluntary savings fund membership and the preparedness for old age in the area of physical health in comparison with the relationship between mandatory savings fund membership and the preparedness for old age in the area of physical health. This difference could be a result of a sense of ownership ingrained with the savings fund's voluntary nature.

The observed correlation between savings fund membership and preparation for old age in the area of physical health could indicate a cause-and-effect relationship, where the expectation of future benefits from a savings fund is taken into account, and an individual therefore decides that he/she should maintain good physical health. This is what the authors have argued in the conceptual framework. However, the relationship could also be due to endogeneity bias, which could be caused by personal characteristics of an individual, where those with a low discount rate (who place high importance on the future) are more inclined to become members of a voluntary savings fund, as well as prepare for old age in the area of physical health. In this case, the observed correlation between membership in a

voluntary savings fund and preparation for old age is driven by a personal characteristic (i.e. the individual's low discount rate) of an individual. If the personal characteristic is the key driver of the result, there would still be room for policy intervention. Suppose that the government has taken measures to encourage savings (either mandatory or voluntary); this is likely to affect an individual's time preference. By encouraging people to think and plan more for the future financially, the policy is likely to lower an individual's discount rate as that person has to think more about himself/herself in the future. A lower discount rate should in turn lead to changes in behaviors in other dimensions, including preparation for old age in the area of physical health.

Other independent variables are sex, age, marital status, number of surviving children, highest level of education, annual income and income sufficiency. This study conforms to previous studies which found that females, older participants, participants with a higher level of education or annual income and participants with sufficient income to be more inclined to prepare themselves for old age in the area of physical health than males, younger participants, participants with a level of education or annual income, and participants with insufficient income. Married participants are more inclined to be physically prepared for old age than single or previously married participants. However, participants with a greater number of surviving children are less likely to be physically prepared for old age in comparison with participants having fewer surviving offspring. The two correlations observed in terms of both marital status and number of surviving offspring also conform to the studies previously explored in the literature review (Kumruangrit, 2013; Yommana et al., 2008; Lisawat, 1997). Marital status, in particular, is crucial in that the percentage of either single or previously married individuals is continuously increasing (Kumruangrit, 2013). Even so, the negative correlation between the number of surviving children and preparedness for old age in the area of physical health should be regarded with care in that this study considers only one facet of the dependent variable. Because other than the area of physical health, the relationships between the number of surviving children and preparedness in the area of mental health, living arrangements, and financial health have

yet to be investigated. It is possible that a positive correlation in those aforementioned areas could exist.

8. Conclusions

Overall, this study shows that membership in both mandatory and voluntary savings funds is significantly correlated with preparation for old age in the area of physical health. One main channel of the mechanism for this could be the expectation to receive benefits in the form of an old-age pension, which consequently increases an individual's motivation to maintain good physical health so that they can be rewarded later on. Moreover, even if a relationship is found due to a personal characteristic in the form of a low discount rate, by encouraging membership in mandatory and voluntary savings funds the government is likely to influence an individual's discount rate, leading to attitudes and behaviors that place more importance on the future. Therefore, the policy implication derived from the results of this study is that the government should encourage membership in both mandatory and voluntary savings funds among formal and informal workers.

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