

The Decision to Retire Early: Evidence from Private Service Sector in Thailand

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Abstract

Using worker survey data from the Foundation of Thai Gerontology Research and Development Institute, this paper analyzes the factors that lead to the decision to take early retirement of workers in the private service sector in Thailand. The private service sector is here limited to the wholesale, retail, hotel, and restaurant industries. The analysis is restricted to individuals aged above 45 years at the time of the survey. The data set includes information gathered from 611 individuals. This study applies Beehr's (1986) framework, which identifies the extension of working decisions by individual characteristics and working environment. Using the logistic regression model, it was found that individuals who work in retail have an approximately 9% higher propensity to delay their plan to retire early than those in other industries. The results also indicate that individuals with debt have an approximately 8% higher propensity to retire early than those without. In addition, it was found that those who can avail of financial transfers from their families have a higher propensity to delay their early retirement than those who cannot. This may imply that older workers may not want to be a financial burden on their family. Regarding other sources of financing after retirement, only the availability of a social security plan shows a positive – although insignificant – impact on the decision to retire early. Also, those with a positive attitude toward older workers in the workplace – for example, regarding their ability to adapt to a new work environment – have a higher propensity to retire early. These findings call into question the belief that family altruism and a positive attitude toward older workers in the workplace are essential factors in individual decision-making regarding retirement.

Keywords

Retirement; older workers; Thailand

Introduction

Since 2005, changes in the population structure in Thailand have been leading to an ageing societyⁱ. The total fertility rate remained the same from 2005 to 2013 at 1.5 births per woman, but the population structure changed significantly (Figure 1). Overall, the change in the population structure resulted in an ageing society in the country, as can be seen from Figure 2, which illustrates the old age dependency ratio from 1960 to 2014. This ratio almost doubled from 7.9% in 1994 to 13.9% in 2014. The Foundation of Thai Gerontology Research (2014) states

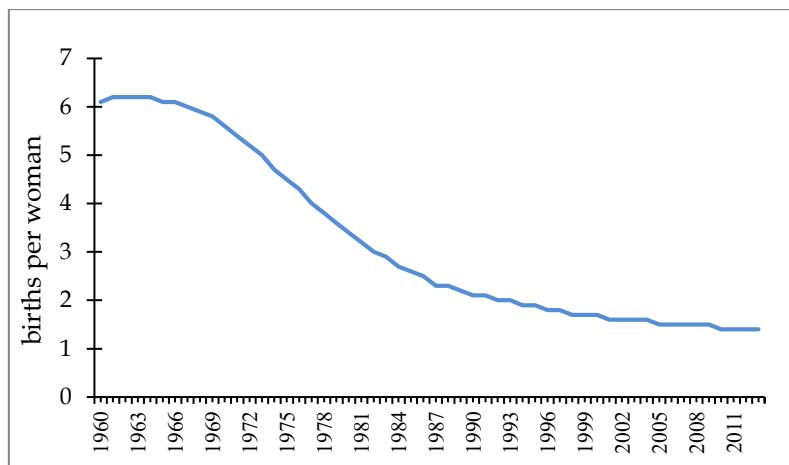
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ⁱ Definition of a society with different proportions of older people: 1) Ageing society: 7-14% of the population are 65 years or older 2) Aged society: 14-21% of the population are 65 years or older and 3) Hyper-aged society: 21% or more of the population are 65 years or older.

that Thailand is expected to have an aged society by the year 2021. In addition, the proportion of the hyper-aged is forecasted to reach 29.2% by 2030, and 42.5% by 2040 (Figure 3).

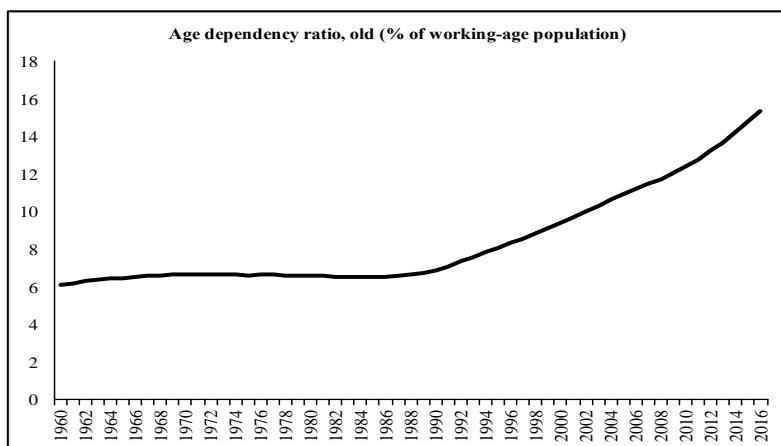
From an economic perspective, approximately 33.8% of the population aged 60 years old and above were living below the poverty line in 2011 compared to 46% in 2002 (Foundation of Thai Gerontology Research, 2014). Their sources of funding come from family, work, and senior allowances. Government policies related to extending the retirement age and reemploying older workers are essential to support the current and future population structure. These policies will allow older workers to achieve financial protection and social security and will reduce the old-age dependency ratio in Thailand. With regard to work retirement extension and reemployment policies, it can be argued that the productivity of older workers may not be as high as that of younger workers. However, older workers' higher levels of knowledge and experience, and the fact that these may be transferable to new employees, may substitute for this lack.



Source: World Development Indicators (WDI), April 2015.

Note: Total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates.

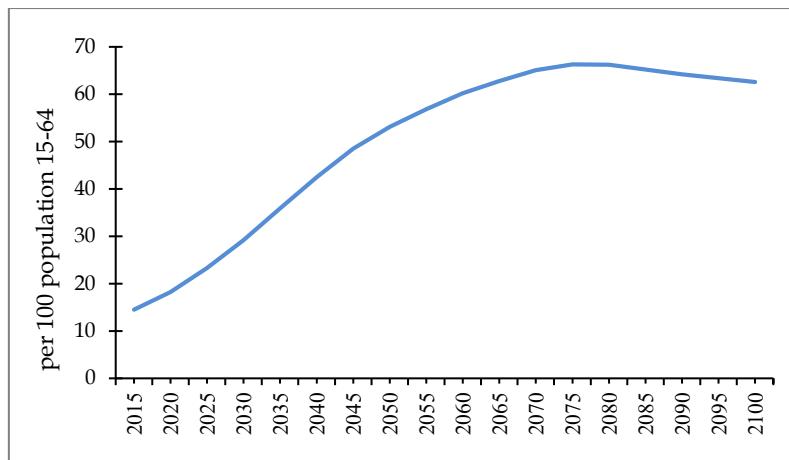
Figure 1: Total fertility rate, Thailand



Source: The World Bank.

Note: Age dependency ratio is the ratio of older dependents —people older than 64—to the working age population—those aged 15-64. Data depict the proportion of dependents per 100 working-age population.

Figure 2: Age-dependency ratio, old (% of working-age population), Thailand



Source: *World Population Prospects: The 2012 Revision (Update: 13 June 2013)*.

Figure 3: Forecast on old-age dependency ratio, Thailand

Several studies have been done based on different theories concerning the determinants of employee retirement. The Department of Work & Pensions report (2017) shows that the proportion of older workers in the workplace varies depending on several characteristics, including region, industry, age, occupational group, union recognition, and the presence of equal opportunities policies. Wang and Shultz's (2010) review of the literature on five corresponding theories on retirement as decision-making conceptualization is also used here and the results are illustrated in Table 1. These corresponding theories include rational choice theory (Hatcher, 2003; Gustman & Steinmeier, 1986; Quinn, Burkhauser, & Myers, 1990), image theory (Feldman, 1994; Beach & Frederickson, 1989), role theory (Talaga & Beehr, 1995; Ashforth, 2001; Moen, Dempster-McClain, & Williams, 1992; Brougham & Walsh, 2007), theory of planned behavior (Cron, Jackofsky, & Slocum, 1993; Ajzen, 1991; Adams & Beehr, 1998; Huuhtanen & Piispa, 1992; Shultz, Taylor, & Morrison, 2003; Wang, Zhan, Liu, & Shultz, 2008), and expectancy theory (Vroom, 1964; Kim, 2003; Belgrave & Haug, 1995; Cron, Jackofsky, & Slocum, 1993; DeVaney & Kim, 2003; Karpansalo, Manninen, Kauhanen, Lakka, & Salonen, 2004). Retirement decision-making is mostly involuntary, and the voluntariness of the retirement decision can be viewed as a boundary condition for applying an informed decision-making approach in testing predictors of the retirement decision (Gallo, Bradley, Siegel, & Kasl, 2000; Hanisch & Hulin, 1990; Shultz, Morton, & Weckerle (1998); Szinovacz & Davey, 2004; van Solinge & Henkens, 2007).

Soonthornchawakan and Cintakulchai (2009) have investigated through the use of socio-economic survey data the types of industries in the private sector employing older workers and recommend the wholesale, retail, hotel and restaurant industries for retirement extensions. In addition, Soonthornchawakan and Kulthanavit (2013) examined older worker productivity in the manufacturing, wholesale, retail, hotel, and restaurant industries using socio-economic survey data. They show that, due to health issues, the productivity of workers aged between 55 to 59 years old declines significantly in the manufacturing industry while the productivity of workers in the wholesale, retail, hotel and restaurant industries reaches a maximum when they are in this age bracket.

There are a limited number of studies focusing on the determinants of retirement decisions in the private sectors in Thailand. Soonthornchawakan and Kulthanavit (2013), mentioned above, provide evidence on the worker productivity of older workers and the decision to retire early

from the private service sector in Thailand. The private service sector is limited to the wholesale, retail, hotel, and restaurant industries. The structure of this paper is organized as follows: Section 2 discusses the background to Thailand's retirement policy; Section 3 gives the conceptual framework for the study; Section 4 gives an overview of the data; Section 5 describes the empirical strategy and methodology; Section 6 discusses the empirical results; and Section 7 highlights the policy implications and concludes the paper.

Table 1: Five corresponding theories on retirement

Corresponding theories	Description	Research examples
Rational choice theory	Rational Choice theory has been used to tie financial status and the external economic environment to retirement decisions	Hatcher, 2003 Gustman & Steinmeier, 1986 Quinn, Burkhauser, & Myers, 1990
Image theory	Both Image theory and Role theory have been used to tie workers' demographic status and work experience, marital life, type of industries, and productivity to their retirement decisions	Feldman, 1994 Beach & Frederickson, 1989
Role theory		Talaga & Beehr, 1995 Ashforth, 2001 Moen, Dempster-McClain, & Williams, 1992 Brougham & Walsh, 2007
Theory of planned behavior	The theory of planned behavior has linked workers' attitude (job satisfaction, organizational commitment), retirement attitudes, and workplace norms to retirement decisions	Cron, Jackofsky, & Slocum, 1993 Ajzen, 1991 Adams & Beehr, 1998 Huuhtanen & Piispa, 1992 Shultz, Taylor, & Morrison, 2003 Wang, Zhan, Liu, & Shultz, 2008
Expectancy theory	The expectancy theory has linked workers' productivity, job characteristics, and health status to their retirement decisions	Vroom, 1964 Kim, 2003 Belgrave & Haug, 1995 Cron, Jackofsky, & Slocum, 1993 DeVaney & Kim, 2003 Karpansalo, Manninen, Kauhanen, Lakka, & Salonen, 2004

Source: Wang and Shultz (2010).

Background on the pension system and retirement policy in Thailand

The Thai pension system was initiated in 1902 by King Rama V for the well-being of all government officials after their retirements (Government pension fund, 2012). It was funded by the annual government budget, granting pensions to all government officials, and was based on the final month's salary of the recipient. Thailand's pension system is illustrated in Table 2. The first grouping, state-provided, includes the old civil service scheme and the universal old age payment for the elderly without any formal pension payment. It is intended

to secure basic needs. The second grouping, compulsory savings, is made up of the social security scheme. The social security scheme is mainly contributed to by employers and their employees. Though the government does contribute a certain amount to the fund, their contribution is small compared to the total. The social security fund is a Pay-As-You-Go scheme as it uses contributions made by newcomers to pay out for the retirees. The financial sustainability of the fund thus depends on the balance between the amount contributed and the amount of pension paid out. The third grouping, voluntary savings, is made up of a provident fund, a retirement mutual fund, and a national savings fund, and is a privately-financed personal provision. It is incentivized with tax advantages and intended to cover Thai citizens, especially informal workers, who are not covered by any pension scheme.

Table 2: Thai pension system

State-provided	Compulsory saving	Voluntary saving
Old civil service scheme	Social security fund	Provident Fund
The universal old age payment		Retirement Mutual Fund
		National Saving Fund

Source: *Government Pension Fund, Thailand (2012)*.

The retirement age and the age to receive a pension in the Thai employment sector are illustrated in Table 3. All formal workers in the public sector retire at the age of 60. They are eligible to receive pension and senior allowances between the ages of 50 and 60. No formal workers in the private sector have a specific legal age for retirement. The age of retirement for these workers can be negotiated between employees and employers in the work contract. The age usually agreed upon is 55 and that is based on the eligibility to receive a pension from a social security fund. The age of retirement for all formal workers in the public sector is 60 years old. The age of eligibility to receive a pension and senior allowances is from 50 to 60 years old. There is no specific legal age of retirement for informal workers. Informal workers include workers in agricultural sectors and the self-employed. Informal workers are not eligible to receive pensions.

Table 3: Age of retirement and age of eligibility to receive pension benefits in the Thai employment system

Employment sector	Formal workers		Informal workers (e.g. Agriculture, Self-employed, etc.)
	Public Sector	Private sector	
Age of retirement	60 years old	No specific legal requirement Depends on the agreement between employees and employer	No specific legal requirement
Age eligibility to receive pension and age eligibility to receive senior allowances	From 50-60 years old	From 55 years old (Social Security)	No specific legal requirement None

Source: *Chamchan (2008)*.

Data and Methodology

This study applies Beehr's (1986) framework, which identifies the extension of working decisions by individual characteristics and working environment. Individual characteristics include health conditions, economic conditions, work-related characteristics, non-work-related characteristics, and attitude concerning work and retirement. Working environment variables include level of satisfaction toward current work and supportive work atmosphere for older workers. In addition, Feldman (1994) and Taylor and Shore (1995) use work and non-work-related factors as predictors of retirement decisions. This study also applies their theoretical framework concerning the relationship between work and non-work-related factors on a retirement decision model.

We can extend our model with the life-cycle theory. The model shows how individuals can smooth their consumption. It considers not only individual decision-making on work and leisure hours, consumption, and savings, but also on age of retirement. Sources of financing to smooth individual's consumption come from family and government transfers.

Antolin and Scarpetta (1998) introduce the optional value of choice model as illustrated in equation (1).

$$V_t(r) = E_t[\sum_{t=\tau}^{r-1} \delta^{t-\tau} s_t U(Y_t) + \lambda \sum_{t=r}^{\infty} \delta^{t-r} U(RB_t(r, Y)) s_t; X] \quad (1)$$

When Y_t is salary from working at time t

$RB_t(r, Y)$ is total income after retirement at time t at age r until death

r is age of retirement

s_t is the probability of survival from period t to period $t+1$

λ is the marginal utility of leisure

δ is the discount factor

X is the control variable

$E_t[\cdot]$ is the expectation at time t

Therefore, if r^{\max} is the retirement age that makes $E_t[V_t(r)]$ the highest, the alternative choice is $O_t(r) = E_t[V_t(r^{\max})] - E_t[V_t(r)]$ and an individual will only choose to extend his or her retirement if the alternative choice is greater than zero or $O_t(r^{\max}) > 0$

This model identifies age of retirement and decisions on age of retirement extension through comparing total utility at every age. It includes variables that have an impact on retirement decisions, such as education attainment, family characteristics, nationality, occupation, industry, tenure, health status, and house ownership.

From a business's viewpoint, the company's offered wage reflects the labor value of the marginal product and also worker productivity. So, at a specific level of offered wage, companies may compare the worker productivity of each age group. In addition, the tendency to hire older workers tends to decline due to their lower productivity, which may be caused by physical and health conditions, though their greater work experience may counterbalance that loss of productivity. From the government perspective, the extension of the work-retirement age will reduce the burden on government expenditure of pensions, health, and other welfare transfers. In addition, it will reduce the old-age dependency ratio in the long-run.

The primary dataⁱⁱ for this study was gathered using purposive samplings from firms and workers in the private service sector, including the wholesale, retail, hotel, and restaurant industries. The sampling process is explained in Appendix A. The analysis was limited to

ⁱⁱ The survey data is funded by the Foundation of Thai Gerontology Research and Development Institute and National Health Security Office (NHSO), Thailand.

individuals above the age of 45 years at the time of the survey. The sample of workers was further restricted to individuals working at the operating level or in so-called "blue collar" positions. The data set includes information gathered on 128 firms and 611 workers from 9 provinces in 5 geographic regions of Thailand. The number of samples of firms by geographic region is illustrated in Table 4. 23 Firms were included from the wholesale and retail industry including the motor vehicle and motorcycle industry, and these represented approximately 17.97% of the total number of firms. 9 firms from the wholesale industry excluding the motor vehicle and motorcycles industry were included representing approximately 7.03% of total firms. 14 firms from the retail industry excluding the motor vehicle and motorcycle industry were included, representing approximately 10.94% of total firms. 53 firms were included from the hotel industry, representing approximately 41.41% of total firms. Finally, 29 firms came from the restaurant industry (approximately 22.66% of the total). The number of samples of workers by province is illustrated in Table 5. 97 workers came from the wholesale and retail industry including the motor vehicle and motorcycle industry (approximately 15.88% of the total number of workers). 52 workers came from the wholesale industry excluding the motor vehicle and motorcycle industry (approximately 8.51% of the total). 75 workers came from the retail industry excluding the motor vehicle and motorcycle industry (approximately 12.27% of the total). 261 workers came from the hotel industry (approximately 42.72% of the total). Finally, 126 workers came from the restaurant industry (approximately 20.62% of the total).

Variables' names, means and standard deviations are summarized in Table 6. The dependent variable is the decision for early retirement. The explanatory variables are geographic region, gender, marital status, age, education level, type of industry, income, family size, debt, attitude toward workplace, and sources of income after retirement. Geographic region was generated as a dummy variable and classified into four groups: i) central region, ii) north region, iii) northeastern region, and iv) southern region. A zero-one dummy variable was introduced for the gender of respondent. A dummy variable is equal to one for male. A marital status dummy variable was included on the presumption that married individuals are more motivated, work harder, and earn higher incomes (Byron and Manaloto, 1980), and it was classified into two groups: i) married, and ii) single. Education attainment was designated as a dummy variable and classified into three groups: i) primary education and lower, ii) secondary education, and iii) higher vocational certificate. An age dummy variable was generated and classified into two groups: i) Age of workers below and equal to 55 years old and ii) Age of workers from 56 to 64 years old. Types of industry was generated as a dummy variable and classified into four groups: i) wholesale except motor vehicles and motorcycles, ii) retail except motor vehicles and motorcycles, iii) hotels, and iv) restaurants. Sources of financing after retirement was generated as a dummy variable and classified into five groups: i) old age pensions, ii) social security, iii) providence funds, iv) savings or investment, and v) family. The variable of attitudes toward older workers in the workplace was scaled from 1 to 5.

Table 4: Number of sample firms by geographic region

Type of industry	Number of workers	Firms by geographic region							Total
		Bangkok	Outskirt region of Bangkok	Central	Northern	Northeastern	South		
Wholesale and retail :repair of motor vehicles and motorcycles	1,801	2 (13.33)	3 (27.27)	7 (20.59)	3 (12.43)	2 (6.67)	6 (31.63)	23 (17.97)	
Wholesale excluding motor vehicles and motorcycles	810	1 (6.67)	0 (0.00)	0 (0.00)	4 (16.97)	4 (13.33)	0 (0.00)	9 (7.03)	
Retail excluding motor vehicles and motorcycles	1,062	2 (13.33)	1 (9.09)	2 (10.09)	1 (4.55)	7 (23.33)	1 (5.56)	14 (10.94)	
Hotel	4,884	6 (40.00)	4 (36.36)	7 (37.40)	15 (56.06)	12 (40.00)	9 (38.04)	53 (41.41)	
Restaurant	683	4 (26.67)	3 (27.27)	8 (31.93)	3 (10.00)	5 (16.67)	6 (24.79)	29 (22.66)	
Total	9,240	15 (100.00)	11 (100.00)	24 (100.00)	26 (100.00)	30 (100.00)	22 (100.00)	128 (100.00)	

Note: Number in the bracket is the percentage of firms by geographic region in each type of industry.

Table 5: Number of samples of workers by provinces

Type of industry	Number of workers by provinces									Total
	Bangkok	Nakhon Pathom	Kanchanaburi	Phetchaburi	Phitsanulok	Chiang Mai	Ubon Ratchathani	Nakhon Si Thammarat	Songkhla	
Wholesale and retail: repair of motor vehicles and motorcycles	9 (13.24)	21 (25.30)	0 (0.00)	12 (16.00)	3 (4.76)	8 (16.00)	14 (9.86)	26 (61.90)	4 (7.27)	97 (15.88)
Wholesale excluding motor vehicles and motorcycles	4 (5.88)	6 (7.23)	0 (0.00)	0 (0.00)	4 (6.35)	18 (36.00)	20 (14.08)	0 (0.00)	0 (0.00)	52 (8.51)
Retail excluding motor vehicles and motorcycles	14 (20.59)	8 (7.23)	4 (12.12)	12 (16.00)	1 (1.59)	4 (8.00)	28 (19.72)	4 (9.52)	0 (0.00)	75 (12.27)
Hotel	25 (36.76)	26 (31.33)	21 (63.64)	27 (36.00)	43 (68.25)	20 (40.00)	60 (42.25)	8 (19.05)	31 (56.36)	261 (42.72)
Restaurant	16 (23.53)	19 (26.51)	8 (24.24)	24 (32.00)	12 (19.05)	0 (0.00)	20 (14.08)	4 (9.52)	20 (36.36)	126 (20.62)
Total	68 (100.0)	83 (100.0)	33 (100.0)	75 (100.0)	63 (100.0)	50 (100.0)	142 (100.0)	42 (100.0)	55 (100.0)	611 (100.0)

Note: Numbers in parentheses represent the percentage of workers by province in each type of industry.

Table 6: Descriptive Statistics

Variable	Description	Mean (Standard Deviation)
Sample size (N)		611
<i>Dependent variables</i>		
Early retire	Individual plans to retire early	0.2291 (0.4206)
<i>Explanatory variables</i>		
Age	Age of workers (years)	49.8331 (4.3099)
Age group 1 Ψ	Age of workers below and equal to 55 years old	0.8903 (0.3127)
Age group 2 Ψ	Age of workers between 56 to 64 years old	0.0966 (0.2956)
Male Ψ	Gender (male=1, otherwise=0)	0.3617 (0.4809)
South Ψ	Living in southern region (Yes=1, No=0)	0.1588 (0.3657)
Central Ψ	Living in the central region (Yes=1, No=0)	0.1768 (0.3818)
North Ψ	Living in the northern region (Yes=1, No=0)	0.1849 (0.3886)
Northeast Ψ	Living in the northeast region (Yes=1, No=0)	0.2324 (0.4227)
Educ1 Ψ	Education attainment (Finished primary education level or lower =1, otherwise=0)	0.3977 (0.4898)
Educ2 Ψ	Education attainment (Finished secondary education level=1, otherwise=0)	0.3519 (0.4779)
Educ3 Ψ	Education attainment (Finished higher vocational certificate=1, otherwise=0)	0.1293 (0.3358)
Married Ψ	Marital status (married =1, otherwise=0)	0.6170 (0.4865)
Single Ψ	Marital status (single =1, otherwise =0)	0.1735 (0.3789)
Family size	Number of family member in the household	3.8543 (1.5555)
Quartile1 Ψ	Total income in quartile1 (Yes=1, otherwise =0)	0.2520 (0.4345)
Quartile2 Ψ	Total income in quartile2 (Yes=1, otherwise =0)	0.2897 (0.4540)
Quartile3 Ψ	Total income in quartile3 (Yes=1, otherwise =0)	0.2537 (0.4355)
Debt Ψ	Have debt (Yes=1, otherwise =0)	0.4746 (0.4998)
Source 1 Ψ	Source of financing after retirement: old age pension (Social Security) (Yes=1, otherwise =0)	0.3126 (0.4639)
Source 2 Ψ	Source of financing after retirement: social security (Yes=1, otherwise =0)	0.2881 (0.4532)
Source 3 Ψ	Source of financing after retirement: provident fund (Yes=1, otherwise =0)	0.1293 (0.3358)
Source 4 Ψ	Source of financing after retirement: savings or investment (Yes=1, otherwise =0)	0.2570 (0.4373)
Source 5 Ψ	Source of financing after retirement: family (Yes=1, otherwise =0)	0.4812 (0.5001)
Industry1 Ψ	Individual works in wholesale and retail and repairs motor vehicles and motorcycles (Yes=1, otherwise =0)	0.1588 (0.3657)
Industry2 Ψ	Individual works in wholesale excepting the motor vehicle and motorcycle industry (Yes=1, otherwise =0)	0.0851 (0.2793)
Industry3 Ψ	Individual works in retail excepting the motor vehicle and motorcycle industry (Yes=1, otherwise =0)	0.1227 (0.3284)
Industry4 Ψ	Individual works in the hotel industry (Yes=1, otherwise =0)	0.4272 (0.4951)
Industry5 Ψ	Individual works in the restaurant industry (Yes=1, otherwise =0)	0.2062 (0.4049)
Attitude 1 Ψ	Attitude toward older workers in the workplace: older worker's health does not interfere with his or her work (Level 1-5)	3.7332 (1.0846)
Attitude 2 Ψ	Attitude toward older workers in the workplace: older workers can manage stress from work (Level 1-5)	3.7905 (0.9190)
Attitude 3 Ψ	Attitude toward older workers in the workplace: older workers can adapt to new technology (Level 1-5)	3.6841 (0.9582)
Attitude 4 Ψ	Attitude toward older workers in the workplace: older workers can adapt to new work environments (Level 1-5)	3.9165 (0.7626)
Attitude 5 Ψ	Attitude toward older workers in the workplace: older workers can get along with their coworkers (Level 1-5)	4.0393 (0.7778)
Attitude 6 Ψ	Attitude toward older workers in the workplace: older workers can be trained effectively (Level 1-5)	3.8773 (0.8682)
Attitude 7 Ψ	Attitude toward older workers in the workplace: older worker works effectively (Level 1-5)	3.9624 (0.8475)
Attitude 8 Ψ	Attitude toward older workers in workplace: older worker does not generate problems for firm (Level 1-5)	3.9869 (0.8473)

Ψ is dummy variable.

We use the logistic regression model to describe factors associated with workers' plans to retire early. Borsch-Supan et al. (2004) apply this model to estimate retirement decisions. Their explanatory variables include age, marital status, health condition, educational attainment, home ownership, financial assets, working experience, expected income, and entrepreneurship. Based on Maddala (1983) and Wooldridge (2002), the logistic analysis model assumes that there is an underlying response variable y^* defined by the regression relationship in equation (2):

$$y^* = x\beta + u \quad (2)$$

where x_i represents individual and economic characteristics, attitude toward the workplace, work environment factors, and the disturbance term u . A dummy variable y is defined by equation (3):

$$\begin{aligned} y &= 1 \text{ if } y^* > 0 \\ y &= 0 \text{ otherwise} \end{aligned} \quad (3)$$

From (2) and (3) we get

$$P(y = 1|x) = P(y^* > 0|x) = P(u > -x\beta) = 1 - F(-x\beta) = F(x\beta) \quad (4)$$

where F is the cumulative distribution function for u , u has a standard logistic distribution. The logit model is shown by equation (5):

$$F(x\beta) = \frac{\exp(x\beta)}{1+\exp(x\beta)} \quad (5)$$

For the nonlinear model interpretation, the marginal effects of individual and household characteristics are calculated to interpret the β_j on both continuous and discrete explanatory variables. The marginal effects derivations are taken from Wooldridge (2002) and Cameron and Trevedi (2009). When x_j is continuous, the marginal effect is computed by equation (6):

$$\frac{\partial p(x)}{\partial x_j} = f(x\beta)\beta_j, \text{ where } f(x\beta) = \frac{dF}{d(x\beta)}(x\beta) \quad (6)$$

There are two important properties to consider when explanatory variables are continuous. First, if $F(x\beta)$ is a strictly increasing CDF function, then the sign of the marginal effect is determined by the sign of β_j . Second, concerning the relative effects for continuous variables x_j and x_h , the ratio of the partial effects is constant and given by the ratio of the corresponding coefficients by equation (7):

$$\frac{\partial p(x)/\partial x_j}{\partial p(x)/\partial x_h} = \frac{\beta_j}{\beta_h} \quad (7)$$

When x_K is a binary explanatory variable, the marginal effect of changing x_K from zero to one while holding all other variables fixed is computed by equation (8):

$$F(\beta_1 + \beta_2 x_2 + \cdots + \beta_{K-1} x_{K-1} + \beta_K x_K) - F(\beta_1 + \beta_2 x_2 + \cdots + \beta_{K-1} x_{K-1}) \quad (8)$$

For other discrete variables, such as number of family members in the household, the effect on the probability of x_K going from c_K to $c_K + 1$ is computed by equation (9):

$$F(\beta_1 + \beta_2 x_2 + \cdots + \beta_{K-1} x_{K-1} + \beta_K (c_K + 1)) - F(\beta_1 + \beta_2 x_2 + \cdots + \beta_{K-1} x_{K-1} + \beta_K c_K) \quad (9)$$

Results

The estimated effect on the probability of workers who plan to take an early retirement is shown in Table 7. Planning an early retirement was estimated as a function of the following explanatory variables: geographic region, gender, marital status, age, education level, type of industry, income, family size, debt, attitude toward older workers in the workplace, and sources of financing after retirement. The dependent variable is given the value of 1 if workers plan to retire from current work early and 0 otherwise. Several points can be discussed from Table 7. First, the results show that workers in the northeastern and northern region have a

higher propensity to retire early (approximately 18.84% and 11.70%) compared with workers in Bangkok and its metropolitan area. Workers in other regions have an insignificant effect on the likelihood of planning an early retirement. Second, the results show that workers in retail industries have a higher propensity (by approximately 9.51%) to delay their plan to retire early compared with workers in other industries. Third, as workers age, they have a higher probability of retiring early. Fourth, males still have a significantly higher propensity to delay their plan to retire early (by approximately 6.04%) compared with females. Fifth, the results show that workers whose highest educational attainment was primary level or below have a higher propensity to delay their plan to retire early (by approximately 12.07%) compared to workers whose highest educational attainment was a bachelor's degree or above.

In addition to individual characteristics, sources of financing after retirement and attitude toward older workers in the workplace have a significant impact on the decision to retire early. Sixth, the results show that workers who have debt have a higher propensity to retire early (by approximately 8.42%). These findings signal that the source of financing after retirement, for example, social security, might be used to repay debt instead of to support individuals when they get older. Seventh, the availability of family transfers causes a higher propensity to delay early retirement (by approximately 8.44%). This may imply that older workers may not want to be a financial burden on their family. Eighth, the results show that a higher result on attitude of older workers towards the workplace, such as adaptation to new work environments has a significant effect on the likelihood of planning an early retirement. That is to say that workers who scored higher on this scale have a higher propensity to retire early (by approximately 5.4%).

Table 7: Marginal effect of variables of workers who plan an early retirement

Explanatory variable	Coefficient (Standard error)		Marginal effect of variables for plan an early retirement		X
Constant	-4.8220*	(2.5947)			
Geographic region					
CentralΨ	-0.0584	(0.4147)	-0.0091	(0.0635)	0.1768
NorthΨ	0.6622*	(0.3742)	0.1170*	(0.0728)	0.1849
NortheastΨ	1.0323***	(0.3511)	0.1884***	(0.0714)	0.2324
SouthΨ	0.4616	(0.3803)	0.0794	(0.0709)	0.1588
Type of industry					
Industry2Ψ	-0.5801	(0.4664)	-0.0781	(0.0528)	0.0851
Industry3Ψ	-0.7206*	(0.4464)	-0.0951**	(0.0484)	0.1228
Industry4Ψ	-0.1864	(0.3413)	-0.0290	(0.0526)	0.4272
Industry5Ψ	-0.3221	(0.3869)	-0.0476	(0.0538)	0.2062
Age	0.0596*	(0.0364)	0.0093*	(0.0057)	49.8331
Age					
Age group1Ψ	0.7691	(0.9857)	0.0996	(0.1028)	0.8903
Age group2Ψ	0.5828	(0.8831)	0.1045	(0.1772)	0.0966
MaleΨ	-0.3982*	(0.2343)	-0.0604*	(0.0342)	0.3617
Education attainment					
Educ1Ψ	-0.8077**	(0.4047)	-0.1207**	(0.0573)	0.3977
Educ2Ψ	-0.5083	(0.3834)	-0.0762	(0.0548)	0.3519
Educ3Ψ	-0.3305	(0.4250)	-0.0480	(0.0570)	0.1293
Marital status					
MarriedΨ	-0.1019	(0.2759)	-0.0161	(0.0439)	0.6170
SingleΨ	0.0995	(0.3400)	0.0159	(0.0554)	0.1735
Family size	0.0112	(0.0670)	0.0018	(0.0105)	3.8543
Total income					
Quartile1Ψ	-0.4900	(0.3667)	-0.0713	(0.0492)	0.2520
Quartile2Ψ	-0.4917	(0.3550)	-0.0724	(0.0488)	0.2897
Quartile3Ψ	-0.5708*	(0.3451)	-0.0821*	(0.0451)	0.2537
DebtΨ	0.5324**	(0.2265)	0.0842**	(0.0358)	0.4746

Table 7 Cont.

Explanatory variable	Coefficient (Standard error)		Marginal effect of variables for plan an early retirement		X
Attitude toward workplace					
Attitude 1 Ψ	0.0141	(0.1096)	0.0022	(0.0172)	3.7332
Attitude 2 Ψ	-0.0512	(0.1321)	-0.0080	(0.0207)	3.7905
Attitude 3 Ψ	-0.1214	(0.1453)	-0.0190	(0.0228)	3.6841
Attitude 4 Ψ	0.3441*	(0.2025)	0.0540*	(0.0316)	3.9165
Attitude 5 Ψ	-0.0806	(0.1913)	-0.0126	(0.0300)	4.0393
Attitude 6 Ψ	0.2049	(0.1815)	0.0321	(0.0284)	3.8773
Attitude 7 Ψ	-0.2366	(0.2016)	-0.0371	(0.0316)	3.9624
Attitude 8 Ψ	0.1210	(0.1962)	0.0190	(0.0308)	3.9869
Source of income after retirement					
Source 1 Ψ	-0.2419	(0.2518)	-0.0369	(0.0373)	0.3126
Source 2 Ψ	0.3329	(0.2371)	0.0545	(0.0403)	0.2881
Source 3 Ψ	-0.3715	(0.3445)	-0.0535	(0.0452)	0.1293
Source 4 Ψ	-0.3366	(0.2902)	-0.0502	(0.0410)	0.2570
Source 5 Ψ	-0.5409**	(0.2446)	-0.0844**	(0.0377)	0.4812
Sample size	611		611		
Pseudo R-Squared	0.1100				

Notes: Numbers are reported as marginal effects at a representative value. Numbers in parentheses represent standard errors. (Ψ) dy/dx stands for the discrete change of the dummy variable from 0 to 1.

*Indicates that the variable coefficient in the underlying logit regression differs significantly from zero at the 10 percent level. **Indicates that the variable coefficient in the underlying logit regression differs significantly from zero at the 5 percent level. ***Indicates that the variable coefficient in the underlying logit regression differs significantly from zero at the 1 percent level.

Conclusion and Policy Implications

The study aims to analyze the factors that lead to the decision for early retirement of workers in the private service sector in Thailand. Our results support the assumption that geographic region, industry, gender, age, education, and attitude toward the workplace have an impact on retirement decisions. We find that workers whose highest education attainment is primary education level or below have a higher propensity to delay their plan to retire early. Furthermore, workers who have debts have a higher propensity to retire early. These finding signal that a compulsory savings plan such as social security might be used to repay debt instead of supporting individuals after retirement.

Davies, Van der Heijden, & Flynn (2017) state that the relationship between job satisfaction and retirement attitude differ according to socio-economic group. They find no relationship between job satisfaction and retirement attitude for higher-household income older workers, whereas they find that increases in job satisfaction for low- and mean-household income workers are likely to make the prospect of retirement less attractive. In addition, Messe, Eva, & Wolff (2014) find that older workers who benefit from a skill-upgrading training program have a higher intended retirement age. This study finds that the only attitude towards the workplace that has a significant impact on retirement decisions is a positive attitude towards adapting to a new work environment —the higher the score given for adaptation to new work environment attitude, the higher the propensity to retire early. We also expected to find that public sources of financing after retirement, such as old age pension or social security, would make a considerable contribution to workers' retirement decisions. However, the results indicate that none of the public sources of financing after retirement have a significant impact on the decision to retire early. On the other hand, the availability of family transfers causes a propensity to delay retirement. Older workers may decide to delay their retirement because they do not want to be a financial burden to their family. These findings call into question the

belief that family altruism and a positive attitude toward older workers in the workplace are essential factors in individual decision making.

In order to prepare workers for the change in the population structure in Thailand, the government of Thailand should:

Change its attitude toward aged workers and create a sound working environment for them. Due to the aging society, the national policy should be geared toward work retirement extension or reemployment.

Work with academic institutions on designing lifelong learning courses for aged workers. This will provide sustainable benefits for these workers if they decide to apply for work retirement extensions or to work in a new workplace. For example, aged workers who want to start up a new business may need certain entrepreneurial skills, while those who move to the agricultural sector may need to equip themselves with new agricultural technology.

Appendix A

The study sample can be classified into two groups. The first group is made up of owners or managers who determine the older-worker hiring policy of the firm. The second group is formed of workers between 45-59 years old of the particular firm in the first group. The worker sample is restricted to workers at the operating level. The number of sampled older workers at each firm was a minimum of 4-9. Table A1 illustrates the number of firms classified by number of workers in the private service sector including wholesale, retail, hotel, and restaurant industries in Thailand in 2011. Table A2 shows the number of formal and informal workers classified by industry.

Table A1: Number of firms classified by number of workers in the private service sector, including the wholesale, retail, hotel, and restaurant industries in Thailand in 2011

Number of workers	Number of firms in the wholesale and retail industry	Number of firms in the hotel and restaurant industry
1	68,276	113,967
2	38,740	91,544
3-5	36,171	52,569
6-10	9,120	15,995
11-15	2,188	4,833
16-20	930	2,214
21-25	568	1,172
26-30	375	784
31-50	646	1,305
51-100	393	854
101-200	144	368
201-500	44	156
501-1000	6	33
More than 1000	4	6
Total	157,605	285,800

Source: The National Statistics Office of Thailand.

Table A2: Number of formal and informal workers classified by industry, Thailand

Type of industry	Number of formal workers (1000)	Number of informal workers (1000)
Agriculture, Forest, and Fishery	16,329.1	15,490.4
Manufacturing	5,245.6	1,178.5
Construction	2,352.2	1,090.4
Wholesale and retail and repair of motor vehicles and motorcycles	6,079.6 (15.4%)	3,759.4 (15.16%)
Hotel and restaurant	2,377.9 (6.00%)	1,602.7 (6.46%)
Transportation and Logistics	908.4	479.6
Finance and Insurance	416.8	22.1
Real Estate	126.4	38.1
Government	1,674.8	141.6
Education	1,223.4	109.9
Health and Welfare	668.2	71.0
Others	2,184.6	815.8
Total	39,578.3	24,799.5

Source: National Statistics Office (2015)

This study applied purposive sampling by industry, region, and firm size. In addition, we also carried out a pre-survey to verify the content of the questionnaire and perform validity checking using Cronbach's alpha coefficient. The sample size was calculated using equation A1:

$$n = \frac{Z_{1-\alpha}^2 P(1-P)}{d^2}$$

Where the confidence level is $1 - \alpha = 0.95$, so $Z = 1.96$, P is the proportion of the number of workers in this industry ($= 21.4\%$). The error $d = 0.05$. The minimum number of workers required for the sample can be calculated as 260; we collected data from 611 workers from 128 firms. To prevent a misleading outcome, the scope of the study sets the criteria of industry, age, and minimum samples for each firm (minimum 4 – 9 workers). Since Thailand has many small and medium-sized enterprises across the country and many firms have few workers, directly proportional sampling would have resulted mostly in small and medium-sized enterprises being targeted. Given our time and budget constraints, we did a survey on 9 provinces in 5 regions of Thailand that represented the main centers of business in each region. Table A3 presents the number of firms in the sample classified by region and industry.

Table A3: Number of firms and number of sampling classified by region and industry in 2011

Region	Number of firms			Number of samples		
	Wholesale and retail and repair of motor vehicles and motorcycles	Hotel and restaurant	Total	Wholesale and retail and repair of motor vehicles and motorcycles	Hotel and restaurant	Total
Bangkok	17,106	36,754	53,860	5	10	15
Outskirt of Bangkok	12,754	22,345	35,099	4	7	11
Central	30,996	54,293	85,289	9	15	24
Northern	28,585	57,683	86,268	8	16	24
Northeastern	44,362	61,324	105,686	13	17	30
Southern	23,802	53,401	77,203	7	15	22
Total	157,605	285,800	443,405	43	78	121

Source: National Statistics Office (2015)

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