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LABOR SUPPLY OF OLDER WORKERS IN THAILAND: THE ROLE OF CO-RESIDENCE, HEALTH, AND PENSIONS

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Abstract

During the last few decades, the composition of the Thai population has changed dramatically due to reduced fertility and the aging of the population. Thailand's aging society faces many challenges. This is particularly so for older Thai people who still have to work for a living due to insufficient savings. This paper first provides an overview of the basic changes related to the labor force participation (LFP) of older people using the Labor Force Survey (LFS) from 1985 to 2017. Then, this study uses Socio-Economic Survey (SES) panel data from 2005 to 2012 and employs the fixed-effect logit model (FE-logit) to estimate the determinants of older people's LFP. Our main findings provide strong evidence that pensions and poorer health status reduce the LFP of older people in Thailand. Furthermore, while health status is significant across all analyses, pensions have less impact on lower-status workers, indicating that even if they receive a pension, they may still be too poor to retire. Finally, co-residence decreases the LFP only of older people in rural areas. Those who are older, with a primary education, and who are usually employed in the informal sector suffer from poverty and require more assistance from others.

Keywords: population aging, older worker, elderly labor supply, Thailand

JEL Classification: J21, J22, J14, O17, O53

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1. INTRODUCTION

During the last few decades, the composition of the Thai population has changed dramatically due to reduced fertility and the aging of the population. In 1964, the average number of children per woman was 6.3, decreasing to 1.6 in 2014 (Institute of Population and Social Research 2014). In 2020, at 1.45, Thailand ranked 183rd out of 199 countries worldwide in its fertility rate, lower than neighboring countries the Philippines (2.88), Malaysia (2.01), and Brunei Darussalam (1.85) (World Population Review 2020). In contrast, Thai life expectancy continued to increase, rising from 59 in 1964 to 75 in 2015. The proportion of elderly persons (over 60 years old) increased from 5.5% in 1980 to 12.9% in 2010 and is estimated to reach 32% in 2040 (National Economic and Social Development 2013). Among all ASEAN countries, Thailand ranks second in the percentage of elderly people, after first-placed Singapore (United Nations 2015).

The global labor market is transforming and faces challenges due to demographic changes (ILO 2019). Recent studies have suggested that population aging has an impact on the composition of the workforce, and labor force participation (LFP) relating to the aging structure will lead to a new direction for the future labor force (Kühn, Milasi, and Yoon 2018; Abeliansky et al. 2020). For several decades, widespread attention has been given to aging populations among developed countries, while this has become a recent phenomenon and is more severe in developing countries (Kaushal 2014). The aging of the population is accompanied by a higher probability that older people will stay in the labor force, which suggests that they tend to contribute more to the labor market (Schmidt and Sevak 2008). Therefore, understanding the labor supply of older people has become increasingly important for policymakers and future development.

Thailand's aging society faces many challenges. Developing countries usually have different retirement systems for elderly persons from developed countries (Giles, Wang, and Cai 2011). Pension systems in developing countries, including Thailand, can usually be categorized as either formal systems, in which employees in the formal sector have a mandatory retirement age and receive a good pension after retirement, and pension systems in informal sectors, in which those employees depend on family support and usually keep working after retirement age. The majority of older workers are in the informal sector.

According to the World Bank (2012), elderly persons are the poorest age group in Thai society. In 2010, Thailand's overall poverty rate was 7.7%, while it was 10.9% for elderly persons. Moreover, most elderly poverty occurs in the informal sector. The monthly subsistence level in Thailand ranges from 5,000 to 6,000 baht per person (Tankulrat 2015a; Hempornwisan and Akarachanon 2014). In 2007, over 80% of the aging population had an income of approximately 6,000 baht or lower, and 42% reported that their income was insufficient or barely sufficient at the time (National Statistical Office 2007). Financial support from their children is the most important source of income for elderly Thai persons, while a small proportion comes from pensions and allowances (United Nations 2013).

In Thailand, approximately two-thirds of older people reside with, or live near their children, and the co-residence rate is higher in urban areas than in rural areas (Survey of Older Persons in Thailand [SOPT] 2014). Co-residence declined from 77% in 1986 to 55% in 2014, but that was not the case with monetary and nonmonetary filial support, which suggests that the trend toward smaller families correlates with the probability of receiving financial support from adult children (Knodel and Teerawichitchainan 2017).

Studies on the labor supply of older people in developed countries have focused on different factors because of different economic conditions and social security systems, while studies on developing countries have generally used cross-sectional data and have mainly focused on descriptive analysis or have suffered from data limitations when making estimations. Although the concern over the aging population has also been addressed by many studies in Thailand, empirical evidence is lacking.

In this study, we use both Labor Force Survey (LFS) and Socio-Economic Survey (SES) panel data to study the determinants of the labor supply of older people. LFS data from 1985 to 2017 provide an overview of the basic changes related to the LFP of older people, while SES panel data from 2005 to 2012 enable us to estimate the determinants of LFP, allowing us to better control for the factors that may be associated with older people's preference for work, including their own and their spouse's pension, self-reported health status, co-residence, and income sources from other people or government.

We find strong evidence that pensions and poorer health status reduce the LFP of older people in Thailand. The majority of older workers are located in the informal sector, where they have a lower level of education and reduced access to social security. While health status is significant across all analyses, pensions have less impact on lower-status workers, indicating that even if they receive a pension, they may still be too poor to retire. Moreover, we find that co-residence only decreases the LFP of older persons in the case of those in rural areas, those of an older age, and those with a primary level of education, who usually suffer from poverty and require more assistance from others than their counterparts.

The remainder of this paper is organized as follows. Section 2 outlines the background of the study. Section 3 presents the literature review, and Section 4 describes the data. Section 5 provides an overview of older workers in Thailand, and Section 6 analyzes the determinants of older people's LFP. Section 7 concludes.

2. BACKGROUND

The current Thai pension system is based on the three-pillar old-age income security system recommended by the World Bank (1994). The first pillar is the universal program that has the main objective of protecting general households against poverty, while the second pillar is the occupational pension program, and the third pillar consists of voluntary programs. The pension system comprises the old-age allowance, a pay-as-you-go scheme, and a government pension system. The target population can be separated into three categories covered by the three-pillar system: government officers, workers in the formal sector, and workers in the informal sector. Table 1 presents the pension programs under the three-pillar system.

Table 1: Thai Pension Programs under Three-Pillar System

	Program	Target Population	Type	Program Sponsor
Pillar I	Old-age allowance	Formal and informal workers	Universal	Individual
Pillar II	Old civil service pension	Government officers	Mandatory	Government
	Government pension	Government officers	Mandatory	Government
	Social security fund (Articles 33 and 39)	Formal workers	Mandatory	Employer
	Social security fund (Article 40)	Informal workers	Voluntary	Individual
Pillar III	Retirement mutual fund	All workers	Voluntary	Individual
	National savings fund	Formal and informal workers	Voluntary	Individual
	Provident fund	Formal workers	Mandatory if listed	Employer

Source: World Bank (1994, 2012).

The funding structure and pensionable age differ under each pension scheme. Introduced in 1992, the old-age allowance was expanded in 2009 and has been paid out to the entire Thai population over the age of 60 (approximately $20 to $30 per month), except for government employees. Its aim is to assist poor older people, especially those working in the informal sector. The government pension fund was introduced in 1997, covering government officials with at least 25 years of service, and is payable at the age of 60. The pension coverage for the private-sector workforce under the social security system was established in 1999; it required at least 15 years of contributions and set 55 as the payable age. The pensionable age of the provident fund is 55, but members can take a lump sum payment before the age of 55 without any tax privilege. The National Savings Fund was introduced in 2011 to assist informal and unemployed workers, with a pensionable age of 60. The retirement mutual fund that provides tax incentives for saving is pensionable at the age of 55 (Ratanabanchuen 2019).

According to SOPT (2014), although the Thai government has expanded the pension system, it still makes up a minor portion (below 8%) of older people's income. Ninety-seven percent of older people have more than one source of income, with support from their children accounting for the largest share, but one that has decreased over time. The second-largest share of income is employment income, which saw an increasing trend from 1994 to 2014. In addition, income from interest, savings, or rent also shows a growing trend. The old-age allowance accounted for only 3% of the income of elderly persons in 2007 and increased to nearly 15% in 2014. Asked their reasons for working, over 50% of older people mentioned the need for an income, while the second-largest proportion (around 30%) of older people mentioned their desire to maintain their health. As for reasons for not working, the majority of older people suggested that they were too old, and the second-most commonly given reason was the need to take care of home and family (NSO 2003).

Informal workers account for more than half of the Thai labor force, but they have much more limited access to social security than the other two groups (Fujioka and Thangphet 2009; ILO 2020). The government has put much effort into revising the pension system to cover more informal workers in recent years, including the recently introduced universal pension allowance and two voluntary programs[1] for informal workers. Currently, the old-age allowance, social security fund, retirement mutual fund, and National Savings Fund cover informal workers (see Table 1). The primary program

[1] The new voluntary programs include the National Savings Fund, the social security fund, and Article 40, which were introduced in 2011.

that helps poor older people is the old-age allowance. It appears to have a significant impact on the reduction of poverty among the elderly. However, given its universality, most of the advantages benefit those who are not poor, which casts doubt on its efficiency in helping older people.

3. LITERATURE REVIEW

Population aging and decreased fertility highlight the significance of understanding the determinants of the labor supply of older people. Studies in developed countries have provided several explanations for the labor supply of older people, including their financial status, health status, wages, social security income and pensions, and related tax rate (e.g., Gruber and Wise 1999; Kostol and Mogstad 2014; Blau and Gilleskie 2006). In the US, Haider and Loughran (2001) suggested that the labor supply of older workers consists mainly of the most educated, richest, and healthiest individuals, who treated their work as leisure. Similarly, Maestas (2010) found that 24% of retirees return to the labor market and that these returners have higher pre-retirement incomes and education. Schmidt and Sevak (2008) found a positive relationship between wages and marginal tax rates with the LFP of older Americans. Researchers have demonstrated that pension reform has a significantly positive impact on senior employment (Engels, Geyer, and Haan 2017; Manoli and Weber 2016). Many studies also focus on the impact of financial wealth on the labor supply of older people, including the effects of inheritances, lottery wins, and stock markets (e.g., Imbens, Rubin, and Saerdote 2001; Brown, Coile, and Weisbenner 2010; Coronado and Perozek 2003). Meanwhile, studies have provided strong evidence of the effect of social security, medical care, and health factors on the labor market behavior of older people (e.g., Krueger and Pischke 1992; Blau and Gilleskie 2001; Bound, Stinebrickner, and Waidmann 2010; Vere 2011; French and Jones 2011).

In developing countries, because of differences in pension systems and cultural norms, the explanations are quite different. One of the main factors that affect labor market participation for older people is poverty in developing countries. Barrientos, Gorman, and Heslop (2003) found a high level of old-age poverty in developing countries, including Thailand, due to the lack of accessibility to markets, public services (including healthcare and education), and social networks. Households, as the key to older people's support in developing countries, play an especially important role in low-income and rural areas. Giles, Wang, and Cai (2011) suggested that unlike developed countries, given the lack of pension support and the absence of a mandatory retirement age, workers in the informal sector in developing countries expect to work until late in their lives. In Latin America, the working hours of people over the age of 65 are similar to those aged 50 to 59, but older people receive much less payment (Del Popolo 2001). Kaushal (2014) found that pensions have a relatively small negative effect on the employment of older people in India, in contrast to rich and middle-income countries that documented a large negative effect. Moreover, most older people in developed countries do not live with their adult children, but co-residence is a traditional norm in developing countries. Caregiving in the intergenerational family can go both ways. On the one hand, an adult child may provide care for their parents. On the other hand, parents also help with the housework and grandparenting. Connelly, Maurer-Fazio, and Zhang (2014) used the Chinese population census to study the determinants of the labor participation of older people and found that co-residence reduces the labor participation of older people in the People's Republic of China's

(PRC) rural areas but not in urban areas. However, because of data limitations, they do not control for health status and pensions.

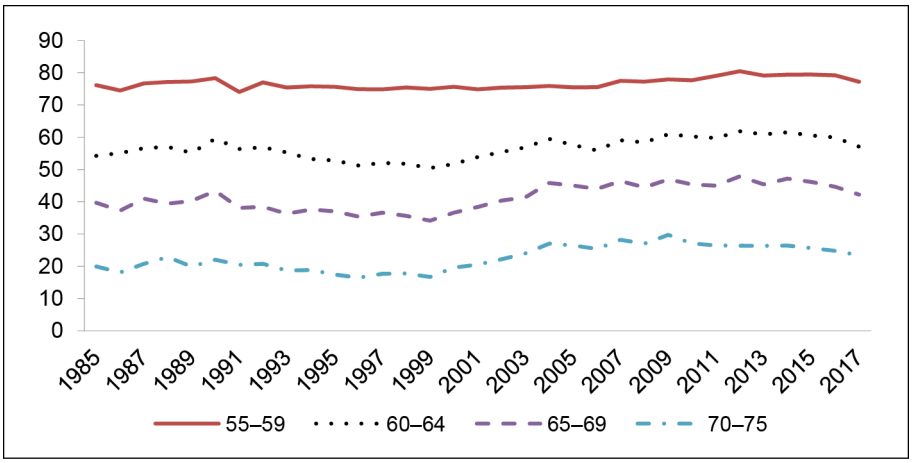
Many studies in Thailand have addressed the concerns over the aging population, but empirical analysis of their labor supply is lacking, and studies are limited by their cross-sectional design. Fujioka and Thangphet (2009) provided a descriptive analysis of the aging population in Thailand and highlighted the significance of this group in the labor market. In addition, it has been suggested that the recent increase in older people's labor participation in Thailand may be due to their improved health (Fujioka and Thangphet 2009). In 2002, the universal health coverage scheme was implemented, which covered those in the informal sector who had not previously benefitted from the public health scheme. Using the 2007 Survey of Older Persons in Thailand and the logit model, Adhikari, Soonthorndhada, and Haseen (2011) analyzed the factors determining the LFP of elderly Thai individuals, which suggested that women living with children and those with poor health are more likely to withdraw from the labor force. Keeratipongpaiboon (2012) estimated the determinants of older people's employment decisions using a standard probit model that considers household types, health, and pensions in Thailand. However, with the limitation of the cross-sectional data, their results suffer from estimation bias.

More recently, Paweenawat and Vechbanyongratana (2015) studied the impact of older people's allowances on their labor participation using the standard probit model and suggested that social pensions have a negative impact on LFP in Thailand, and the impact is higher for low-income households. Sadangharn (2017) investigated elderly employment in the Thai automotive industry through interviews, which drew attention to the recruitment method, health, pensions, and working conditions for older workers. A recent study by Wattanasaovaluk (2020) found that the incidence of experienced older workers returning to the workforce increased with their skill level. |To the best of our knowledge, no one has provided a detailed overview of the employment of older people and estimated the determinants of LFP among older people, considering the effect of co-residence, health, and pensions, by exploring panel data in Thailand.

4. OVERVIEW OF OLDER WORKERS IN THAILAND

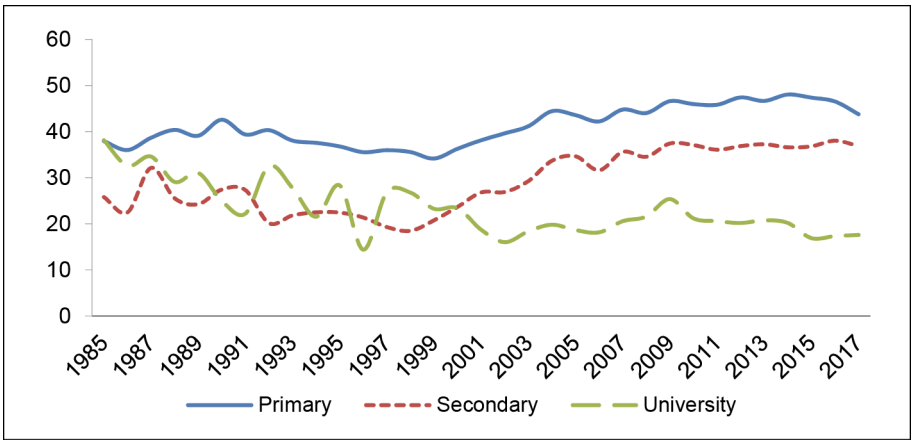
Using the Labor Force Survey (LFS) from 1985 to 2017, we provide an overview of the employment of older people in the Thai labor market, including the LFP, wages, working hours, and work status. Figure 1 shows the labor force participation rate (LFPR) for older people for four age groups. Nearly 80% of the sample aged 55 to 59 in the LFS is in the labor force. After the official retirement age of 60 is reached in the public sector, over 57% of those aged between 60 and 64, over 40% of those aged 65 to 69, and over 20% of those aged 70 to 75 remain in the labor force. The LFPR increased by around 6% for each of the age groups over 60 after the 1997 financial crisis.

Figure 1: Labor Force Participation Rate for Older People
(%)



This trend has been consistent with that found in developed countries. In the US, the LFP of older people increased significantly from 1996, from 17.5% in 1996 to 26.8% in 2016 (US Bureau of Labor Statistics). During the period 1990–2015, an average increase of 20% in the rate of LFP was found among older people (55–64) (Regina 2018). Geppert et al. (2019) found that the labor participation of older people in almost all OECD countries has increased in the last two decades, mainly because of rising life expectancy and improved education.

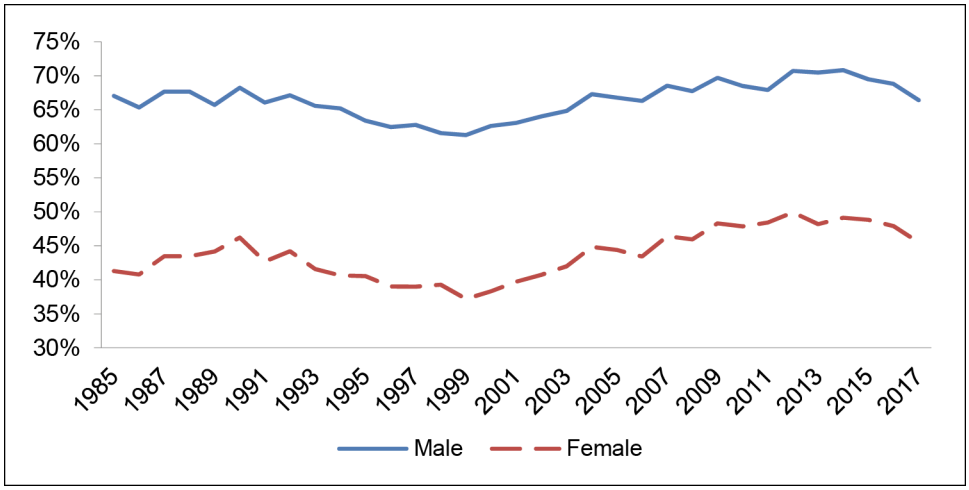
Figure 2: Labor Force Participation Rate of Older People by Education Levels
(%)



The LFP among older people in developing countries is usually higher than that of developed countries because of insufficient income security and social welfare in the former. In developing countries, especially low-income ones, the proportion of older people in the labor market is very high, as they make a significant contribution to their households, but their remuneration decreases as they age (Barrientos, Gorman, and Heslop 2003). Thailand exhibits a higher rate of LFP among those aged over 60 than certain other economies in Southeast Asia, including Singapore, Indonesia, and Brunei Darussalam (Arifin and Anata 2009).

Figure 2 shows that the primary level has the highest labor force participation among older persons. After 2000, there is a clear gap in LFP between each education level, which may suggest that less educated workers tend to work longer to support themselves. In Figure 3, we separate the LFP by gender. At over 20%, older male participants have a much higher participation rate than women.

Figure 3: Labor Force Participation Rate of Older People by Gender
(%)



5. DATA

In this study, we used two data sets, both from surveys conducted by the National Statistical Office (NSO) of Thailand. To mitigate the issue of seasonal migration of the workforce, only the third quarter of the year is used for analysis (Sussangkarn and Chalamwong 1996). The sample is restricted to individuals aged 55 to 75. We provide an overview of the trends of older workers' labor market behavior by using the LFS from 1985 to 2017. While the LFS contains many observations and a long time span for the basic analysis, it lacks comprehensive information relating to the labor supply of older people, such as pensions and health status.

Therefore, to estimate the determinants of older people's labor force participation, we use the 2005, 2006, 2007, 2010, and 2012 waves of the SES on individuals aged 55 to 75. They are nationally representative panel data, containing more information that would affect the labor supply of older people than merely the LFS. Besides information on individuals' health status, household type, and pension, the SES also asked about the sources of their income ("Did you receive money in cash or in kind from the following sources?"), including job compensation, monetary assistance from other people, and assistance from the government, which allows us to provide more insights into labor force participation.

Table 2 shows the summary statistics of the SES data. On average, 57% of the sample between the ages of 55 and 75 participated in the labor force. About 60.5% of the sample lives with their adult children. Most older people obtained only primary-level education (78.1%), and only 3.5% of those receive a pension. Health status is measured on a five-point scale. The descriptive details of the variables are shown in Table 3.

Table 2: Summary Statistics of SES 2005–2012

	Observations	Mean	Std	Min	Max
Labor force participation	10,406	0.577	0.494	0	1
Pension	10,406	0.035	0.183	0	1
Health	10,406	2.744	0.777	1	5
Co-residence	10,406	0.605	0.489	0	1
Age	10,406	63.538	6.075	55	75
Education levels:					
Primary level	10,406	0.781	0.413	0	1
Secondary level	10,406	0.091	0.287	0	1
University level	10,406	0.128	0.334	0	1
Gender	10,406	0.448	0.497	0	1
Married	10,406	0.725	0.447	0	1
Urban	10,406	0.355	0.479	0	1
Income source:					
Job compensation	10,406	0.002	0.050	0	1
Assistance from other people	10,406	0.348	0.476	0	1
Assistance from government	10,406	0.288	0.453	0	1
Income from house/land/asset lending	10,406	0.041	0.198	0	1
Income from interest/dividend/share/bond	10,406	0.090	0.287	0	1
Spouse information:					
Spouse pension	6,317	0.040	0.195	0	1
Spouse work	6,317	0.591	0.492	0	1

Table 3: Description of Variables

Variable	Description
LFP	a dummy that equals 1 if individual i participates in labor force at time t
Pension	a dummy that equals 1 if individual receives pension
Health	categorical variable that equals 1 if self-report health status is very good, 2 if good, 3 if fair, 4 if poor, 5 if very poor
Co-residence	a dummy that equals 1 if individual currently lives with their adult child
Agegroup	group dummies of 55 to 59, 60 to 64, 65 to 69, and 70 to 75
Edu	three education degree dummies, namely primary level, secondary level, and university level
Gender	a dummy that equals 1 if individual is male
Marital	a dummy that equals 1 if individual is married, 0 includes single, widowed, divorced, or separated
Area	a dummy that equals 1 if individual resides in urban area, 0 in rural area
Income_source	includes five dummies:
	equals 1 if individual receives job compensation
	equals 1 if individual receives assistance from other people
	equals 1 if individual receives assistance from government
	equals 1 if individual receives income from house/land/asset lending
	equals 1 if individual receives income from interest/dividend/share/bond
Spouse pension	a dummy that equals 1 if individual's spouse receives pension
Spouse work	a dummy that equals 1 if individual's spouse participates in labor force

6. DETERMINANTS OF OLDER PEOPLE'S LABOR FORCE PARTICIPATION

6.1 Methodology

The theory of older people's labor supply assumes that individuals maximize their utility subject to a budget constraint, which is related to their health, wealth, and other individual or household characteristics (Giles, Wang, and Cai 2011; Connelly, Maurer-Fazio, and Zhang 2014).

We examine the determinants of older people's labor force participation by employing both a standard logit model and a fixed-effect logit model. While the standard logit model provides some evidence on the determinants by controlling for older people's individual and household characteristics that reflect their preference in terms of labor force participation, unobserved heterogeneity, such as ability, may still bias the estimation results. Therefore, we also apply the fixed-effect model to account for additional endogenous bias.

With the binary outcome of labor force participation, we first employ the standard logit model to estimate the determinants of labor force participation for older people in the form of

$$\mathrm{LFP}_{it} = \beta_0 + \beta_1 \mathrm{Pension}_{it} + \beta_2 \mathrm{Health}_{it} + \beta_3 \mathrm{Co-residence}_{it} + \beta_4 \mathrm{Agegroup}_{it}$$

$$+\beta_5 \mathrm{Edu}_{it} + \beta_6 \mathrm{Gender}_{it} + \beta_7 \mathrm{Marital}_{it} + \beta_8 \mathrm{Area}_{it} + \beta_9 \mathrm{Income\_source}_{it} + \varepsilon_{it} \quad (1)$$

where $\mathrm{LFP}_{\mathrm{it}}$ is an indicator that equals 1 if individual i participates in the labor force in period t, and 0 otherwise. The model accounts for the availability of pensions, individual health status, co-residence status or not, education levels, gender, marital status, residence areas, and sources of income. We expect that without pensions, declining health and aging are negatively correlated with older people's labor force participation. We also expect that co-residence status and residence areas will affect their decision to work.

Because most older workers are in the informal sector, which does not report wages, we do not include wages in the regression. However, we include education levels and income sources as proxies for their wealth as suggested by Giles, Wang, and Cai (2011); education levels reflect the returns and accumulated wealth of elderly persons.

To correct for unobserved heterogeneity, we further employ the fixed-effect logit model (FE-logit). The probability that older people choose to work is as follows:

$$\Pr\left(\mathrm{LFP}_{\mathrm{it}} = 1 | \mathrm{x}_{\mathrm{it}}, \gamma, \alpha_{\mathrm{i}}\right) = \Lambda(\alpha_{\mathrm{i}} + \mathrm{x}_{\mathrm{it}}\gamma) \quad (2)$$

where x_{it} is a set of covariates, which is the same as in Equation (1). α_{i} is the individual specific effects, the unobserved heterogeneity in individual preferences for labor force participation, which is allowed to be correlated with the regressors x_{it}. $\Lambda(\theta) = \exp(\theta)/[1 + \exp(\theta)]$. However, we have lost many observations under fixed effects.[2] Furthermore, as the LFP of older people may be affected by the LFP or

[2] The random-effect (RE-logit) results taking account of unobserved heterogeneity that assume the regressors are completely exogenous, α_i is distributed independently of x_{it} (Verme, Barry, and Guennouni 2016), are also presented in the results. The Hausman test shows strong rejection of the null hypothesis that random effect provides consistent estimates.

pension of their spouse, additional controls for spouse pension and spouse labor force participation with loss of observations are added as a robustness check.

6.2 Results

6.2.1 Basic Analysis

Table 4 presents the basic results of the standard logit model, fixed-effect logit model, and random-effect logit model. The magnitudes of the coefficients under each model are quite different. After correction for potential endogeneity from the standard model, the results show a smaller magnitude under a fixed-effect model, indicating an upward bias. We find strong evidence that age growth, pension, health status, marital status, job compensation, and assistance from other people have a significant impact on the LFP of older people, with the findings being robust across the three models.

Pensions and worse health status have a negative influence on LFP. After we control for age, education, and other related individual characteristics, older people are 36.4% less likely to participate in the labor force if they receive pensions, and those with very poor health are 26.7% less likely to participate in the labor force than those with very good health under the fixed-effect model. The negative effect of co-residence on LFP is not statistically significant under the fixed-effect model. Both job compensation and assistance from other people have been shown to have a significantly negative impact on LFP: job compensation reduces the probability of LFP by 42.6%, and assistance from other people reduces it by 7.9%.

In Thailand, informal workers have until recently received much less access to social security than formal and government employees. Those without pensions usually occupy a lower status with less education and wealth, and they tend to remain in the labor force into old age to support themselves. Similar results have been found in studies in developing countries to varying extents. For example, de Carvalho Filho (2008) found that old-age benefits increased the retirement rate by 38% in Brazil, while Bloom et al. (2008), using cross-country data, suggested that pensions were associated with a 5% reduction in LFP.

Many of the informal workers are in the agricultural industry, which requires brawn (Mu and van de Walle 2011; Rendall 2013). Health status acts as a leading factor in older people's decision to work. In line with previous empirical studies in both developed and developing countries, unhealthy people leave the labor force earlier than healthy people (e.g., McGarry 2004; Kalwji and Vermeulen 2008). A decreased level of work strongly associated with health and age growth is also found in Thailand (Knodel et al. 2015). Keeratipongpaiboon (2012) suggested that health plays a significant role in older people's choice to work, with healthy individuals being 26.9% more likely to work than unhealthy ones.

We next run a regression by adding controls for the spouse's pension and spouse's LFP. For those with spouses, pensions and health have a smaller negative effect than for the overall sample, but spouses' pensions and work do not show a significant impact on LFP under the fixed-effect model.

Table 4: Determinants of Labor Force Participation of Older People (Marginal Effects)

	Overall			With Spouse Control	
	Logit	FE Logit	RE Logit	FE Logit	RE Logit
Pension	–0.410***	–0.364***	–3.519***	–0.170**	–2.662***
	(0.027)	(0.099)	(0.307)	(0.070)	(0.310)
Health status (Base group: very good)					
Good	–0.0775***	–0.129***	–0.657***	–0.0673**	–0.564***
	(0.020)	(0.039)	(0.191)	(0.029)	(0.216)
Fair	–0.124***	–0.160***	–0.929***	–0.0815***	–0.741***
	(0.020)	(0.037)	(0.188)	(0.028)	(0.211)
Poor	–0.262***	–0.238***	–1.832***	–0.135***	–1.689***
	(0.022)	(0.044)	(0.210)	(0.031)	(0.233)
Very poor	–0.358***	–0.267***	–2.497***	–0.124***	–2.061***
	(0.052)	(0.069)	(0.467)	(0.044)	(0.460)
Co-residence with adult children	–0.124***	–0.0303	–0.910***	–0.0249	–0.698***
	(0.009)	(0.027)	(0.104)	(0.020)	(0.102)
Age (Base group 55–59):					
Age 60–64	–0.130***	–0.0820***	–1.200***	–0.0520**	–0.633***
	(0.012)	(0.028)	(0.112)	(0.023)	(0.121)
Age 65–69	–0.281***	–0.139***	–2.408***	–0.0863***	–1.509***
	(0.013)	(0.039)	(0.134)	(0.031)	(0.137)
Age 70–75	–0.420***	–0.185***	–3.516***	–0.101***	–2.100***
	(0.013)	(0.051)	(0.155)	(0.036)	(0.156)
Education (Base group primary level):					
Secondary level	–0.0605***	–0.0691	–0.471***	–0.0244	–0.478***
	(0.016)	(0.042)	(0.177)	(0.028)	(0.169)
University level	–0.0383***	–0.0107	–0.305**	0.0136	–0.350**
	(0.013)	(0.034)	(0.140)	(0.029)	(0.139)
Gender	0.186***	0.142	1.837***	–0.989	1.603***
	(0.009)	(0.247)	(0.125)	(42.820)	(0.109)
Married	0.0687***	0.110**	0.802***	0.0393	0.167
	(0.010)	(0.048)	(0.120)	(0.042)	(0.139)
Urban	–0.0944***	–0.0244	–0.803***	0.00458	–0.429***
	(0.009)	(0.044)	(0.112)	(0.027)	(0.102)
Source of income:					
Job compensation	–0.317***	–0.426**	–2.757***	–0.0815	–2.734***
	(0.094)	(0.170)	(0.818)	(0.109)	(1.061)
Assistance from other people	–0.0896***	–0.0794***	–0.688***	–0.0402***	–0.579***
	(0.009)	(0.021)	(0.087)	(0.015)	(0.094)
Assistance from government	0.0141	–0.101***	–0.00692	–0.0469***	0.146
	(0.010)	(0.026)	(0.085)	(0.017)	(0.097)
House/land/asset lending	–0.103***	–0.0175	–0.538***	–0.0109	–0.562***
	(0.021)	(0.038)	(0.195)	(0.028)	(0.217)
Interest/dividend/share/bond	0.0735***	0.0262	0.496***	0.00474	0.385**
	(0.016)	(0.029)	(0.145)	(0.021)	(0.155)
Spouse pension	–	–	–	0.016	0.143
	–	–	–	(0.038)	(0.266)
Spouse work	–	–	–	–0.00916	2.102***
	–	–	–	(0.010)	(0.089)
Observations	10,406	3,444	10,406	1,851	6,317

6.2.2 Subgroup Analysis

While the marginal effects from Table 4 reflect the effect of each determinant of LFP, it is possible that the results are driven by the composition of the sample that has not been adequately controlled in the estimation. Therefore, we separated the analysis of LFP behavior by subgroups, including gender, residence area, and age and lower education level. Table 5 shows the results for men and women. Pension and health status negatively affected women's LFP more than men's. Under the fixed-effect logit model, men who are eligible for pensions are 21.5% less likely to participate in the labor force than those who are not, while women with pensions are 35.3% less likely to do so than those without pensions.

Under the traditional norm, women are expected to take care of household chores and child care, suggesting that they are more likely to leave the labor market than men (Johnson and LoSasso 2006; Maurer-Fazio et al. 2011). As shown in Figure 3, more older men participate in the labor force than older women, and the gender gap in LFP is stable over time. According to the NSO (2005), there is a large gender gap in the share of those who engage in household work among those over 60: 21.8% of women and only 1.9% of men.

Table 6 shows the results for rural and urban areas. In rural areas, older people usually earn less over their lifetimes and have less access to pensions than those in urban areas (Ravallion and Chen 2007). Health status has a greater impact on older people in rural areas than in urban areas, as rural work may require more physical skills than urban work. In Thailand, the percentage of working elderly persons is much higher in rural than in urban areas regardless of year, indicating a higher work tendency among older people in agriculture (Knodel et al. 2015). Pension status affects urban residents more than rural residents, suggesting that even though older people receive pensions, those in urban areas are more likely to leave the labor market than those in rural areas.

Interestingly, the significantly negative impact of co-residence is evident in the rural sample but not in the urban area. Similarly, Connelly, Maurer-Fazio, and Zhang (2014) found that co-residence has a large and significantly negative impact on the LFP of older people in Chinese rural areas but not in urban areas. The main source of income for older people in Thailand is support from their working children, especially for poor and informal workers without social security. Those who live with their children usually have a lower likelihood of participating in the labor force as they may provide child care or share housework with their children. Monetary transfers from adult children to their parents are partly given in exchange for child care services (Park 2014). Liao and Paweenawat (2020) suggested that intergenerational co-residence increased the maternal labor supply because of grandparents' assistance in child care in Thailand. The lack of social security in rural areas also explains why older people depend more on their children and are less likely to leave the labor market with greater financial needs. In addition, the health status of older people and co-residence with adult children may be correlated. Poor health may be a good indicator that may increase the probability of co-residence and lower the LFP of older people. According to Knodel and Chayovan (2011), Thai parents who are not in good health much prefer to receive care from, and live with, their children.

Table 5: Comparison of Determinants of Labor Force Participation of Older People by Gender (Marginal Effects)

	Men		Women	
	FE logit	**RE logit**	**FE logit**	**RE logit**
Pension	–0.215**	–3.983***	–0.353**	–2.596***
	(0.100)	(0.402)	(0.143)	(0.566)
Health status (Base group: very good)				
Good	–0.0449	–0.349	–0.156***	–0.889***
	(0.037)	(0.285)	(0.050)	(0.263)
Fair	–0.0740**	–0.794***	–0.177***	–1.042***
	(0.037)	(0.281)	(0.048)	(0.259)
Poor	–0.125***	–1.782***	–0.244***	–1.916***
	(0.044)	(0.325)	(0.046)	(0.283)
Very poor	–0.157***	–3.214***	–0.231***	–1.956***
	(0.058)	(0.762)	(0.086)	(0.604)
Co-residence with adult children	–0.0106	–0.538***	–0.0425	–1.183***
	(0.027)	(0.178)	(0.030)	(0.130)
Age (Base group 55–59):				
Age 60–64	–0.184***	–1.974***	–0.0293	–0.908***
	(0.059)	(0.223)	(0.030)	(0.132)
Age 65–69	–0.199***	–3.381***	–0.0858**	–1.997***
	(0.066)	(0.255)	(0.041)	(0.163)
Age 70–75	–0.204***	–4.405***	–0.140***	–3.109***
	(0.071)	(0.282)	(0.049)	(0.193)
Education (Base group primary level):				
Secondary level	–0.0392	–0.41	–0.0623	–0.628**
	(0.036)	(0.259)	(0.051)	(0.263)
University level	0.0151	–0.542**	–0.025	–0.234
	(0.046)	(0.262)	(0.035)	(0.165)
Married	0.0703	1.309***	0.0925*	0.642***
	(0.061)	(0.247)	(0.052)	(0.135)
Urban	–0.066	–1.019***	–0.0102	–0.700***
	(0.050)	(0.194)	(0.048)	(0.140)
Source of income:				
Job compensation	–1.772	–6.059***	0.0169	–0.00296
	(69.630)	(1.314)	(0.166)	(0.966)
Assistance from other people	–0.0737**	–0.888***	–0.0548***	–0.611***
	(0.029)	(0.154)	(0.020)	(0.107)
Assistance from government	–0.0943**	–0.151	–0.0730***	0.0299
	(0.040)	(0.143)	(0.026)	(0.107)
House/land/asset lending	0.0142	–0.314	–0.0655	–0.698***
	(0.034)	(0.304)	(0.051)	(0.261)
Interest/dividend/share/bond	–0.0262	0.273	0.0564	0.630***
	(0.030)	(0.233)	(0.036)	(0.188)
Observations	1,298	4,660	2,140	5,746

Table 7: Determinants of Labor Force Participation of Older Workers over Age 60 and Lower Education (Marginal Effects)

	Over 60		Over 60 and Primary Level	
	FE Logit	RE Logit	FE Logit	RE Logit
Pension	–0.223*	–3.295***	0.11	–1.771***
	(0.121)	(0.364)	(0.185)	(0.664)
Health status (Base group: very good)				
Good	–0.135***	–0.705***	–0.104*	–0.664**
	(0.051)	(0.227)	(0.056)	(0.262)
Fair	–0.157***	–1.026***	–0.153***	–1.089***
	(0.054)	(0.224)	(0.058)	(0.258)
Poor	–0.214***	–1.912***	–0.202***	–2.012***
	(0.069)	(0.248)	(0.069)	(0.285)
Very poor	–0.289***	–2.555***	–0.254**	–2.423***
	(0.111)	(0.547)	(0.105)	(0.593)
Co-residence with adult children	–0.0683*	–1.070***	–0.0702*	–1.158***
	(0.036)	(0.126)	(0.040)	(0.142)
Gender	0.0248	1.502***	0.0503	1.518***
	(0.280)	(0.152)	(0.290)	(0.168)
Married	0.093	1.017***	0.0674	1.124***
	(0.058)	(0.143)	(0.060)	(0.160)
Source of income:				
Job compensation	–0.188	–0.988	–0.266	–1.318
	(0.184)	(0.941)	(0.272)	(1.317)
Assistance from other people	–0.0844**	–0.770***	–0.109***	–0.934***
	(0.034)	(0.103)	(0.042)	(0.116)
Assistance from government	–0.134***	–0.471***	–0.138***	–0.444***
	(0.048)	(0.092)	(0.049)	(0.104)
House/land/asset lending	0.00275	–0.471**	0.0284	–0.451*
	(0.044)	(0.230)	(0.051)	(0.256)
Interest/dividend/share/bond	0.02	0.456***	0.0538	0.675***
	(0.035)	(0.176)	(0.047)	(0.212)
Observations	2,347	6,965	1,757	5,446

Given that the mandatory retirement age for workers in the public sector is 60 in Thailand (Labor Protection Act), Table 7 provides the results for people aged over 60 and those who have primary-level education. Those who only have primary education are more likely to be poor and participate in the labor force to earn a living. Similarly, as suggested by the United Nations Population Fund (UNFPA 2017), poorer older Thai people aged over 60 are more likely to work than wealthier ones, indicating that those elderly persons are more likely to remain in the labor force out of obligation than out of choice.

The results show that the impact of pensions is negatively significant for those aged over 60 but not for the primary level. Not only does a very small proportion of older people of low economic status receive pensions, but even if they do, it may still not be enough to live off. Therefore, their labor force decisions have not been affected by pensions but rather by their health status and co-residence status, which may indicate the inadequacy of government support for the poor. According to SOPT (2014), older people who reported the government allowance as their primary source of income were more likely to say that their income was inadequate, while those who reported

employment or their children as their primary sources of income were much less likely to feel that their income was inadequate. Both of the samples show that co-residence reduces the LFP of older people, whereas lower education levels have a stronger effect. Those aged over 60 and with primary-level education co-residing with adult children are 7% less likely to work.

7. CONCLUSION

In this paper, we focus on the labor supply of older people in Thailand and the impact of pensions, health, and co-residence status on their labor force participation using LFS and SES data. We first present the trends of the labor market behavior of older people by using the LFS from 1985 to 2017. Then, we rely on SES panel data from the period 2005 to 2012 to estimate the determinants of older people's labor force participation. Our estimates imply that older people with pensions and worse health status are less likely to work. Women's LFP is more affected by pension and health status than men's. Pension status has less impact on those living in rural areas than on those living in urban areas, while it is not significant for those with lower education. The results underscore that older people of lower economic status, especially those in the informal sector, may suffer from inadequate government support, which makes them remain in the labor market to earn a living. Furthermore, older people's LFP is negatively affected by co-residence, which suggests that the lack of public support and other social assistance tends to lead them to depend more on their children.

Thailand, as well as other UN members, adopted the Sustainable Development Goals (SDGs) in 2015, which include among their objectives improving the well-being of old people. While notable progress has been made, further improvement is still required. Compared to developed countries, where most workers are covered by social security, including pensions, health insurance, and other benefits, in developing countries, social security usually covers workers in the formal sector with a large proportion of the labor force uncovered (Giles, Wang, and Cai 2011). In developed countries, over 90% of the labor force has access to the pension system, in which the provision of voluntary and mandatory pension programs is well structured and funded (Dethier 2007). In OECD countries, different methods have been applied to ensure that older people can satisfy a minimal living standard. For example, the UK and Australia use a means-tested public scheme, while the US has an earnings-related scheme (Dethier 2007). Because of various obstacles in developing countries, such as fiscal and structural constraints, it is difficult to apply these models from developed countries directly to developing ones.

On the basis of our analysis in this study, we highlight several issues related to employment among Thailand's aging population. First, our results suggest a strong association between pensions and the labor supply of elderly persons. A high share of older workers in rural areas is likely to show the "ceaseless toil" of rural older people (Davis-Friedman 1991), which raises concern about the insufficiency of social pensions for older people, especially in the informal sector and rural areas.

The Thai government has taken steps to help increase older people's income in recent years, such as through the Older Persons Act (2003), the implementation of the Old Age Allowance (2009), and the National Savings Fund (2015). However, except for the universal program, all other pension programs available for informal workers are on a voluntary basis. The benefit level of allowances is low and hardly has a significant impact on older workers (Paweenawat and Vechbanyongratana 2015). Similarly, the voluntary social program in pillar three remains undersubscribed (NSF 2017). In fact, the majority of older people in the informal sector still cannot afford to join those

programs. Until the end of 2017, the National Savings Fund had only approximately 546,000 members (NSF 2017). Although it is too early to assess the impact of the program, preliminary evidence in Thailand and past evidence from other countries with similar programs have shown that it primarily helped wealthier persons in the informal sector (World Bank 2012).

The government should give more attention to increasing its pension coverage and benefits to address older people's income insecurity. The universal allowance for older people should relate to the national subsistence level and the poverty line. As suggested by Knodel and Teerawichitchainan (2017), "civil social networks and community-based organizations can support the expansion of the National Savings Fund." The implementation of voluntary social programs should be facilitated, which requires expanded effort among workers in the informal sector. The government needs to provide more incentives to encourage working-age people to participate in voluntary programs, in which, through savings, they can obtain a higher income as they age. In addition to social programs, given the high poverty rate among the elderly (World Bank 2012), supplementing older people's income through public programs is encouraged. For example, it has been suggested that study programs and/or community activities should be made available to improve their skills and raise their income for sustainable development.

REFERENCES

Abeliansky, A.L., E. Algur, D.E. Bloom, and K. Prettner. 2020. The Future of Work: Meeting the Global Challenges of Demographic Change and Automation. International Labour Review, 159(3), 285–306.

Adhikari, R., K. Soonthorndhada, and F. Haseen. 2011. Labor Force Participation in Later Life: Evidence from a Cross-sectional Study in Thailand. BMC Geriatrics 11, Article number: 15. https://doi.org/10.1186/1471-2318-11-15.

Arifin, E.N., and A. Anata. 2009. Older People in Southeast Asia: An Emerging Asset. Singapore: Institute of Southeast Asian Studies. Edited by Evi Nurvidya Arifin, Aris Ananta.

Barrientos, A., M. Gorman, and A. Heslop. 2003. Old Age Poverty in Developing Countries Contributions and Dependence in Later Life. World Development, 31 (3), 555–570.

Blau, D., and D. Gilleskie. 2001. Retiree Health Insurance and the Labor Force Behavior of Older Men in the 1990s. Review of Economics and Statistics, 83(1), 64–80.

Blau, D.M., and D.B. Gilleskie. 2006. Health Insurance and Retirement of Married Couples. Journal of Applied Econometrics, 21, 935–953.

Bloom, D.E., D. Canning, G. Fink, and J. E. Finlay. 2008. Demographic Change, Institutional Settings, and Labor Supply. PGDA Working Paper # 4208. Harvard Center for Population and Development Studies.

Blundell, R., and T. MaCurdy. 1999. Labor Supply: A Review of Alternative Approaches. In Handbook of Labor Economics, Volume 3A, Edited by Orley Ashenfelter and David Card. Amsterdam: North Holland.

Bound, J., T. Stinebrickner, and T. Waidmann. 2010. Health, Economic Resources and the Work Decisions of Older Men. Journal of Econometrics, 156(1), 106–129.

Brown, J., C. Coile, and S. Weisbenner. 2010. The Effect of Inheritance Receipt on Retirement. Review of Economics and Statistics92(2), 425–434.

Connelly, R., M. Maurer-Fazio, and D. Zhang. 2014. The Role of Coresidency with Adult Children in the Labor Force Participation Decisions of Older Men and Women in China. IZA Discussion Papers 8068.

Coronado, J.L., and M. Perozek. 2003. Wealth Effect and the Consumption of Leisure: Retirement Decisions During the Stock Market Boom of the 1990s. Discussion series no. 2003-20, Board of Governors of the Federal Reserve System, Finance and Economics.

Davis-Friedman, D. 1991. Long Lives: Chinese Elderly and the Communist Revolution, Expanded edition, Stanford, CA: Stanford University Press (1991).

de Carvalho Filho, I.E., 2008. Old-age Benefits and Retirement Decisions of Rural Elderly in Brazil. Journal of Development Economics, 86(1), 129–146.

del Popolo, F., 2001. Socio-demographic Characteristics and Socio-economic Conditions of Old People in Latin America. Serie Population and Development 16. United Nation Publication. Santiago: CELADE.

Dethier, J., 2007. Social Security: What Can Developing Countries Learn from Developed Countries? 2020 Vision Briefs BB20 Special Edition, International Food Policy Research Institute (IFPRI).

Engels, B., J. Geyer, and P. Haan. 2017. Pension Incentives and Early Retirement. Labour Economics, 47, 216–231.

French, E., and J.B. Jones. 2011. The Effects of Health Insurance and Self-Insurance on Retirement Behavior. Econometrica, 79(3), 693–732.

Fujioka, R., and S. Thangphet. 2009. Decent Work for Older people in Thailand. ILO Asia-Pacific Working Paper Series.

Geppert, C., Y. Guillemette, H. Morgavi, and D. Turner. 2019. Labour Supply of Older People in Advanced Economies: The Impact of Changes to Statutory Retirement Ages. Organisation for Economic Co-operation and Development. OECD Economics Department Working Paper No. 1554.

Giles, J., D. Wang, and W. Cai. 2011. The Labor Supply and Retirement Behavior of China's Older Workers and Elderly in Comparative Perspective. World Bank Policy Research Working Paper No. 5853. Available at SSRN: https://ssrn.com/abstract=1948991.

Gruber, J., and D. Wise, eds. 1999. Social Security and Retirement Around the World, University of Chicago Press: Chicago.

Haider, S., and Loughran, D., 2001. Elderly Labor Supply: Work or Play? SSRN Electronic Journal. DOI: 10.2139/ssrn.285981.

Hempornwisan, W., and P. Akarachanon. 2014. Creating Financial Stability After Retirement for Thais. Research Division, The Securities and Exchange Commission. September (in Thai).

Imbens, G., D. Rubin, and B. Saerdote. 2001. Estimating the Effect of Unearned Income on Labor Earnings, Savings, and Consumption: Evidence from a Survey of Lottery Players. American Economic Review, 91(4), 778–794.

Institute of Population and Social Research, 2014. Population Gazette, Mahidol University.

International Labour Organization, ILO, 2020. Covid-19 employment and labour market in Thailand. June 2020.

———. 2019. Work for a brighter future. Online source: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---cabinet/docum ents/publication/wcms_662410.pdf.

Johnson, R., and A. LoSasso. 2006. The Impact of Elder Care of Women's Labor Supply. Economic Inquiry, 43(3), 195–210.

Kalwji, A., and F. Vermeulen. 2008. Health and Labor Force Participation of Older People in Europe: What Do Objective Health Indicators Add to the Analysis? Health Economics,17(5), 619–638.

Kaushal, N. 2014. How Public Pension Affects Elderly Labor Supply and Well-being: Evidence from India. World Development, 56, 214–225.

Keeratipongpaiboon, T. 2012. Population Ageing: Changes in Household Composition and Economic Behaviour in Thailand. PhD Thesis. SOAS, University of London.

Knodel, J.E. and N. Chayovan. 2011. Intergenerational Family Care for and by Older People in Thailand. PSC Research Report No. 11-732.

Knodel, J., and B.P. Teerawichitchainan. 2017. Family Support for Older people in Thailand: Challenges and Opportunities. Research Collection School of Social Sciences. Paper 2439.

Knodel, J., B.P. Teerawichitchainan, V. Prachuabmoh, and W. Pothisiri. 2015. The Situation of Thailand's Older Population: An Update Based on the 2014 Survey of Older Persons in Thailand. Research Collection School of Social Sciences, Paper 1948. Available at: https://ink.library.smu.edu.sg/soss_research/1948.

Kostol, A.R., and M. Mogstad. 2014. How Financial Incentives Induce Disability Insurance Recipients to Return to Work. American Economic Review, 104(2), 624– 55.

Krueger, A.B., and J. Pischke. 1992. The Effect of Social Security on Labor Supply: A Cohort Analysis of the Notch Generation. Journal of Labor Economics, 10(4), 412–437.

Kühn, S., S. Milasi, and S. Yoon. 2018. Population Ageing and Future Labour Market Challenges. World Employment and Social Outlook, 2018(1): 45–50.

Liao, L., and S. Paweenawat. 2018. Labor Supply of Married Women in Thailand: 1985–2016. PIER Discussion Papers 88, Puey Ungphakorn Institute for Economic Research, revised Jun 2018.

———. 2020. Alternative Boomerang Kids, Intergenerational Co-Residence, and Maternal Labor Supply. Review of Economics of the Household (2020). https://doi.org/10.1007/s11150-020-09524-9.

McGarry, K. 2004. Health and Retirement: Do Changes in Health Affect Retirement Expectations? Journal of Human Resources, 39(3), 624–648.

Maestas, N. 2010. Back to Work: Expectations and Realizations of Work after Retirement. Journal of Human Resource, 45(3), 718–748.

Manoli, D.S., and A. Weber. 2016. The Effects of the Early Retirement Age on Retirement. Decisions. NBER Working Paper No. 22561.

Maurer-Fazio, M., R. Connelly, C. Lan, and L. Tang. 2011. Childcare, Eldercare, and Labor Force Participation of Urban Women in China: 1982–2000. Journal of Human Resources 46(2), Spring, 261–294.

Mu, R., and D. van de Walle. 2011. Left Behind to Farm? Women's Labor Reallocation in Rural China. Labour Economics, 18, S83–S97.

National Statistical Office 2007. The survey of the older persons in Thailand.

National Economic and Social Development, 2013. Population Projections for Thailand 2010–2040. Bangkok.

National Savings Fund, 2015. https://www.nsf.or.th/.

———. 2017. Current Status of the Fund. Source: https://www.nsf.or.th/index.php/2016-02-10-11-29-25/2016-05-24-08-12-48.

National Statistical Office, 2005. Report of the Labor Force Survey. Quarter 3: June–August 2005. Bangkok: National Statistical Office.

NSO 2003. Report on the 2002 Survey of Elderly in Thailand. Bangkok: National Statistical Office (in Thai).

Park, C. 2014. Why Do children Transfer to Their Parents? Evidence from South Korea. Review of Economics of the Household, 12, 461–485. https://doi. org/10.1007/ s11150-012-9173-6.

Paweenawat, S., and J. Vechbanyongratana. 2015. The Impact of a Universal Allowance for Older people on Labor Force Participation: The Case of Thailand. Population Review, 54 (1), 53–68.

Ratanabanchuen, R. 2019. The Pension System in Thailand. Nomura Journal of Asian Capital Market, 3(2), 34–39.

Ravallion, M., and S. Chen. 2007. China's (Uneven) Progress Against Poverty. Journal of Development Economics, 82(1), 1–42.

Regina, K. 2018. Retention and Reintegration of Older Workers into the Labour Market: What Works Best? Erwerbsverlauf und sozialer Schutz in Europa, 371–389.

Rendall, M. 2013. Structural Change in Developing Countries: Has it Decreased Gender Inequality? World Development. 45, 1–16.

Sadangharn, P. 2017. An Elderly Employment Model for the Thai Automotive Industry. The South East Asian Journal of Management, 11(2), 103–119.

Schmidt, L., and P. Sevak. 2008. Taxes, Wages, and the Labor Supply of Old Americans. Research on Aging, 31 (2), 207–232.

Survey of Older Persons in Thailand, SOPT 2007. http://www.nso.go.th/sites /2014en/Pages/survey/Social/Demographic,%20Population%20and%20 Housing/The-Survey-Of-Elderly-In-Thailand.aspx.

Survey of Older Persons in Thailand, SOPT 2014. http://www.nso.go.th/sites /2014en/Pages/survey/Social/Demographic,%20Population%20and%20 Housing/The-Survey-Of-Elderly-In-Thailand.aspx.

Sussangkarn, C., and Y. Chalamwong. 1996. Thailand Development Strategies and Their Impacts on Labour Markets and Migration. In Development Strategy, Employment, and Migration, edited by D. O'Connor and L. Farsakh. Paris: OECD.

Tankulrat, S. 2015. Lonesome Elderly's Life Saved by 5,000 Baht? *Post Today*. 1 August 2015. A4. (in Thai).

United Nations, 2013. Department of Economic and Social Affairs, Population Division. World Population Ageing 2013. ST/ESA/SER.A/348

———. 2015. World Population Prospects: The 2015 Revision, DVD Edition. United Nations Population Fund (UNFPA), 2017. Old Age Income Security in Thailand: Work, Family and Social Protection. HelpAge International.

Vere, J. P. 2011. Social Security and Elderly Labor Supply: Evidence from the Health and Retirement Survey. Labour Economics, 18(5), 676–86.

Verme, P., A.G. Barry, and J. Guennouni. 2016. Female Labor Participation in the Arab World: Evidence from Panel Data in Morocco. LABOUR, 30(3), 258–284.

Wattanasaovaluk, K. 2020. The Economic Significance of Work Experience for Elderly Employment in Thailand. Journal of Population and Social Studies, 29, 2021. 82–99. http://doi.org/10.25133/JPSSv292021.006.

World Bank. 2012. Reducing Elderly Poverty in Thailand: The Role of Thailand's Pension and Social Assistance Programs (English). Washington, DC: World Bank Group. http://documents.worldbank.org/curated/en/949741468120871479/Reducing-elderly-poverty-in-Thailand-the-role-of-Thailands-pension-and-social-assistance-programs.

———. 1994. Averting the Old Age Crisis: Policies to Protect the Old and Promote Growth (English). Washington, DC; World Bank. http://documents.worldbank.org/curated/en/973571468174557899/Averting-the-old-age-crisis-policies-to-protect-the-old-and-promote-growth.

———. 2020. Thailand Economic Monitor June 2020: Thailand in the Time of Covid-19 (English). Washington, DC: World Bank Group. Online source: http://documents.worldbank.org/curated/en/456171593190431246/Thailand-Economic-Monitor-Thailand-in-the-Time-of-COVID-19.

World Population Review. 2020. https://worldpopulationreview.com/.