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Risk Factors of Income Inadequacy among Thai Elderly: A National Cross-Sectional Study for 2007 and 2011

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Abstract

Thailand's population is aging rapidly. As of 2011, statistics have shown that there has been a constant increase in the percentage of the population aged 60 and older. This study evaluates the causal issues of income deficiency among the elderly in Thailand. The timeline for the study includes two national representative surveys of elderly people, one in 2007 and another in 2011, with double-stage sampling techniques being utilized. The sample is comprised of 30,427 and 34,173 participants in 2011 and 2007, respectively, all aged 60 years and older. SPSS 18 was employed for logistic regression and cross-tabulation analysis. A general decrease in income deficiency was observed in 2011 (38.6%) compared to 2007 (41.9%). The northern region exhibited a higher prevalence of income insufficiency compared to the southern region. Regardless of the prevailing benefit policies for the elderly, the current results demonstrate the need for an augmented government policy that supports elderly individuals facing income deficiency.

Keywords: elderly, income deficiency, poverty, risk factor, Thai

1. Introduction

Previous studies have shown that there are high instances of vulnerability and poverty in the elderly population in developing countries, which face the dual challenges of eliminating poverty and managing the ensuing difficulties encountered by the aging population. In most countries, poverty is more prevalent among the elderly population (Barrientos, 2006; Gasparini, 2007), particularly for individuals who do not receive social security pension benefits. Social security programs for the elderly provide monetary transfers in the form of resources and health services. Non-contributory pensions have been established by several countries, such as Nepal, Chile, Zambia, Bangladesh, and Brazil (Johnson & Williamson, 2008), and these pensions are funded by the general tax income. Various studies have found that monetary transfer programs for the elderly population decrease poverty and inequality (Devereux, 2002; Smeeding & Sandstrom, 2005).

The elderly population of Thailand faces significant economic, social and public health issues, which generates high health care and pension expenses, a decreasing workforce (R. Adhikari, Soonthorndhada, & Haseen, 2011; National Statistical Office, 2013), a need for social security reforms (Suwanrada, 2009) and the deficiency of an active workforce with the capacity to provide for the elderly population (Ramesh Adhikari, Jampaklay, & Chamratrithirong, 2011).

In several studies, income is viewed as a type of economic security for individuals. For instance, from the OECD perspective (Caminada & Goudswaard, 2009), economic security allows for a stable stream of income to pay for expenses and attain a satisfactory standard of living. However, when an individual's income is inconsistent, their standard of living is often poor (Choiejit, 2011; Deaton & Paxson, 1998; Ma & McGhee, 2013). The occurrence of income insufficiency and its determinants among the elderly population must be understood so that targeted activities can be developed and implemented. In this study, the occurrence of and factors related to income insufficiency among the elderly population of Thailand were examined for the 2007-2011 period.

2. Method

2.1 Data Source and Sampling

During the survey, data were obtained from the cross-sectional Survey of Older Persons performed by the National Statistical Office (NSO) of Thailand in 2007 and 2011. A method of stratified multi-stage sampling was used. Approximately 5,973 villages and 5,796 blocks participated in the survey, yielding household ratios of 79,542 and 79,560 in 2007 and 2011, respectively. Elderly respondents—those aged 60 and older—participated in the interview, with 30,427 and 34,173 interviews conducted in 2007 and 2011, respectively. The survey covered major health concerns, socio-economic status, and demographic indicators among the elderly population in Thailand. The probability-weighting method was used, and the study was approved by the Ethics Review Committee for Research Involving Human Research Subjects of the Health Sciences Group at Chulalongkorn University (ECCU). The study was assigned the reference number 022/58.

2.2 Data Management

In managing the sampled data, an evaluation was performed and particular variables were selected, with the perception of income insufficiency being used as the dependent variable. In addition, the perception of income insufficiency was the definition of the participants' opinions concerning their beliefs about the sufficiency of their total income from all sources. As a result, a code of 0 was assigned to participants who thought that they have sufficient income, and all other participants were assigned a code of 1.

A literature review (Stoller & Stoller, 2003; Thanakwang & Soonthorndhada, 2008) indicated that independent variables included the following socio-economic elements: gender, which was coded as female = 1 and male = 0; continuous age approximation; education, which was coded as dummy variables; and literacy level, which was coded as illiterate = 1 and literate = 0. The codes assigned to marital status included the following dummy variables: never married = 2, married but not living with spouse = 1, married and living with spouse = 0. "Never married" was used as the reference group. The living arrangement variables were coded as follows: living with another person = 1, and living alone = 0. A respondent who was the head of the household was assigned a value of 1, and those who were not the head of the household was assigned a value of 0. Additionally, geographic elements were assessed according to residential area (rural = 1, urban = 0) along with the specific region (South = 5, North East = 4, North = 3, Central = 2, and Bangkok = 1, with South as the reference group).

The health status elements comprised self-rated health, the presence of at least one chronic disease and the presence of at least one limitation in performing daily chores. The self-rated health assessment was coded as follows: very poor = 5, poor = 4, fair = 3, good = 2, excellent = 1 (excellent was the reference group). Respondents who had at least one of five chronic diseases—diabetes, hypertension, heart disease, cancer or stroke—were coded as 1, whereas the absence of any of these five chronic diseases was coded as 0.

An assessment of disabilities among the respondents required the coding of at least one physical disability if they reported the inability to execute one of the eight daily activities. These activities included eating, dressing, squatting, lifting 5 kg, walking 200-300 meters, climbing 2-3 stair steps, using bus/boat transportation and counting money. Individuals who reported no limitations were coded as 0, whereas those who reported the presence of at least one limitation were coded as 1.

Respondents having savings were coded as 1, whereas those without savings were coded as 0. Respondents who were members of any pension funds were coded as 1, whereas those who were not a member of any pension funds were coded as 0. The average income per year was divided into four classifications and coded into the following dummy variables: more than 300,000 baht = 3; 100,000 to 299,999 baht = 2; 50,000 to 99,999 baht = 1; and less than 49,999 baht = 0. The source of income elements were classified as follows: income from work (1 = yes, 0 = no), income from brother/sister (1= yes, 0 = no), income from relatives (1 = yes, 0 = no), income from pension (1 = yes, 0 = no), earns an income (1 = yes, 0 = no), income from spouse (1 = yes, 0 = no), income from the Old Age Allowance (OAA) (1 = yes, 0 = no), and income from savings/interest (1 = yes, 0 = no). The respondents' employment status was classified as follows: employer (1 = yes, 0 = no), business owner (1 = yes, 0 = no), homemaker (1 = yes, 0 = no), government employee (1 = yes, 0 = no), enterprise and private employee (1 = yes, 0 = no), or unemployed 7 days before the interview (1 = yes, 0 = no).

2.3 Data Analysis

In analyzing the data, the population's diversity was demonstrated using descriptive statistics with two methodologies. A logistic regression analysis was used to evaluate the capacity of the chosen independent variables to explain the income security of Thailand's elderly population. A statistical analysis was also conducted using IBM-SPSS 18, in which the statistical significance was estimated by the 95% confidence

intervals (CIs).

3. Results

A total of 30,427 and 34,173 elderly respondents were successfully interviewed in 2007 and 2011, respectively (Table 1). The average age of the respondents in 2007 and 2011 was 69.0 and 69.2 years, respectively, and the majority was female. The prevalence of illiteracy decreased from 23.9% in 2007 to 17.8% in 2011. The percentage of married elderly respondents not living together was approximately 60%. The percentage of respondents who never married increased from 2.7% in 2007 to 3.9% in 2011. In contrast, the percentage of elderly people living with others decreased from 92.3% in 2007 to 91.4% in 2011. The percentage of elderly respondents who owned houses was similar in both surveys, but the percentage of elderly heads of household increased slightly from 59.8% in 2007 to 61.2% in 2011.

Elderly respondents who were members of any pension funds (e.g., provident funds, social security funds, government pension funds, private teacher aid funds, retirement mutual funds, long-term funds) increased from 7.7% in 2007 to 15.3% in 2011. In contrast, the percentage of elderly adults with savings decreased from 68.7% in 2007 to 35.8% in 2011. The prevalence of elderly respondents who were satisfied with their financial status increased from 71.8% in 2007 to 76.8% in 2011. Additionally, the prevalence of elderly respondents who reported inadequate income decreased from 41.9% in 2007 to 38.6% in 2011.

The average income per year decreased slightly across all income categories between the two surveys. The percentage of respondents with income from work increased from 37.8% in 2007 to 42.7% in 2011. The population of elderly citizens aged 60 years or older who received government assistance increased from 24.4% in 2007 to 81.4% in 2011. The percentage of respondents who had income from savings/interest also increased from 31.7% in 2007 to 35.7% in 2011. However, income acquired from brothers/sisters or other relatives decreased. The percentage of elderly people who did not receive income from any source decreased from 20.3% in 2007 to 2.7% in 2011, but those who had at least one source of income also decreased from 39.3% in 2007 to 32.5% in 2011.

With respect to health status, 40% of the elderly people surveyed reported that their current health was good. The prevalence of "fair" health status increased from 28.9% in 2007 to 41.5% in 2011. Additionally, the prevalence of at least one chronic disease increased from 40.3% in 2007 to 43.8% in 2011, and the prevalence of at least one disability increased slightly from 36.2% in 2007 to 37.4% in 2011. The prevalence of economically inactive elderly people, defined as those who had not engaged in any economic activity in the seven days prior to the date of the interview, decreased from 64.3% in 2007 to 61.7% in 2011. Among those who were economically active in both survey, the most common employment type was working as a business owner (22.8%), followed by working in a family business (7.4%); employees of private enterprises (4.6%); employers of private enterprises (1.5%); and government employees (0.7%).

3.1 Risk Factors for Income Inadequacy: A Logistic Analysis of the Two Surveys

Figure 1 shows a forest plot of the odds ratios from the logistic regression analyses of the two surveys, and the entire model structure is shown in Table 2. In the model, the strongest predictor of income insufficiency is residence in northeast Thailand, where the elderly are 2.31 times more likely to report inadequate income compared to the elderly residing in the south.

Our analysis highlighted an important finding with respect to the impact of age. An increase in age was correlated to a decrease in income insufficiency. Illiteracy was the strongest predictor of income insufficiency (OR = 1.21, 95% CI: 1.14, 1.28, $p < 0.001$). Our findings show that elderly people living as a couple, those not living as a couple, and heads of household were not significantly associated with risk of income insufficiency. The elderly respondents who saved were 0.88 times less likely to report low income.

With respect to the source of income, elderly people who were dependent on income from work were 1.19 times more at risk for income insufficiency compared to elderly people with other income sources. Those with income from government assistance were 1.14 times more at risk for income insufficiency compared to those with other income sources. However, participants who relied on income from pension funds had a 0.53 times lower risk for income insufficiency compared to the reference group, and those with income from savings/interest had a 0.74 times lower risk for income insufficiency compared to the reference group.

According to our results, the risk of having insufficient income was greater when the average income level was at a critically low level. Finally, the risk of income insufficiency was associated with health status, with a higher probability of income insufficiency among those who reported a poorer health status compared to those who reported excellent health. Elderly respondents who presented with at least one of five chronic diseases (heart

disease, stroke, cancer, diabetes, and hypertension) were 0.87 times less likely to report income insufficiency than those without chronic conditions, whereas those presenting with at least one of eight disabilities were 1.19 times more likely to report inadequate income than those without a disability.

Table 1. Descriptive information (Sample probability weights)

	2007	2011	Total
	N (%)	N (%)	N (%)
N	30,427	34,173	64,600
Demographic			
Mean Age	69.03 ± 7.4	69.24 ± 7.5	69.12 ± 7.5
Female	16,859 (55.4)	19,119 (55.9)	35,978 (55.7)
Illiterate	7,271 (23.9)	6,078 (17.8)	13,349 (20.7)
Marital status			
Married, not living as a couple	18,279 (60.1)	20,496 (60.0)	38,775 (60.0)
Married couple	11,314 (37.2)	12,352 (36.1)	23,666 (36.6)
Never married	834 (2.7)	1,325 (3.9)	2,159 (3.3)
Living arrangement			
Live with others	28,095 (92.3)	31,240 (91.4)	59,335 (91.8)
Own house	24,363 (80.1)	27,624 (80.8)	51,987 (80.5)
Head of household	18,197 (59.8)	20,911 (61.2)	39,108 (60.5)
Savings behavior			
Member of any pension funds	2,184 (7.7)	5,233 (15.3)	7,417 (11.9)
Have savings	20,915 (68.7)	12,222 (35.8)	33,137 (51.3)
Perceived economic strain			
Income satisfaction	21,857 (71.8)	26,243 (76.8)	48,100 (74.5)
Income inadequacy	12,751 (41.9)	13,149 (38.6)	25,900 (40.1)
Income per year (Baht)			
< 49,999	21,096 (69.3)	21,970 (64.3)	43,066 (66.7)
50,000 - 99,999	4,619 (15.2)	7,744 (22.7)	12,363 (19.1)
100,000 – 299,999	3,247 (10.7)	2,987 (8.7)	6,231 (9.6)
≥300,000	1,433 (4.7)	1,127 (3.3)	2,560 (4.0)
Source of income			
Any income source	24,206 (79.5)	33,236 (97.3)	57,442 (88.9)
Old Age Allowance	7,428 (24.4)	27,823 (81.4)	35,351 (54.6)
Work	11,491 (37.8)	14,589 (42.7)	26,080 (40.4)
Interest/savings	9,660 (31.7)	12,204 (35.7)	21,864 (33.8)
Spouse	7,080 (23.3)	7,304 (21.4)	14,384 (22.3)
Relative	2,865 (9.4)	2,420 (7.1)	5,285 (8.2)
Pension	1,632 (5.4)	2,573 (7.5)	4,205 (6.5)
Brother/sister	1,604 (5.3)	1,233 (3.6)	2,837 (4.4)
Number of income sources			
0	6,190 (20.3)	937 (2.7)	7,127 (11.0)
1	11,928 (39.2)	11,099 (32.5)	23,027 (35.6)
2	7,949 (26.1)	12,376 (36.2)	20,325 (31.5)
≥ 3	4,360 (14.3)	9,761 (28.6)	14,121 (21.9)

	2007 N (%)	2011 N (%)	Total N (%)
Health status			
Self-rate health			
Excellent	1,162 (3.8)	1,486 (4.3)	2,648 (4.1)
Good	13,068 (43.0)	13,106 (38.4)	26,174 (40.5)
Fair	8,787 (28.9)	14,167 (41.5)	22,954 (35.6)
Bad	6,527 (21.5)	4,914 (14.4)	11,441 (17.7)
Very bad	837 (2.8)	501 (1.5)	1,338 (2.1)
Present at least one disability	10,976 (36.2)	12,765 (37.4)	23,741 (36.8)
Present at least one chronic illness	12,251 (40.3)	14,963 (43.8)	27,214 (42.1)
Geographic			
Residential area			
Urban	8,690 (28.6)	11,445 (33.5)	20,135 (31.2)
Rural	21,737 (71.4)	22,728 (66.5)	44,465 (68.8)
Regions			
Bangkok	2,806 (9.2)	3,366 (9.9)	6,172 (9.6)
Central (not include Bangkok)	7,166 (23.6)	7,918 (23.2)	15,084 (23.3)
North	6,360 (20.9)	6,948 (20.3)	13,308 (20.6)
North East	10,224 (33.6)	11,647 (34.1)	21,871 (33.9)
South	3,872 (12.7)	4,293 (12.6)	8,165 (12.6)
Employment status			
Self-employed	6,872 (22.6)	7,838 (22.9)	14,710 (22.8)
Homemaker	1,873 (6.2)	2,925 (8.6)	4,798 (7.4)
Enterprise and Private Employee	1,400 (4.6)	1,596 (4.7)	2,996 (4.6)
Employer	469 (1.5)	513 (1.5)	982 (1.5)
Government employee	237 (0.8)	193 (0.6)	430 (0.7)
Other employment	24 (0.1)	31 (0.1)	55 (0.1)
Did not work 7 days before interview	19,552 (64.3)	21,077 (61.7)	40,629 (62.9)

Chronic diseases were diabetes, hypertension, heart disease, stroke and cancer. Disabilities specified in this study were inability to eat, dress, squat, lift 5 kg, walk 100-200 meters, climb stairs (2-3 steps), use bus/boat transportation alone, and use money correctly.

Table 2. Logistic regression results of inadequate income among the elderly based on two surveys

	Overall two surveys			
	Coef	S.E.	OR 95%CI	p-value
Age	-0.03	0.00	0.97 (0.97-0.98)	<0.001
Female	-0.04	0.03	0.96 (0.91-1.01)	0.093
Illiterate	0.19	0.03	1.21 (1.14-1.28)	<0.001
Marital Status				
Never Married (reference)				<0.001
Married, not living as a couple	0.00	0.07	1.00 (0.87-1.16)	0.959
Married, living as a couple	0.11	0.07	1.12 (0.97-1.29)	0.117
Living Arrangement				
Live with others	0.17	0.04	1.18 (1.09-1.29)	<0.001
Own house	0.05	0.03	1.06 (0.99-1.12)	0.102

	Overall two surveys			
	Coef	S.E.	OR 95%CI	p-value
Head of household	0.13	0.03	1.14 (1.08-1.21)	<0.001
Working Status				
Not working	-1.24	0.32	0.29 (0.15-0.55)	<0.001
Employed	-1.56	0.34	0.21 (0.11-0.41)	<0.001
Self-employed	-1.29	0.32	0.28 (0.15-0.52)	<0.001
Homemaker	-1.30	0.32	0.27 (0.15-0.51)	<0.001
Government employee	-1.40	0.38	0.25 (0.12-0.52)	<0.001
Enterprise &Private Employee	-0.80	0.32	0.45 (0.24-0.84)	0.013
Savings Behavior				
Have savings	-0.13	0.03	0.88 (0.83-0.94)	<0.001
Member of any pension funds	0.06	0.04	1.06 (0.98-1.14)	0.120
Average income/year (baht)				
< 49,999	-0.25	0.15	0.78 (0.57-1.06)	0.107
50,000 – 99,999	-0.60	0.16	0.55 (0.41-0.75)	<0.001
100,000-299,999	-0.88	0.16	0.42 (0.30-0.57)	<0.001
≥ 300,000	-1.56	0.18	0.21 (0.15-0.30)	<0.001
Perceived economic status				
Income satisfaction	-4.27	0.04	0.01 (0.01-0.02)	<0.001
Source of Income				
Work	0.17	0.05	1.19 (1.07-1.32)	0.001
Pension	-0.64	0.08	0.53 (0.45-0.62)	<0.001
Government allowance	0.13	0.03	1.14 (1.08-1.21)	<0.001
Interest/savings	-0.30	0.04	0.74 (0.69-0.80)	<0.001
Spouse	-0.02	0.03	0.98 (0.92-1.04)	0.459
Sibling	-0.01	0.06	0.99 (0.87-1.12)	0.863
Relative	-0.00	0.05	1.00 (0.91-1.10)	0.951
Any income	-0.07	0.05	0.94 (0.86-1.02)	0.134
Health Status				
Self-rated health				
Excellent (reference)				<0.001
Good	0.15	0.06	1.17 (1.03-1.32)	.014
Fair	0.52	0.06	1.69 (1.49-1.91)	<0.001
Poor	0.70	0.07	2.01 (1.76-2.30)	<0.001
Very poor	0.76	0.11	2.13 (1.73-2.63)	<0.001
Any of 5 chronic diseases	-0.14	0.02	0.87 (0.83-0.92)	<0.001
Present at least one disability	0.17	0.03	1.19 (1.13-1.25)	<0.001
Geographic				
Rural	0.20	0.03	1.22 (1.15-1.29)	<0.001
Bangkok	0.35	0.06	1.42 (1.26-1.60)	<0.001
Central	0.41	0.04	1.50 (1.38-1.63)	<0.001
North	0.53	0.04	1.70 (1.57-1.85)	<0.001
Northeast	0.84	0.04	2.31 (2.14-2.50)	<0.001
South (reference)				<0.001
Constant	5.33	0.40	207.19	<0.001

Note. Central excludes Bangkok; not working means being unemployed for seven days before the interview; any of five chronic diseases includes heart problems, hypertension, diabetes, cancer and stroke.

4. Discussion

The findings of the two surveys performed across the country by the NSO showed that income insufficiency in the elderly declined from 41.9% in 2007 to 38.6% in 2011. This trend is justified by the increasing proportion of elderly people who obtain old age benefits from 24.4% in 2007 to 81.4% in 2011. Old age benefits are a non-contributory income support scheme funded by general taxes.

Earlier studies have shown that when the elderly have an adequate stream of income, they feel economically secure and sufficiently capable of fulfilling their essential requirement. Education is related to income sufficiency, as has been found in early studies (Herd, Goesling, & House, 2007; Woo, Ho, & Yu, 2000) showing that illiteracy has a strong relationship with lower incomes in the elderly, as they are unable to obtain well-paid jobs. Furthermore, poor health due to disability, rather than chronic illness, was found to have a strong relationship with insufficient income. The likelihood of the elderly population developing functional deficiencies and chronic illnesses is high (Guralnik, Fried, & Salive, 1996; Verbrugge & Jette, 1994). No gender disparity was observed, as it did not have a significant relationship with the risk of income inadequacy.

Marital status, earning members in a household, house ownership, and having at least one chronic illness had no significant relationship with income insufficiency (Kobetz, Daniel, & Earp, 2003). Government assistance for the elderly increased from 2007 to 2011; however, elders who were dependent only on the OAA faced a greater risk of income insufficiency.

An increase in the risk of income insufficiency faced by the elderly population living in Bangkok was observed compared to the reference group from 2007 to 2011, likely because most elderly citizens in Thailand did not know that they were eligible for the OAA.

The findings of the two surveys show that elderly citizens who were dependent on employment income face a higher risk of feeling that their income was inadequate. This may be because 80% of the elderly are employed in the unpaid informal sector, where they do not receive monthly pension payments or payments from the Social Security Scheme. Similar to the findings of earlier studies, elderly citizens receiving income from interest/savings or pensions have a lower risk of income insufficiency (Dercon, 2005; Jitsuchon, Skoufias, & Wiener, 2012; Subbarao et al., 1997). In addition, 68.8% of elderly people living in rural areas face income insufficiency (Smeeding & Sandstrom, 2005).

Thailand is widely recognized to have an insecure society, and the impact of this insecurity on social welfare mechanisms is considered a vital issue in social policy discussions (Bonoli, 2005; Esping-Andersen, 1999). It is believed that adult male earners are awarded long-term, stable job opportunities over other groups, such as the youth, divorced people, single parents, contract employees and temporary workers who no longer have social security coverage. The changes in the family structure and labor market have altered the life cycle of people. Retirement is no longer a planned occurrence and is unpredictable for a majority of employees (Vickerstaff, 2006), which is why elderly individuals face higher financial risks after retirement. Taking care of the elderly population is considered a crucial matter by all developing and industrialized countries.

There are various individual pension programs in Thailand, which mainly include programs civil servants as well as informal and formal sector employees.

Articles 33 and 39 of the Social Security Act includes the OAP system, which was developed for formal sector workers ("Social Securiy Act, B.E. 2533," 1990). The scheme provides benefits to the workers after their retirement based on the number of years of employment and their salaries. Provident funds are also available for public and private employees, as noted in the Provident Fund Act of 1987("Provident Fund Act, B.E. 2530," 1987) A voluntary provident fund is available for all employees who retire from state organizations, private firms, and government organizations, with a contribution rate of 3% to 15% of the salary. Employers must also assign an obligatory fund for a minimum amount equivalent to the years of service of the employee. Another option is the Retirement Mutual Funds (RMF), which is available to all citizens, particularly government employees with high salaries (Chalamwong & Meepien, 2012).

Specific pension payments are also determined by the state budget and the Government Pension Fund (GPF) to civil servants who spend most of their careers in government jobs. Employees who were hired prior to March 1996 fall under the non-contributory pension scheme of the government based on tax, whereas those who were hired after March 1996 can choose their contribution rate, ranging from 3% to 12% of their salaries.

The Old Age Act ("Old Age Persons Act in B.E. 2546," 2003) permitted the OAA, which is a key program that provides financial support to the eligible elderly population, mainly those who work in the informal sector. This universal program provides support for any citizen older than 60 years who does not have coverage from any

other program. By 2011, the OAA provided coverage to approximately 80% of elderly people in Thailand.

Only 12 million workers out of a total of 38 million workers in the formal sector are covered by the OAP program, which is managed by the Social Security Office for the private sector.

Two additional voluntary pension schemes were also launched in Thailand, specifically for the informal sector, namely, the pension savings program and the National Savings Funds (NSF) included in the Social Security Act. Little is known about the two programs and the eligibility criteria among the informal sector. However, considering the evidence given previously, initiation will not be popular, as the primary participants will either be rich and/or self-employed experts in the informal sector. It may not be affordable to allow the regular participation of poorer employees, as the program is unable to fulfill their saving needs.

There will be a remarkable increase in the elderly population in Thailand in the next three decades. The rates of poverty will increase under the existing insufficient social policies regarding income security for the elderly population. Hence, the government should immediately review the programs to reduce the shortcomings of the programs and the relevant legal aspects and management intricacies, including the greater number of poorer citizens in the programs and additional income support. Certain policy alternatives have been recommended that the analysis and outcomes of the two national surveys be considered.

4.1 Consolidate Existing Programs

First, the various pension programs must be integrated to reduce their fragmentation and improve their management.

4.1.1 The plans of the government personnel and the formal sector should be integrated. It is possible for both sectors to participate in the GPF and OAP. The same infrastructure should be implemented so that the fundamental benefits can be provided to everyone, including civil workers from the formal sector.

4.1.2 A single voluntary contribution program should be established for both the formal and informal sectors, which can be consolidated with the help of the NSF program. These programs would focus on those with moderate to high incomes with the intention of generating higher savings following retirement.

4.2 Voluntary Informal Sector Program Options

Article 40 programs and NSF have mainly been successful in drawing highly paid members, such as self-employed professionals, from the informal sector. The objective of the two programs should be to supplement the universal social pension, not to replace it. The two programs are suitable for those who intend to save more money after their retirement. In this study, the occurrence and profiles of the factors playing a role in income insufficiency have been evaluated. The OAA may not have a direct effect on decision making; however, it informs policy by showing that despite the monthly allowance, it is not sufficient.

This study has several limitations. First, there are some proxies in the interviews of the elderly population, such as their children or other relatives. Furthermore, the income insufficiency measure involves a self-evaluation measure that may not reflect the actual level of inadequacy. The elderly person's income is not directly measured by the NSO, as poverty is determined by benchmarking with the mean household income—Thai households measure collective income from the entire family.

5. Conclusion

Notwithstanding the above-mentioned factors from 2009 onward, the universal informal sector social pension, or OAA, has proven to be beneficial for elderly people. Poverty has decreased by approximately 75% in the elderly population. At present, OAA is provided through public aid; thus, a compulsory savings account should be established at the start of adulthood along with a government contribution to the Public Savings Fund. The shortcomings that are typically prevalent in targeted programs can be avoided by approaching it as a universal plan that is applicable to all workers in the informal sector. The government can improve the program by eliminating additional costs to concentrate solely on the poor elderly population.

The overall Thai pension system must be re-evaluated. The number of pension programs should be reduced by executing a regulatory pension policy and entitlement responsibility to the overall pension system. This policy should highlight one possible structure but ensure that other choices are also available to attain similar goals.

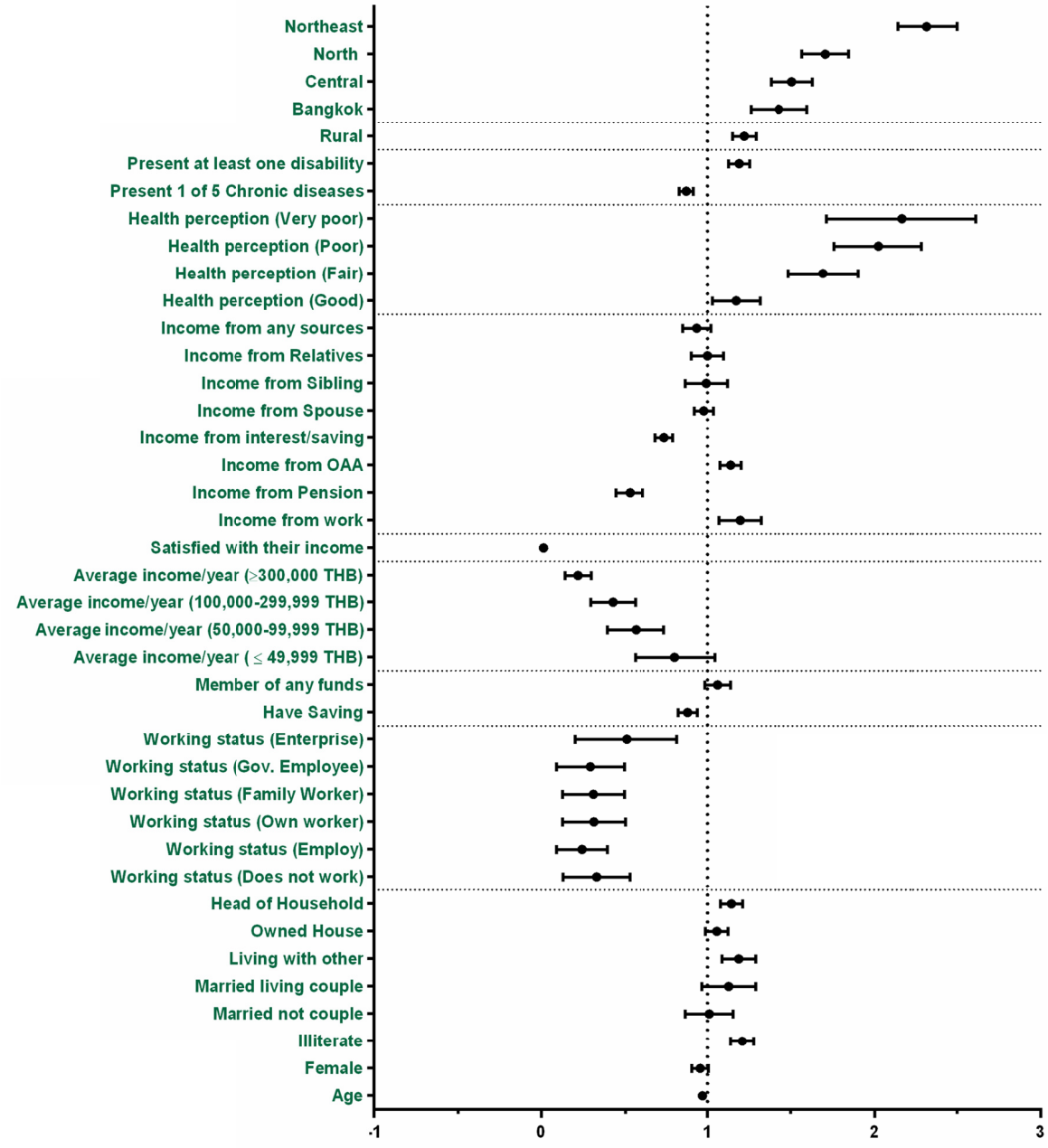

Figure 1. Forest plot of the odds ratio results of inadequate income among the elderly based on two surveys.

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References

Adhikari, R., Jampaklay, A., & Chamratrithirong, A. (2011). Impact of children's migration on health and health care-seeking behavior of elderly left behind. *BMC public health, 11*(1), 143. http://dx.doi.org/10.1186/1471-2458-11-143

Adhikari, R., Soonthorndhada, K., & Haseen, F. (2011). Labor force participation in later life: evidence from a cross-sectional study in Thailand. *BMC geriatrics, 11*, 15. http://dx.doi.org/10.1186/1471-2318-11-15

Barrientos, A. (2006). *Ageing, poverty and public policy in developing countries: new survey evidence*. Paper presented at the FISS 13th International Research Seminar on Issues in Social Security 'Social Protection in an Ageing World', Sigtuna, Sweden.

Bonoli, G. (2005). The politics of the new social policies: providing coverage against new social risks in mature welfare states. *Policy & politics, 33*(3), 431-449. http://dx.doi.org/10.1332/0305573054325765

Caminada, K., & Goudswaard, K. (2009). Income distribution and social security in an OECD perspective Social Security in the Global Village. *International social security series, 8*, 163-188. New Brunswick: Transaction Publishers.

Chalamwong, Y., & Meepien, J. (2012). Poverty and just social protection in Thailand. *ASEAN Econ Bull, 29*(3), 230-244. http://dx.doi.org/10.1355/ae29-3e

Choiejit, R. (2011). *Income distribution of Thai ageing households.* school of economic and public policy, Srinakharinwirot University.

Deaton, A. S., & Paxson, C. H. (1998). Aging and inequality in income and health. *Am Econ Rev*, 248-253.

Dercon, S. (2005). *Insurance against poverty*. http://dx.doi.org/10.1093/0199276838.001.0001

Devereux, S. (2002). Can social safety nets reduce chronic poverty? *Dev Policy Rev, 20*(5), 657-675. http://dx.doi.org/10.1111/1467-7679.00194

Esping-Andersen, G. (1999). *Social Foundations of Postindustrial Economies*. http://dx.doi.org/10.1093/0198742002.001.0001

Gasparini, L., Alejo, J., Haimovich, F., Olivieri, S., & Tornarolli, L. (2007). Poverty among the elderly in Latin America and the Caribbean. *Documentos de Trabajo del CEDLAS*.

Guralnik, J., Fried, L., & Salive, M. (1996). Disability as a public health outcome in the aging population. *Annu Rev Public Health, 17*(1), 25-46. http://dx.doi.org/10.1146/annurev.pu.17.050196.000325

Herd, P., Goesling, B., & House, J. S. (2007). Socioeconomic position and health: the differential effects of education versus income on the onset versus progression of health problems. *J Health Soc Behav, 48*(3), 223-238. http://dx.doi.org/10.1177/002214650704800302

Jitsuchon, S., Skoufias, E., & Wiener, M. (2012). *Reducing Elderly Poverty in Thailand: The Role of Thailand's Pension and Social Assistance Programs*. Washington DC: World Bank.

Johnson, J. K., & Williamson, J. B. (2008). Universal non-contributory pension schemes for low-income countries: an assessment. *Social protection in an ageing world, 13*, 195-219.

Kobetz, E., Daniel, M., & Earp, J. (2003). Neighborhood poverty and self-reported health among low-income, rural women, 50 years and older. *Health & Place, 9*(3), 263-271. http://dx.doi.org/10.1016/S1353-8292(02)00058-8

Ma, X., & McGhee, S. M. (2013). A cross-sectional study on socioeconomic status and health-related quality of life among elderly Chinese. *BMJ Open, 3*(2). http://dx.doi.org/10.1136/bmjopen-2012-002418

National Statistical Office. (2013). *Labour Force Participation among Elderly in Thailand 2012*. Thailand: Statistical Forecasting Bureau.

Old Age Persons Act in B.E. 2546. (2003). Retrieved January 12, 2015, from http://www.thailawforum.com/database.html

Provident Fund Act, B.E. 2530. (1987). Retrieved January 12, 2015, from http://www.thailawforum.com/database.html

Smeeding, T., & Sandstrom, S. (2005). *Poverty and Income Maintenance in Old Age: A Cross-national View of Low Income Older Women.* LIS Working Paper Series.

Social Securiy Act, B.E. 2533. (1990). Retrieved January 12, 2015, from http://www.thailawforum.com/database.html

Stoller, M., & Stoller, E. (2003). Perceived income adequacy among elderly retirees. *J Appl Gerontol, 22*(2), 230-251. http://dx.doi.org/10.1177/0733464803022002004

Subbarao, K., Bonnerjee, A., Braithwaite, J., Carvalho, S., Ezemenari, K., Graham, C., & et al. (1997). *Safety net*

programs and poverty reduction: Lessons from cross-country experience: http://dx.doi.org/10.1596/0-8213-3890-0

Suwanrada, W. (2009). Poverty and financial security of the elderly in Thailand. *Ageing Int, 33*(1-4), 50-61. http://dx.doi.org/10.1007/s12126-009-9030-y

Thanakwang, K., & Soonthorndhada, K. (2008). Determinants of economic security among Thai elderly: evidence from a cross-sectional national survey. *AJGS Asia Journal of Global Studies, 1*(2), 35-49.

Verbrugge, L. M., & Jette, A. M. (1994). The disablement process. *Soc Sci Med, 38*(1), 1-14. http://dx.doi.org/10.1016/0277-9536(94)90294-1

Vickerstaff, S. (2006). Entering the retirement zone: how much choice do individuals have? *Social Policy and Society, 5*(4), 507-517. http://dx.doi.org/10.1017/S1474746406003265

Woo, J., Ho, S. C., & Yu, A. L. (2000). The influence of income on morbidity, mortality and dependency in elderly Hong Kong Chinese. *Arch Gerontol Geriatr, 30*(1), 55-61. http://dx.doi.org/10.1016/S0167-4943(99)00050-3