ECONOMIC SECURITY AMONG THE THAI ELDERLY IN 2002 AND 2007: CHANGES AND DETERMINANTS

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ABSTRACT

This study has three main objectives: 1) to construct a composite index of economic security of the Thai elderly in 2002 and 2007; 2) to investigate the change of economic security levels in 2002 and 2007 and 3) to examine the determinants of economic security among the Thai elderly in both years. Descriptive and binary logistic regression were used to analyze data from two data sets of the 2002 and 2007 Survey of Older Persons in Thailand for examining the determinants of economic security.

The main findings of this study are that the economic security composite index comes from three sources; the most important source is self financial support, followed by government support, and finally family support. Almost all (about 60%) of the Thai elderly have economic security for both years although in 2007 it was a little less likely than in 2002. Determinants of economic security were socio-demographic factors (young old (60-69 years), being male, having higher education, living in rural and southern regions), some health factors (physical functionality and chronic illness), and family factors (living with a non relative) were statistically significant (at 99.99 % confidence interval).

Thus the elderly should prepare specific financial and health self support as well as family support. The government should design employment policies for the elderly to support themselves and policies to support the oldest old (80 years and over) and poor health who are economically vulnerable.

KEY WORDS: ELDERLY/ ECONOMIC SECURITY/ COMPOSITE INDEX

139 pages

ความมั่นคงทางเศรษฐกิจของผู้สูงอายุในปี พ.ศ.2545 และพ.ศ.2550: การเปลี่ยนแปลงและตัวกำหนด
ECONOMIC SECURITY AMONG THE THAI ELDERLY IN 2002 AND 2007: CHANGES AND DETERMINANTS

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บทคัดย่อ

วัตถุประสงค์ของการศึกษานี้มีสาม ส่วนได้แก่ 1) สืบค้นระดับของความมั่นคงทางเศรษฐกิจของผู้สูงอายุไทยโดยการสร้างดัชนีชี้วัดด้วยวิธีดัชนีองค์ประกอบทั้งในปี พ .ศ. 2545 และ พ.ศ. 2550; 2) เปรียบเทียบความแตกต่างของระดับความมั่นคงทางเศรษฐกิจทั้งสองปี (พ.ศ.2545 และพ.ศ.2550) จำแนกตามปัจจัยทางประชากรและสังคม ปัจจัยด้านสุขภาพ และปัจจัยด้านครอบครัว และ 3) ตรวจสอบตัวกำหนดความมั่นคงทางเศรษฐกิจของผู้สูงอายุทั้งสองปี(พ.ศ.2545 และพ.ศ.2550) โดยใช้ข้อมูลจากการสำรวจประชากรสูงอายุในประเทศไทย พ.ศ. 2545 และพ.ศ.2550

ผลการศึกษาพบว่า แหล่งเกื้อหนุนรายได้เป็นดัชนีชี้วัดความมั่นคงทางเศรษฐกิจของผู้สูงอายุทั้งสองปี และผู้สูงอายุส่วนใหญ่ยังคงมีความมั่นคงทางเศรษฐกิจทั้งสองปี แม้ว่าความมั่นคงทางเศรษฐกิจในปี พ .ศ. 2550 จะมีแนวโน้มลดลงเล็กน้อยเมื่อเปรียบเทียบกับความมั่นคงทางเศรษฐกิจของผู้สูงอายุในปี พ .ศ.2545 อย่างไรก็ตาม การศึกษาพบว่าปัจจัยด้านประชากรและสังคม ปัจจัยด้านสุขภาพและปัจจัยด้านครอบครัวของผู้สูงอายุมีผลกระทบต่อความมั่นคงทางเศรษฐกิจของผู้สูงอายุทั้งในปี พ.ศ. 2545 และพ.ศ.2550

ข้อค้นพบนี้ชี้ให้เห็นว่าผู้สูงอายุควรมีการเตรียมการก่อนเข้าสู่วัยสูงอายุทั้งในด้านเศรษฐกิจและสุขภาพ ยิ่งไปกว่านั้นรัฐบาลควรตระหนักถึงการสร้างนโยบายสำหรับผู้สูงอายุเพื่อผู้สูงอายุจะสามารถช่วยเหลือตนเอง และการสร้างนโยบายเพื่อเกื้อหนุนผู้สูงอายุที่กำลังเผชิญกับความเปราะบางเศรษฐกิจอย่างทั่วถึงและต่อเนื่อง

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CHAPTER I
INTRODUCTION

1.1 Background and Rationale

A sharp decline in fertility together with a rise in life expectancies has brought about a rapidly increasing aging population in both developed and developing countries. As well as Thailand now becoming an aging society due to its successful family planning program and improvements in medical technology and treatment. During the past three decades, the total fertility rate (TFR) decreased from 4.9 in 1970-1975 to 1.9 in 2000-2005. The average life expectancy rose from 59 years in 1964 to 74 years in 2009 when economic and social development of the country took place (Institute for Population and Social Research, 2009). In addition, as a result of a rapid decline in fertility over the past decades that have affected the population structure in Thailand, the old age population has continuously risen from 4.6% in 1960 to 11.5% in 2009 while the proportion of children as well as working-age population has decreased (National Statistical Office (NSO), 2007). The population of those aged 60 and over was predicted to triple from 7% in 1987 to 21% in 2025, thus presenting Thailand with serious challenges associated with an aging population (Vapattanawong & Prasartkul, 2006).

Thailand is one of the countries with most rapidly increasing aging population in Asia. The country has become aging society much faster than many developed countries. As Jitapunkul & Bunnag (1997) presumed that while it took England and Wales 107 years for the proportion of older people (aged 60 and over) to double from 7% to 14%, and France over a period of 115 years, it would take only 30 years for Thailand to achieve at the same level. Such rapid change in Thai society leads to major socioeconomic consequences therefore well-planned policies are needed to accommodate the changing age structure.

These changes inevitably have impact to the elderly themselves due to alterations of the dependency ratio, which refers to economic dependency among children, older people, and working age people. In other words, the dependency ratio of children is decreased while that of older people is increased, and it leaves the elderly as burden to those in the working age. This situation leads to the decreasing of the potential support ratio. The ratio refers to those of working age people who aged between 15 and 59 per those of the elderly who aged 60 years and over. The ratio has grown from 11.3 in 1960 to 6.5 in 2005 and it was predicted to be 2.4 in 2035 according to Vapattanawong & Prasartkul (2006). See table 1.1, the dependency ratio for older people tended to be increased. The higher proportion of aging population leads to the higher old-age dependency ratio of Thailand seems to be increased from 9.6 per 100 in 1975 to 22.1 percent in 2015, it is expected to increase further to approximately 31.2 percent in 2025.

Table 1.1: Dependency ratios (%)

	1975	**1995**	**2005**	**2015**	**2025**	**2050**
Old-age Dependency	9.6	11.9	15.9	22.1	31.2	50.1
Total dependency	91.5	56.2	52.1	54.9	62.6	80.4

Source: United Nations (2007).

Higher proportion of aging population is also a big challenge for the economic structure because of their inability to work normally and declining health. With older age, the prevalence of disability, frailty, and chronic diseases (e.g. arthritis, hypertension, and diabetes) occurs and causes economic concerns to aging people (Ministry of Public Health, 2007).

Aging causes a change and decline in both physical and psychological endeavors, including economic status of people. Older people usually undergo various illnesses and diseases such as Alzheimer's disease, cancer, cardiovascular diseases, etc. According to the study conducted by the Health System Research Institute (2004), the elderly in Thailand were increasingly afflicted by chronic diseases and were faced with more and more disabilities. Specifically, it showed that 74.3 percent of the Thai elderly had at least one chronic illness and that most of them suffered from many

chronic illnesses simultaneously (Porrapakkam & Punyaratabandhu, 2006). These health conditions of older people affect not only their family's financial resources but also the nation economy.

Social and economic changes have an impact on Thai people's traditional ways of life including patterns of occupation and living arrangement. Since Thailand has transformed from the agricultural to non-agricultural society, and extended families become more nuclear ones, the majority of Thai working-age population have to move to urban areas for work opportunities, particularly in periphery areas around Bangkok. The result of changed traditional Thai family structure has increasingly gravitated toward the nuclear family, necessitating that the living arrangements of older people adapt in tandem with their lone living (Cowgill, 1972; Thanakwang & Soonthorndhada, 2007). Studies on living arrangements of the elderly in Thailand found that most old people still lived in families with more than two members. However, the number of old people living without children and living alone has increased due to the decrease in the number of newborns in the family and the increase in young people who migrated to cities to find work, particularly women entering the formal workforce (Knodel, et al., 2005). This results in a lack of people in caring older people when they need assistance. The present study is parallel to Soonthorndhada's (2009), which found that the elderly living with the same generation decreased a little, except those living alone and with spouse that had a higher proportion. Visit rates of children of the 2007 Survey of Older Persons in Thailand showed that only 55% of old people were visited by their out-migrant children because they had more economic burden in the city and could not make many visits. Moreover, the study revealed that the main cause for distanced relationship within family between young and old generations was the economic hardship and that the elderly received very little financial support.

These situations affect the economic dependency of the elderly. Soonthorndhada (2009) added that most aging people received income from children and the second source of income was their working both in 2002 and 2007 although in 2007 the amount of working income was not different from that from their children. Moreover, in this same year the elderly received most income as allowances from the government. However, this study views that the elderly still have insufficient income,

causing economic difficulties for the elderly and even those with health problems. The elderly need more support from others in order to live on.

Economic status, social support and health condition of the elderly are the important factors that determine their economic stabilities. Poverty among the aged people is a global problem in both developed and developing countries that affects their economic security (Chayovan, 2005; Glasgow, 1993). The poor health status of the elderly such as chronic illnesses, disabilities, and dependency, is also a good indicator of well-being of the elderly. Many population subgroups are still faced with economic insecurity, particularly ethnic minorities, disabled people, and the elderly (United Nations Country Team in Thailand, 2005). Previous studies on economic security among old people suggested a clear link between poverty and gender, age, education, health status, area of residence, and living arrangement (Glasgow, 1993; McLaughlin & Holden, 1993; Lee, 1998; McLaughlin & Jensen, 2000). Research conducted in the United States also found that American elders especially those who were women, ethnic minorities, illiterate, disabled, widows, lived alone, and lived in rural areas had serious economic problems as well (Angel & Angel, 1998; Smeeding & Weaver, 2002).

In Thailand, "economic security" of the elderly is the serious problem because it shows the means to living and assured sources of support to survive. Most previous studies attributed economic security only to income. The average annual income of old people is about 29,000 baht (US$1= about 30 baht) and the median annual income is about 10,000 baht. One third of the elderly has an average annual income less than 5,000 baht or less than the median income of the Thai elderly population in general and well below the poverty line (Chayovan, 2005). Moreover, Knodel & Chayovan (2008) found that 13 percent and 19 percent of male and female older population had no income and were poverty-stricken, affecting their daily lives. Most poor elders were female who lived in rural areas and were illiterate. In addition, most impoverished aging people did not have knowledge and had not planned for their older age.

That the proportion of the working age population is likely to decrease and the old age population is likely to increase has an immense impact on the individual's

economy and national economy, also. Economy is the basic variable linked to daily living of human being. Economic status shows the quality of life in terms of health care, food, clothes, and other expenditures for daily living. Therefore, economic security of the elderly is becoming the important issue because it determines wellbeing and ability of daily living as well as an access to health care and housing, which explains the idea of avoidance of economic risks and fulfillments of basic human needs.

Few studies on economic security have been done up to the present. Some do not clearly specify the domain of economic security. Income is considered as the sole indicator of economy (Keawthep, 1980; Chayovan, 2005; and Thanakwang and Soonthorndhada, 2007). Other researches employ assets (Knodel, 2009), or employment security (Bengtson et al, 1977) as economic security. Several studies take amount of income, savings, or expenditure for daily living as measurements of economic security but each of these variables is measured separately at a time. This study suggests that economic security should be measured in multi-dimensions because economy is made up of both monetary and non-monetary matters.

This study also regards sources of income support as one variable contributing to economic security. Due to longer life expectancy, self financial support cannot adequately guarantee their economic security. The senior citizens have declining health and they cannot work like before. The sources of income among the Thai elderly may also come from the government financial support and family financial support although most elders still depend on self financial support.

Self financial support refers to an aging person's working condition, income from working, amount of income, income from savings or interests collected during his or her younger age, and assets i.e. housing. Thailand is an agricultural country, although the country has continuously developed its industry more than before. So, work of older people is classified into two sectors: agricultural and non-agricultural. It is estimated that working of old people is likely to increase, where most of them return to work in the agricultural sector at their retirement age (Siriphanich et al., 2008). Currently, most elders do their business or self-employ with no other employees, or they assist their family business without being paid (NSO,

2007). With respect to income from working, their average monthly income was 5,292 Baht in 2002 and increased to 6,246 Baht in 2007. In 2007 the elderly in municipal areas had an amount of income a month three times higher than those in non municipal areas, and those in Bangkok had the highest income (National Statistical Office (NSO), 2002 and 2007). The Thai people do not pay much attention to saving, however. The saving at low level will affect life security of Thai older people and the national economic stability. As a consequence, there should be campaigns for people's reduction of their consumption expenditure and for more saving. Self financial support among the Thai elderly is becoming their main source of income (NSO, 2009; The Foundation of Thai Gerontology Research and Development Institute (TGRI), 2007).

As ageing is becoming the national agenda across the country, the Thai government tries to alleviate this situation of the elderly by providing social security fund to support them. Over 5.1 million aging people facing economic difficulties and all Thai elderly have registered for the assistance so far. Each will receive a monthly grant of 500 Baht provided by the government (Thaipvd.com 2009). In case an old person used to work for the government office, he or she will receive the available pension after retirement, instead. The pension programme is the main source of formal support for government officers. A monthly pension income is only half the last salary before their retirement, and it can assure their income stability. However, the amount of formal support is sometimes inadequate for economic security systems for older people. In addition to the formal programmes, there is the issue of legislating family care of the older persons the government makes an effort to enhance familial support for them.

As Thai tradition and culture perform, children are supposed to take care of their parents. Thai older persons depend upon such tradition for economic support from family. A family refers to members in a family i.e. spouse, children, and others including parents, relatives, etc. Thus, intergenerational transfers of financial and material goods are also more likely to flow upwards from children to parents. Family financial support is an important source of income to support older members. However, economic fluctuation affects child generation; they move to another place to find better economic opportunity and ignore caring for their parents. Moreover,

couples will decide not to have or to have fewer children, unless policies are not established to recognize the burden on middle-aged people who support two generations–their older parents and their own children. In other words, the Thai elderly are to face economic insecurity if they still depend only upon their children.

From situations above, this study is interested in each source of economic support such as self financial support, government financial support, and family financial support. All of these variables are studied to account for the economic security of the Thai elderly. The concept of constructing index is the main topic of this study. Based on numerous literature reviews, the composite index and factor analysis with principal component analysis are employed as the method for measuring economic security index.

There have been no studies putting an emphasis on the difference of changing economic security during the years (in 2002 and 2007), and determinants on economic security of the Thai elderly in these years. However, with the concept of economic security changing in Thailand over the years, it is necessary to explain these phenomena with regard to economic security of the elderly.

The purposes of this study are 1) to investigate the level of economic security of the Thai elderly by constructing the economic security index in 2002 and 2007, 2) to compare the difference of economic security levels in 2002 and 2007 by socio-demographic, health and family factors, and 3) to examine the determinants of economic security among the Thai elderly in 2002 and 2007.

1.2 Research Questions

1. What kinds of methods and domains of indicators are used to construct economic security index of the Thai elderly?
2. What are the differences of economic security levels of the Thai elderly in 2002 and 2007?
3. What are the factors responsible for economic security of the Thai elderly?

1.3 Research Objectives

1. To investigate the level of economic security of the Thai elderly by constructing the economic security index in 2002 and 2007.
2. To compare the difference of economic security levels in 2002 and 2007 by socio-demographic, health and family factors.
3. To examine the determinants of economic security among the Thai elderly in 2002 and 2007.

1.4 Scope of the Study

The study focuses on economic security at individual levels. The main objective in this study is to search for economic security indicators to contain economic security index as measurement of economic security on the Thai elderly. The findings of the study partly explain economic security index as the Thai context based on the existing variables whose data are available both in the 2002 Survey of Older Persons in Thailand and in the 2007 Survey of Older Persons in Thailand.

1.5 Operational Definitions

Based on numerous studies on analyses and variables, operational definitions are presented here so as to facilitate clear and unique understandings.

The Elderly refers to older persons who undergo biological and social changes (Mason 1992). In each country or society, the age when a person is considered an elder is described differently, depending on the average working age or physical, social, economic and cultural status of each society. In Thai society, old age begins at 60, which is the age of retirement for the civil service and most urban occupations. This study, therefore, regards persons aged 60 and over as the elderly.

Economic security refers to sufficient income to pay for expenditure, having regular employment, access to savings/insurance, ability to pay debt, and

access to health care and housing, which explains the idea of avoidance of the economic risk and fulfillment of basic human needs.

Economic Security Index (ESI) refers to the index constructed to measure economic security, consisting of three sources of support: 1) self financial support (income from work, working condition, income, savings, and house ownership), 2) government financial support (pension and allowance), and 3) family financial support (income from spouse, income from children, income from others) as shown in both 2002 and 2007. The ESI is constructed by using Composite Index.

Health factors refer to the physical health status of older persons in terms of self-reported health status, sickness, limitation of activities of daily living (ADL), and limitation of functional ability, and chronic diseases.

1.6 Expected Outcomes

1. Provide fundamental information for any organizations interested in the study of the relationship between factors and economic security.

2. Provide new knowledge in several aspects of the elderly with regard to their daily living and policies that assist older persons in maintaining their independence.

3. The dimension of economic security, indicators, index and methods for investigating economic security index will give the concepts and processes for other organizations and the government to make an effective policy for the elderly.

CHAPTER II
LITERATURE REVIEW

The organizational framework of literature review has five sections. The first section explains related concepts of the elderly and their economic status. The second one gives details about perspectives of economic security in terms of definitions of economic security, domains of economic security, measurement of economic security, and previous studies on economic security of the Thai elderly. The third section discusses factors contributing to economic security among the elderly. Finally, the last two sections are conceptual framework and hypotheses.

2.1 Concept of the Elderly and their Economic Status

2.1.1 Definition of the Elderly

The definitions of the elderly vary across countries, depending on retirement age of working, health status, social status, economy, and culture of each country (Suwitayaporn, 1991). Hashimoto & Kendig (1992) have summarized the vulnerabilities of the elderly, which may lead to the need for support, in three ways. First, there are socially structured vulnerabilities, which have nothing to do with any intrinsic loss of individual competence. The most important characteristic is compulsory retirement, which excludes old people from the economic benefits and other privileges of employment. The second kind of vulnerability is the heightened risk of physically disabled at advanced age. This frequently combines with other age-related losses such as widowhood and reduced income, thus placing older individuals in a position with multiple disadvantages. The third kind of vulnerability concerns the ways in which social change can adversely affect older people. In many cases, new social opportunities, such as better education and jobs, are available only to younger people.

Based on biological and social-psychological conditions of the elderly, some gerontologists divide the aging period into three stages: the young old (60-69 years), the older old (70-79 years), and the oldest old (80 years and over) (Craig, 1980). For the young old, they undergo many critical changes such as retirement, loss of income, loss of social status, loss of spouse and friends. In general, the aged in this group are still healthy but may have to depend on others. The older elderly are between 70 - 79 years old. This is the time when people start to fall ill, their friends and family members close to them die, and socializing declines. The oldest old are aged 80 and over. They have more difficulty adjusting to the environment and require more assistance from others than do the younger elderly. Moreover, because of the higher age, the oldest old are faced with many health problems. It may be concluded that more aged people need more health care than do younger ones. Care needs will vary according to different stages of aging. The very old person needs more assistance than the less old, because their age diminishes their ability to do things. This study has divided the elderly into three age groups (60 - 69 years, 70 - 79 years, and 80 and above). Most of the Thai elderly fall under the age group of 60-69 years and those above 80 years of age are the smallest in number. These groups become a major concern of the study of economic security among the Thai elderly.

2.1.2 Economic Status of the Thai Elderly

Because of age, the elderly tend to face declining physical health and inability of normal working. This leads to economic difficulties of the elderly. Due to the survey of the poor elderly of the Office of the National Economic and Social Development Board (NESDB) (2008), it showed that

"34.13 % of the Thai elderly had average income a year 1,667 Baht per month and two-thirds of them had no saving or financial insurance. Moreover, the oldest old were likely to face several problems e.g. declined health, being left behind, etc. The 500 Baht of allowance system was not enough for their expenses. In fact, more than half of older persons did not receive governmental assistance. Only 23.8% of the poor elderly entered the system. This situation resulted in the crucial economic problem of the Thai elderly."

Most of the Thai elderly still live with their spouse and children despite changes in living arrangements, weakened family financial support, and reducing of family size and degrees of taking care of them. The Thai elderly have to adjust the living pattern and lifestyle, which affects their economic status in terms of employment, paid working, amount of income, etc.

Thailand is an agricultural country although the country has now developed its industries more than before. The jobs of older persons are classified by their economic activities into two main categories: the jobs in agricultural and non-agricultural sectors. Based on data on percentages of the working older persons classified by their economic activities from 2002-2007, it was found that during those 6 years the percentages of the working older persons in the agricultural sector were higher than those who worked in the non-agricultural sector because such job had no retirement age. Some older persons, who worked in the non-agricultural sector at their retirement age, turned to work in the agricultural sector because they could work as long as they desired.

Based on the Labor Force Survey in 2002-2007 carried out by the National Statistical Office, the percentages of the working older persons increased from 32.3% in 2002 to 35.1% in 2007. With regard to sex, administration areas and regions, percentages of the working older persons increased for both older men and older women; the older men accounted for a relatively higher proportion than old women (48% and 26.8% in 2007). The proportions of the working older persons in all regions increased while the working older persons in Bangkok had the smallest number in comparison with other regions (20.3% in 2007), and this group of older persons in southern regions had the biggest number (43.6%). The work condition of older persons may reflect an individual old person and the whole country. As for the employment of older persons during the 6 years period, it tended to increase.

In consideration of the old-age workforce, it was found that proportions of older women in the informal workforce were higher than old men (91.4% and 90.2%), and older persons outside municipalities were in the informal workforce more than those who lived in municipalities (92.7% and 83.6%).

Moreover, employment and wage of both all employed people and the elderly compared between 2001 and 2005 in Table 2.1 illustrates that the average

wage of all employed persons in 2005 was higher than those of 2001 within sex category. However, there was a decline in income of older persons in the majority of categories, except the area of residence, income of those living in urban areas, which increased a little.

In 2001 the average wage of all employed persons was 6,746 Baht and 4,879 Baht for older persons. In 2005 the average wage of all employed persons increased from in 2001 (7,538 Baht) while the average wage of older person decreased from in 2001 (4,335 Baht). As these figures suggest, income security is a major issue for older persons, especially for older women and those in rural areas as shown Table 2.1, according to the study of Fujika & Thangphet (2009).

Table 2.1: Average Wage of All Employed Persons and Income of Older Persons (Baht/month)

		Wage of all employed persons		Income of older persons	
		2001	2005	2001	2005
Total		6,746.0	7,538.4	4,878.95	4,335.90
Sex	Male	7,095.2	7,903.4	5,619.55	5,071.35
	Female	6,347.6	7,099.0	3,442.95	3,029.00
Area	Urban	9,140.9	-	8,068.65	8,694.30
	Rural	4,709.1	-	3,097.15	2,705.70

Sources: National Statistical Office (NSO), (2001a, 2001b, 2003, 2005).
Ministry of Social Development and Human Security (MSDHS), (2006).

With this regard, the majority of older persons considered their income insufficient. Although the proportion of older persons who described their income as “not enough” declined from 61.8 percent in 1994 to 57.9 percent in 2002, the proportion of those who reported their income as “enough” also decreased from 35.4 percent in 1994 to 32.6 percent in 2002. This related to the decline in the average income of older persons. There were no major male-female differences, notwithstanding the income disparities noted above. The proportion of older persons who reported their income as insufficient was higher in urban than rural areas, by 17.1 percent in 1994 and 14.4 percent in 2002, despite the urban-rural income disparities shown in Table 2.2.

From this situation, in parallel to the report of the Office of the National Economic and Social Development Board (NESDB) (2008) the percent of the poor elderly gradually decreased, but it was still considered the high proportion, suggesting not enough income for the elderly.

Table 2.2: Income Sufficiency (%) of the Elderly in 1994 and 2002

		1994				2002				
		Enough	Not enough	More than enough	Do not know	Enough	Not enough	More than enough	Do not know	No income
Total		35.4	61.8	7.7	0.1	32.6	57.9	0.7	0.7	1.8
Sex	Male	37.0	60.6	2.3	0.1	33.5	57.9	0.6	6.6	1.3
	Female	34.1	62.8	3.0	0.1	31.9	57.9	0.7	7.3	2.2
Area	Urban	19.8	75.7	3.9	0.6	22.2	67.9	1.1	6.7	2.2
	Rural	39.0	58.6	2.4	-	37.3	53.5	0.5	7.1	1.6

Sources: NSO (1995, 2003).

Moreover, proportions of poor people according to ages of family heads of NSO (2007) showed that old-age family heads were likely to become poorer than youth family heads because older persons had less occupational chance than working age persons. In 2006, proportions of the poor people of families whose older persons were the heads were at 29.1% while the family heads who were of beginning working age (20-29 years) were found that they had the least problems as they had proportions of poor people only at 4.7%. This group of families had fewer problems but more chances than the group of families with old-age heads. However, when considering the previous overall circumstance, it turned out that proportions of poor older persons seemed to reduce. In 2002, proportions of poor people were at 40.7 percent and reduced to 29.1 percent in 2004 and 2006, respectively.

In conclusion, economic security is becoming the crucial problem for the elderly. However, perspectives of economic security are defined in various meanings, some of which are included in this study.

2.2 Perspectives of Economic Security

2.2.1 Definitions of Economic Security

Economic security is viewed in so many perspectives. The definition of economic security of United Nations Development Programme (UNDP) (1994) is the desire of humans to survive and earn a living without fear from any danger that threatens their survival. Economic security is expressed as sufficient income to pay for expenditure, having regular employment, access to saving/insurance, ability to pay debt, as well as access to health care and housing. Moreover, UNDP mentions that the main feature of economic security implies the idea of avoidance of economic uncertainty and fulfillment of basic human needs, which is also regarded as an indispensable element of human security.

International Committee of the Red Cross (ICRC) (2008) states that economic security is the condition of an individual, who is able to meet his or her essential needs and unavoidable expenditures in a sustainable manner according to their cultural standards. The study of Meschede (2008) gave the definition of economic security as having stable income with a reasonable standard of living, a solid future for the next generation, access to quality healthcare, and retirement in comfort. According to the International Labour Organization (ILO) (2006), economic security is an access to social basic needs infrastructure including health, education, dwelling, information, and social protection, as well as work-related security in a sense of decent work when individuals have a decent level of income, decent representation security, decent work security, and the real freedom to pursue whatever of the other forms of work related securities they desire. In the study of Hermalin (1997), economic security of elderly is defined as having decent work and earning income, having assets, having safety security, and living conditions.

The Canadian Council on Social development (2002) views economic security as adequate income and certain jobs by employing the social safety net as indicators, income support programs measured by financial vulnerability, and feeling of financial vulnerability. The notions of ESCAP cited in Rubkhamdee et al (1999) explain that economic security is a domain of quality of life. It means the level of having income and assets of family. Moreover, Wider Opportunities for Women

organization (WOW) (2006) views that economic security of the elderly implies secure income (social security, pension, retirement savings, and other income) to cover living costs (i.e. self-expenditure, raising offspring, cost for health care),

The economic security according to Anderson et al. (2002) is having adequate income and an access to safe and supportive living environments e.g. financial security to meet daily needs, living condition, access to family and friends, sense of close personal and social bonds, and support. Moreover, economic security means not only hovering above the "official" federal poverty line, but also having enough money to build a more stable and prosperous future. To be truly economically secure, and leave poverty behind for good, people need enough money to be able to pay for the basics like rent, food, childcare, health care, transportation, and taxes, *and* enough money to develop savings and assets.

The definition of economic security in Thai previous studies was expressed as having sufficient income, working, freedom to choose occupation, and creating standard of working status (Poungsumlee & Ard-arm, 1999). The study of Buradacha (1985) viewed that economic security was a part of working security component, i.e. permanent working, insurance of working when faced with injury or disability in forms of saving, allowance, and pensions. Moreover, Boribarnbanpodkhet (1995) suggested that economic security was feelings of well-being, satisfaction, certainty as a part of welfare. It is identified by having high income above poverty line, satisfaction to living expressed as sufficient income, standard of living, and adaptation to environmental changes.

Additionally, the study of Boribarnbanpodkhet (1995) reviewed economic security of individual as a part of social welfare; it referred economic security to as feelings of good living standard, relating to assurance or satisfaction with response to needs and desires both in the past and future. It was identified as 1) having higher income than poverty line or basic living standard, such as food, clothes, medicine, housing and other things needed for living, 2) satisfaction with living status of individuals as having sufficient income for providing things and services to basic needs, living standard of individual and family in the same level or close to living standard of communities, and 3) economic security depends on changes in communities and surroundings.

In this study, the definition of economic security is the financial ability of daily living based on certain sources of income among the Thai elderly, sufficient income to pay for expenditure, having regular employment, access to saving/ insurance, ability to pay debt, as well as access to health care and housing, which implies the idea of avoidance of economic uncertainty and fulfillment of basic human needs.

In summary, the meaning of economic security was regular adequate income for living. Economic security among the Thai elderly was based on certain sources of income to support their daily living. This included 1) self financial supports, 2) government financial supports, and 3) family financial supports, which are detailed as follows.

2.2.2 Domains of Economic Security

The definitions of economic security were dependent upon several aspects and meanings. To limit a scope of economic security in the study, this part will explain sources of support of the Thai elderly.

1) Self financial support

Self financial support is support of the elderly themselves, which is income from work, saving/interest, and house ownership. Moon (1977) posits that the economic life cycle of individual was divided into three periods, that is, firstly, young age needs to depend on parents. Secondly, the 15-65 years age is labour force through employment system, who serves as both producers and consumers. The last group, or old age, returns to be consumers rather than being producers again. This theory views that economic security of the elderly is similar to life cycle theory of saving or life cycle theory of consumption developed by Modigliani, Ando, and Brumberg (Frango, 1986). They offer the concept that the decision making of individual and household between consumption and saving expresses the goal of the expenditure under the limitation of income and working condition or resources gained in the entire life. This issue shows that consumption level depends not only on income level at present but also on income level in the future. The life cycle of economic explains that when younger age, they will have low income, then when old age, they will have higher

income and decrease when older age. The distribution of consumption through their life span will gradually increase when they get older.

Moreover, this theory views that the first period of working people has low income resulting in load and without saving, and then the older age and higher income they may have more saving and debt repayment**.** According to the economic life cycle, it focuses on the long-term plan of individuals' economic status. The theory explains that saving of each person is not the same; while some have more saving than others, they may have more debts. This depends on spending or consumer behavior. In conclusion, the theory of Ando-Madigliani are mainly involved with expense, saving, and debt behaviors.

The theory explains that income of a person will vary by age, education, and working experience. Education is, in particular, the determinant of starting income. The higher education they are, the higher income they have. Moreover, the working experience of individuals will result in higher income also. An income will be the determinant of expenditure and saving. Therefore, the income is the key factor for decision making in consumption or in spending. It is the main factor that helps a person make decisions to save more or less, one way to build his or her wealth. If people want to have wealth or economic security, they should spend less and save more or try to earn more income.

The concept from literature above and the economic life cycle theory were applied in this study. Economic security was shown in forms of security of financial support among the Thai elderly. Self financial support sources among them composed of work status, hour of working, working condition, education, income, sufficiency of income, amount of saving, expenditure of household and for their own living, household assets, house ownership, debt. Some indicators as measures of self financial support based on the data sets (in 2002 and 2007) and literature reviews as follows.

Working or employment: This indicator was considered as paid working variable, and income from work variable. It was considered as certainty of economic activities. Especially, employment reflected economic security as it was protection against loss of income-earning work. For wage and salary workers, employment security exists in organizations and counties, in which there is strong protection

against unfair or arbitrary dismissal and where workers can redress unfair dismissal. Employment covered working condition, employment status, including decent work for the elderly and suitable working hours for them (ILO, 2006). The studies of Nef (1999), Sharpe (1999), and ILO (2006) defined that employment was a part of identification of economic security. Employment consisted of paid working through routine working regardless of any employment status. Owing to working, people can earn income. However, the hour of working was expressed as indicator of employment as it reflected decent work security (ILO, 2006). Moreover, these studies were in accordance with the study of Butterdahl (1994), which found that economic security was an access to employment for improvements in the material quality of individual and household life.

Previous research stated that economic security referred to working condition, and standard of working status (Poungsumlee & Ard-arm, 1999). From the study of Buradacha (1985), economic security was a part of working security component, that is, job security and insurance of working when they were faced with injury or disability in forms of saving, allowance, and pensions. The study of Supab (1970) viewed that economic security affected gerontology, unemployment, injury from industrial working and death of person within households, etc. This statement confirms that working done by most people results from desire for income for their daily living or other basic needs. Working identifies dignity, power and social status; therefore, working is important in human life, as substantiated by the survey of NSO (2007) that one-third of the elderly still keep working.

Moreover, types of work such as employer, self-employment, unpaid family worker, government employee, government enterprise employee, private employee, and member of co-operatives could be classified into two main categories: unpaid and paid working. They may be variables indicating some of economic security because condition of working indentifies characteristics of work, education, occupation, and income, which serve as good indicators of economic security.

Therefore, this study employed working condition and income from work indicators as a measure of economic security.

Amount of income: Several studies regard income components as a part of economic security of individuals. The study of Keawthep (1980) used income as measure of economic security, parallel to ILO (2006), who viewed that economic security was the condition of having stable income for expenditure or attaining a standard of living. Income is important in human life, that is, if income is low, living can be poor. Likewise, UNDP (2007) stated that economic security was having enough income for living daily and the study of Radner (1995) employed income as measure of economic security. Moreover, the study of Radner of 1966 on income in household unit on the elderly and children viewed that economic status of the elderly was measured by income from cash and non cash, including tax. Cash income came from hire, salary, benefits from social security and insurance, and non-cash income came from food and accommodations of individuals as an analysis unit, making balance of economic status in addition to measurement of economic vulnerability.

As income is an indicator of economic security, it is defined that income is a useful measure of economic status because it relates directly to the material conditions that may affect economic security (Lynch & Kaplan, 2000). Moreover, the studies of Hermalin (1997), and UNDP (1994) revealed that income was extensively used as economic security, with the most typical income-based measure being an individual's total cash income, measured over some period of time such as a month, a calendar year, or the 12-month period. Some researchers believe that income is perhaps the strongest and most robust predictor of economic status. Moreover, the studies of economic security as measured by income suggest levels of income, access to social safety net and sufficiency of income.

In Thailand, studies Chayovan & Knodel (1996) were dealt with economic conditions of the elderly by evaluating their income from such variables as average total income per year and satisfaction with current financial status in forms of survey. In the works of Tangthong (2000) and Boribarnbanpodkhet (1995) economic security consisted of income from all sources while that of Thanakwang & Soonthorndhada (2007) employed average total income per year compared to poverty line. Income is determinant to satisfaction and wellbeing. Due to economic crisis, it results in fluctuations of living cost. Older age people cannot support themselves, and they may lose income

in some parts or lose all income due to declining physical health and finally losing routine work. This affects their living expenses, such as transportation, household expense and health care among others.

Although the Thai elderly receive free services in health care by using the senior citizen card, most of them still have other burdens. According to Chayovan et al. (1989) most of the aged were poor and 60% of them had lower income than 500 Baht a month or none. When compared to the average income of the whole population, the elderly had an income of only 1,700 Baht a month as of 1989. Recent studies also had the same results; the Thai elderly were poor expressed by having lower income than poverty line (about 10,000 Baht) (Chayovan, 2005, Suwanrada, 2009). Income is instable while everything of basic needs is of higher costs. It drives elders to go on working. Moreover, Poungsumlee & Ard-arm (1999), and Sociology online (2001) revealed that income as a component of economic security referred to having sufficient income measured by own feeling. Similarly, Boribarnbanpodkhet (1995) viewed that feelings of sufficiency income reflected economic security in terms of responding to basic economic needs and that human should receive both physical and spiritual support.

As a result, income is the most employed component of measure of economic security of the elderly. Furthermore, it has been found that component of income identified several indicators, such as average total income per year, level income, access to social safety net, sufficiency of income, having enough low income, and having higher income than poverty line, income satisfactory to living status of individuals.

However, the study focused on income component identified as average total income per year, and sufficiency of income to express the status of economic security on the elderly based on the identification of two indicators.

Saving/interest and assets: Saving value and assets were identified as an economic status of the elderly. Saving value referred to having sufficient income. Throughout their life, the elderly may collect property and money for use when older. Monetary assets are gained from working for long time. Saving is a main source of income. Moody (1994) viewed that one-fourth of income of the elderly came from saving in both money and assets, such as house, land, and movable property. However,

housing was clearly expressed as living standard; it was the place for resting, cooking, working, and other purposes. The lack of housing of the elderly or living in others' house often brought them unhappiness. Some elders had to live in an almshouse (Thomas, 1988; Boonchuay, 1993).

From the survey of the Thai elderly's economic status, it was found that there were 7 types of housing for them: temporary cabin, hut, Thai house with platform, wood-brick house, row building, town house, and detached house. Previous studies found most of the elderly in rural area living in temporary cabins, huts, and Thai houses with a platform. The examination of their housing in rural areas reported that their houses were in decay accounting for 12% (Chayovan & Knodel, 1996). However, most of them had stable houses because of time and experience and money collected for older age. The elderly needed living security. Assets and saving value indicated living arrangements that could reflect their economic security. Moreover, asset was referred to monetary saving collected since working age. Moreover, the studies of Siriboon & Wongsite (1995), Boribarnbanpodkhet (1995) found that saving, housing, and assets clearly showed economic security of the elderly, similar to the study of Tangthong (2000).

Hence, self financial support consisted of working condition, income from work, amount of income, income from saving/interest, and house ownership, all which were variables that showed self financial support among the Thai elderly.

2) Government financial support

It is well-known that the ageing of the population has serious problems because of inadequate income for later life. The majority of the ageing population in Thailand do not have retirement benefits (formal pensions). The issue of older people is now becoming the national agenda. The policies have been established to support the elderly. According to the Vienna International Plan of Action on Aging in 1978, the Thai government established the National Committee on Elderly to establish the plan for the needs of the elderly. The National Long-Term Plan for the Elderly Population in 1982-2001 was subsequently established to solve their problems in the scopes of health, education, social and income stability, social and cultural integration and social welfare provision.

In 1999, Thailand made its Declaration on Older Persons, the same year that the United Nations proclaimed as the International Year of Older Persons. Under the Declaration, protection of older persons in health care, living their life with value and dignity, happy life, receiving of care, protection from abandonment, educational and learning chances, and social integration are explicitly mentioned. Then in 2002, the United Nations convened the 2nd World Assembly on Ageing in Madrid, Spain and the Madrid International Plan of Action on Ageing 2002 was adopted. Thailand issued its 2nd National Plan for Older Persons 2002-2021 as the principle of development and implementation of work concerning the aged population in Thailand. In compliance with the significant contents of the Madrid International Plan of Action on Ageing 2002, the strategies comprise preparation for quality ageing, promotion, social security/protection system for the elderly along with administration to develop national work for the elderly, including personnel involved, process and development of knowledge on the elderly, and monitoring and appraisal of implementation of the National Plan for Older Persons.

At present, there are three main financial systems in Thailand 1) Universal Coverage Scheme (UC) which covers the population in the informal sector, 2) Social Security Scheme (SSS) which includes all employees in the private sector and those who are not covered by any public insurance, and 3) Civil Servant Medical Benefit Scheme (CSMBS) and state enterprise benefits are fully paid by the government (taxation) and state enterprise. Regarding pensions and retirement benefits, there are two major government-sponsored schemes: one for civil servants and state enterprise employees and the other for general workers under the Social Security Act. The second scheme covering general workers went into effect at the end of 1998. Contributions to the pension fund are made by employees, employers, and the government. This has increased the number of persons under a government retirement benefit system from 6-7 percent to 18 percent of the labor force. The Ministry of Finance undertook the study to establish the obligatory National Pension Fund aiming to set up the income security after retirement for working age populations either as private employees and public servants or as the state-enterprise employees.

National Policies of financial support among the Thai elderly from Thai government were considered in this study with regard to their pension and old-age allowance systems. They are sources of income maintenance system for the elderly as shown in the details below.

Government pension: Government employees who retire from government offices receive benefits in the form of a lifetime pension or a lump sum payment. The amount of lump sum payment is calculated by multiplying the final month's salary by the number of years in service. The retirement benefits for state enterprise employees are also determined in the same manner except that there is no lifetime pension. Additionally, there are two types of pension systems for central and regional government officers. They are pensions from the national budget and the government pension fund. The level of pension depends on the level of salary of the last month before retirement and the length of time working as government officials (numbers of years of working). The formula employed for calculating the monthly pension according to Government Pension Fund (2008) cited in Suwanrada (2009)'s research is presented here.

Pension = (1/ 50) * (last income * time)

Where:

Pension = Monthly pension

Last income = The level of income of the last month before retirement

Time = The number of years working as a government official

However, most elders work in the informal sector, so they do not receive government pension after stopping work. When these workers get older, they will receive the government allowance as poor older persons, instead. It is the elderly fund established in 2004, under the prescription set forth in the Act on Older Persons 2003, as the government fund with objectives to be used as expenses to protect, promote and support older persons.

Monthly allowance for older persons: Non-contributory pension

The government has undertaken to provide pecuniary assistance to poor older persons under the monthly allowance program since 1993. In the beginning the monthly allowance of 200 Baht (6 US$) was granted to all old people who were entitled to such assistance–those who had no income or were poor. In 2007, the State increased the monthly allowance up to 500 Baht (14 US$) per capita. That monthly allowance was accessible to approximately two million older persons in all 75 provinces of the country or equivalent to approximately 25% of the entire old population (Ministry of Public Health and Ministry of Social Development and Human Security, Thailand, 2007). Additionally, the study of Suwanrada (2009) viewed that local authorities with an adequately strong fiscal resource could adjust the funding by their own. They might increase allowances (must not exceed 1,000 Baht per month) or increase the number of eligible recipients. After fiscal year 2005, the number of recipients increased sharply. In fiscal year 2009, the number of recipients was approximately 2.3 million, with 0.5 million of the elderly receiving allowance subsidized by the local authorities.

The income gained from the social security benefits above is inadequate to cover expenditure for health and day-to-day living of the elderly. These policies for them do not cover retirement benefits. Moreover, the government cannot adjust these pension benefits with the changing cost of living or inflation because of low public savings, welfare expenditures and inflation that prevailed in Thailand for some time (Smeeding & Weaver, 2002; Knodel & Chayovan, 2008). Retirement systems currently cover 25 percent of Thailand's working age population (Sobieszczyk et al., 2003; Knodel & Chayovan, 2008) whilst public assistance is provided for 10 percent to the aged. Furthermore, more studies continuously confirm that retirement benefits cover only about 50 percent of the employed population since most workers are in informal sector (NSO, 2007).

The National Policy cannot assist the elderly thoroughly. Most elders are still faced with economic difficulties in the rest of their life. Therefore, economic security is so a crucial problem for the elderly that it needs to be urgently solved. Fortunately, the Thai elderly still have another source of income in addition to apart the government's. This is family financial support.

3) Family financial support

Due to Thai tradition and culture, children should be main care givers and support their old parents. Currently, the elderly in Thailand still depend heavily on family financial support for their main income source, accounting for 52.3 percent in 2007 (NSO, 2007). The Thai elderly cannot depend only on the government financial support. Moreover, because employment and wage of the elderly decreases due to declining health, family financial support is believed to be the best assistance for their living.

Family financial support means assistance the elderly receive from persons living in the same household and having relationships either from the same family, adoption or law. These care givers can be spouse, children, grandchildren, son or daughter-in- law, relatives, and other members in the family.

In general, it is found that family financial support can be categorized into several types, both non-material and material support. However, this study focused on financial support from family or other members in the household.

It is well known that the government financial fund system in most developing countries is pensions or insurance schemes, which are likely to be provided only to a very small number of the elderly, and mainly to those living in the urban areas. For example, in Thailand it was estimated that in 1985, old age pensions, which were given to government employees, state enterprise employees and private enterprise, only benefited about 7 percent of the elderly aged 60 and over, and most of them lived in urban areas (Kiranandana et al., 1988). In Korea, only 1.2 percent of the retired elderly (55 years and above) received benefits from a retirement pension in 1990 (Ehn and Jung, 1991). This is also true of provident funds, which cover only workers in the formal sector, are paid out in a lump-sum upon retirement, and are usually inadequate. Therefore, most elderly persons have to go on working despite old ages and depend almost entirely upon family during their later years. This is also common among Asian families (Concepcion, 1987). The care and support provided to parents are usually in form of shared housing, food and other necessities and, less often, in the form of direct transfers of income. Transfers, or remittances, are more likely to be made by children who live apart from their elderly parents (Kuroda, 1992).

Pramualratana (1990) found in his study done in a rural community in Thailand that material support meant the provision of monetary and material goods. Similar kinds of remittance given by children to their parents were also considered as material support. Types of support may be classified differently. In this study the main focus was on material support including living arrangement and financial support. This is because of limitations of the data used, and of the importance the elderly's needs for the material support, especially the financial one, which is viewed as the main source of comfortable life (Yodpetch et al., 1997 and 1998). Living arrangement covers material support including food, clothes, everyday necessities, and special care when they are ill or occasional visits are made. Financial support refers to money for the elderly for their essential expenses and medical fees when they fall ill.

In every human society, people have organized their lives around a family unit. In a general sense, a family is any group of people who are related to one another by marriage, birth, or adoption. Implicit in the definition of a family is that its members share a sense of social bonding–the mutual acceptance of reciprocal rights and obligations, and of responsibility for each other's security.

Generally, in every type of family, the family institution provides important functions to its members. A California Task Force identifies five basic family functions: maintain physical health and safety, provide conditions for emotional growth, help shape a belief system of goals and values, create a place for recreation, and create a place for recuperation from external stress (Sulima, 1989). Davidson and Moore (1996) proposed three contemporary family functions: economic corporation, socialization of the young, and fulfillment of affective needs.

Thai family system shares some common characteristics and values with other societies in Southeast Asia. The family remains the basic training ground that launches its young generation into the society. Children are not generally considered independent until their marriage or they start their own families. Seniority is well observed, children treat their parents and grandparents with respect, the younger respect the older, and senior members are expected to provide help to junior members. The Thai family system is unique in that it has only a weak sex preference of children, relatively high autonomy of women and less sexual segregation in many respects of lives.

Studies consistently show a mix of nuclear and extended households in the Thai context with nuclear households predominating when viewed in the cross-section (National Statistical Office, 2006; Potter, 1976). A common residence pattern for both urban and rural households is the family compound, where adults build an independent house on the parental land. Much of theoretical focus of work on the Thai family has been put on an extensive debate on the loosely structured paradigm (Sharp and Hanks, 1978). This paradigm views Thai behavior and personality as relatively less governed by standard rules and norms.

The implications of the matrilineal system on the family life cycle are that the household has alternate phases of being nuclear and extended. Men normally move into their wife's parents' household for a period of one to three years and then establish a separate, economically independent household. The most common tradition for the youngest daughter together with her husband is to stay with her parents to take care of them and run the family business. In the typical family life cycle, the non-permanent son-in-law (the husband of an older daughter) moves into the household when his father-in-law is still economically active and relatively powerful, because he controls inheritance. The permanent son-in-law moves in when the father-in-law is older and economically dependent. Although inheritance is normally distributed in equal portions to all children, there is tendency to leave the house and land to the daughter and son-in-law who stay in the parental household (Richter & Podhisita, 1991-1992).

Family financial support in this study was considered as living with family and financial support. Living arrangement is an integral part of the family financial support system in much of the developing world. In Thailand, the elderly parents traditionally live with or nearby their children, typically in a stem family configuration.

As literature discusses, no standard strategy has yet evolved for capturing the essential elements of support system for the elderly. Living arrangements in which the elderly live with their children cannot guarantee that the elderly will have economic security. Whereas living arrangement with children is provided by family, friends, neighbors, colleagues and people within the community may result in more

economic security (Dobrof, 1992). Most studies indicate that the family is an important source of the elderly's support.

Therefore, family financial support by members in the same household, such as spouse, children, offspring, or son/daughter in law, is the foundation of economic support of the elderly for the rest of their life after retirement. According to the studies of Soldo and Hill (1993), and Mason (1992), it is important to distinguish living arrangement with family of the elderly from their economic security derived from financial and material supports. Likewise, Chang (1992) and Kuroda (1992) pointed out that family financial support in terms of economy was normally provided by the family during the terminal stage of life. Moreover, the study of Esterman & Andrews (1992) revealed that family financial support for the elderly included giving money, and paying for medical expenses. Also, this study used secondary data to examine intra-household elderly care provided by the co-residing household members, and at the same time focused strongly on the way the elderly received money, food, and were taken to the hospital and met medical expenses.

A central feature of family financial support in Thailand for elderly members is co-residence (or living in the same household) with at least one child (Cowgill & Holmes, 1972; Knodel et al., 2005). In northern and northeastern Thailand, such a child is usually the youngest daughter. Families in central Thailand, where KDSS is conducted, are characterized by a bilateral family system. The kinship relations in bilateral family systems may give the elderly a greater choice of kin from whom to seek support or care when they get old. Because kinship is practiced in bilateral system, women and men are equal members of their natal families. The elderly may live with daughter or son and children-in-law either in the same house, or in another house in the same compound. Normally, inheritance is equally distributed to all children, but there is a tendency to leave the house and possibly a larger share of land to the daughter or son who stays in the parental household (Foster, 1975; Yoddumnern-Attig et al, 1992; Richter & Podhisita, 1992). A national survey in 2002 showed that a substantial majority of older persons (65.7 percent) in Thailand co-resided with their children (NSO, 2003). That led to economic wellbeing of the elderly as they had supporters.

Family often is an important source of economic support. Besides financial and material support, the assistance the elderly receive in daily living as well as for special care when they are frail or become ill is important to the well-being of older persons. The second national survey has shown that about three fourths of the respondents reported that they were provided assistance for daily living activities during the past 12 months. Children or children-in-law were the main persons providing assistance (43 percent), followed by spouse (29 percent). Those who had economic vulnerability could not assist themselves in main areas, such as food, clothes, medicine, and housing. Again, children or children-in-law were the most frequently reported as the main provider of assistance. Compared to the general aged population of, men and women with economic difficulties and with a special need for living were considerably more dependent on children and children-in-law as well as others who were not their spouse. The majority of respondents also mentioned that when they got sick, children or children-in-law (50 percent), or a spouse (40 percent) were the ones who took care of them (NSO, 2003).

The Survey of Older Persons in Thailand in 2002 also indicated that children (including children-in-law) were the most common source of income support. Assistance from relatives other than children as a main source of income is rare in Thailand. However, relatives are very important for the small number of childless elders. It is also common for them to reside with other relatives (Knodel & Chayovan, 1997).

However, with demographic, social, and economic change, the elderly roles are changing and becoming less in Thai society. Based on the two rounds of Survey of Older Persons in Thailand conducted by the National Statistical Office in 1994 and in 2002, the percentage of the elderly who lived alone increased from 3.6 percent to 6.5 percent, while the proportion of older parents and their adult children or children in-law co-residing decreased from 74 to 66 percent, at an annual rate of one percent (Knodel et al., 2005). The Thai national elderly survey also showed that among those who were living alone, more than half of them (55.3%) reported that they experienced problems, especially those who lived in rural areas and were older.

In summary, the family and adult children, in particular, continue to be the fundamental base of the system of support and care provided to the Thai elderly.

However, many societal changes have implications for the familial support system. These include smaller family sizes, increased economic activity outside the home by women (the predominant caretakers), separation of parents and adult children associated with urbanization and increased migration, and ideational change (Mason, 1992; Martin, 1989; Caffrey, 1992 b). As a result, family financial support became an important component of measure of economic security.

The present study will apply definitions and domains of economic security in terms of social science so as to fit with the availability of data. Economic indicators will be used to construct the index of economic security to measure the level of economic security of the Thai elderly.

2. 3 Measurement of Economic Security

The study of economic security is called aggregate level. Dependent variable is measured for index, and variability in outcomes across groups is examined as an economic security index of these dependent variables. These analyses often proceed as if the measurement of economic aspects at individual level was simply a proxy for measurement at the individual level. In economic security the study is related to the economic status of samples. The units of analyses are often based on administrative definitions, for example, census blocks and tracts, postal codes, metropolitan statistical areas, states, and countries (Lynch & Kaplan, 2000). To measure the economic security of the elderly, such relevant components as income, employment, expenditure, saving and asset, debt are taken into account. One implication is that it is often preferable to employ composite measures that combine data on these components above into one figure. In addition, if data on one or more of these three indicators are lacking, it is often valid to include data on proxy measure in the construction of economic security index (Lynch and Kaplan, 2000).

Although most studies on economic security measure only income, a bulk of literature suggests that several variables can also be indicators of economic security, substantiated by the studies of Lynch & Kaplan (2000), ILO (2006), Min (2008), and Moon (1977), who asserted that economic security could not be explained by any single indicator. Economic security should be constructed by several indicators to

measure economic security, especially for the elderly living for a long time. Therefore, to deeply study in constructing economic security index, the definition and concept of measurement method on economic security should be carefully discussed.

2.3.1 Definitions and Concept of Constructing Index

In previous studies, most studies employed a variable at a time to measure economic security. Alternatively, this study is interested in constructing an index to measure economic security. With regard to economic security, several variables should be used to make the index as literature above suggests. Nardo et al (2005) state that composite indicators (Cls) are increasingly recognized as a useful tool in policy analysis and public communication. The composite indicator can be either a quantitative or a qualitative measure, which points out the direction of change across different units and through time. It is useful in identifying trends and paying careful attention to specific issues. A composite indicator is formed when individual indicators are compiled into a single index on the basis of an underlying model. The composite indicator should ideally measure multi-dimensional concepts which cannot be captured by a single indicator alone. This composite indicator is more beneficial as it can summarize complex or multi-dimensional issues in view of supporting decision-makers. It is easier to interpret than to try to find a trend in many separate indicators. Moreover, the composite indicator facilitates the task of ranking countries on complex issues in a benchmarking exercise, assesses progress of countries over time on complex issues, reduces the size of a set of indicators or includes more information within the existing size limit, places issues of country performance and progress at the centre of the policy arena, facilitates communication with general public (i.e. citizens, media, etc.), and promote accountability. On the other hand, the composite indicator may cause some troubles. It may deliver misleading policy messages if it is poorly constructed or misinterpreted, invite simplistic policy conclusions, and be misused in different ways e.g., to support a desired policy, if the construction process is not transparent and lacks sound statistical or conceptual principles. The selection of indicators and weights could be the target of political challenge. It may also disguise serious failings in some dimensions and increase the difficulty of identifying proper

remedial action. It may lead to inappropriate policies if dimensions of performance that are difficult to measure are ignored.

Munda & Nardo (2005) suggested that in constructing consistent composite indicators, the composite indicator (or indices) should consist of a plurality of variables as the evaluation of a macroeconomic dimension. Composite indicators can consider both the estimation of weights and non weight. The weights of the variables depend on a multiplicative coefficient. The use of weights in combination with intensity of preference (given that variables are always supposed to be measured on an interval or ratio scale) within a linear aggregation rule originates compensatory aggregation conventions and gives the meaning of trade-offs to the weights. The weights follow the value of the trade-off. One has to be obvious that the trade-off depends on the measurement scale used for measuring the variable scores and on the range that the measurements of variable scores may present.

First, consider the measurement scale. In the construction of a sustainability composite indicator, one obvious observation might be that composite indicator variables are normalized and thus effects measurement scales. Consider, for example, the normalization technique distance from the group leader, which assigns 100 to the leading alternative and other alternatives are ranked as percentage points away from the leader (Saisana & Tarantola, 2002), which is 100{actual value/ maximum value}.

Charoenwongsak (2000) viewed that current developments in the globalization age were changing rapidly and this age of much complex information, made it necessary to employ tools or indicators to briefly summarize the information in a situation so as to make many decision on various matters. The importance of using an index or indicator would increase continuously. A valid index could reflect the truth more accurately and precisely. The concepts about indicators are shown below.

An indicator is the information or value that can be observed in a quantitative or quantitative manner whose benefits can be used to broadly point out the condition of something to be measured or give reflections of a matter. An indicator has three main characteristics (Johnstone, 1981). An indicator is something that points out/sets in the form of a quantity or can be made into a quantity. It is not a context narration of an interpretation of the indicator figure value and must be compared with

the criterion made so that it can explain the meaning of how high/ low the figure is. Last, the interpretation criterion of an indicator figure system must be clear.

The value of an indicator is temporary, not permanent. It varies according to time and space. In other words, an indicator will point out a meaning under time and place conditions as it will point out a specific meaning for a certain period of time and in a specific area or years, such as a 3 month- or 5 year-period indicator of any province, district, region, or country depending on duration and place used in collecting data to make such an indicator. An indicator is something that points out what is intended to be measured in a broad perspective or in a form of general information rather than being a specific one.

Composite indicators are increasingly recognized as a useful instrument to gauge a country's performance, which can be applied for economic security index. Even though composite indicators are usually used for macro-level analysis, the way to construct indicators is useful and can be applied for the micro-level (Sirikwanchai, 2005). The following guidelines of constructing composite indicators have been widely and popularly employed until now. It is a guideline highlighting for empirical studies through quantitative analysis. The seven steps of constructing composite indicators are presented below (OECD, 2005 and OECD, 2008).

2.3.2 Steps of Constructing Index

Step 1 Developing a Theoretical Framework

A sound theoretical framework is the starting point in constructing composite indicators. The framework should clearly define the phenomenon to be measured and its sub-components and select individual indicators and weights that reflect their relative importance and the dimensions of the overall composite. This process should ideally be based on what is desirable to measure and not on what indicators are available to be suitable in constructing credible indicators. The details of defining the concept are set out here.

The definition should give a clear sense of what is being measured by the composite indicator. It should refer to the theoretical framework, linking various sub-groups and the underlying indicators. The index constructed should be linked with the framework and related concepts clearly, however, it is even difficult to define and

measure precisely and may be subject to controversy among stakeholders. Ultimately, the composite indicators should assess their quality and relevance.

Multi-dimensional concepts can be divided into several sub-groups. The sub-groups need not be independent of each other, and existing linkages should be described theoretically or empirically as much as possible. This step, as well as the next, should involve experts and stakeholders as much as possible, in order to take into account multiple viewpoints and to increase the robustness of the conceptual framework and set of indicators. Identifying the selection criteria for the underlying indicators and the selection criteria should work as a guide for whether or not an indicator should be included in the overall composite index.

Step 2 Selecting variables

The strengths and weaknesses of indicators derive mainly from the quality of the underlying variables. Ideally, variables should be selected on the basics of their relevance, analytical soundness, timeliness, accessibility, etc. While the choice of indicators must be guided by the theoretical framework for the composite, the data selection process can be quite subjective as there may be no single definitive set of indicators. The lack of relevant data also limits the constructor's ability to build sound composite indicators. Given a scarcity of internationally comparable quantitative (hard) data, composite indicators often include qualitative data from surveys or policy reviews.

Step 3 Imputation of missing data

A lack of data often hinders the development of robust composite indicators. Data can be missing in a random or non-random fashion. The missing patterns could be:

Missing Completely at Random (*MCAR*)

Missing values do not depend on the variable of interest or any other observed variable in the data set. For example, the missing values in the variable income would be of the MCAR type if (1) people who do not report their income have, on average, the same income as people who do report income, and if (2) each of the other variables in the data set would have to be the same, on average, for the people who do not report the income and the people who do.

Missing at Random (MAR)

Missing values do not depend on the variable of interest but they are conditional on other variables in the data set. For example, the missing values in income would be MAR if the probability of missing data on income depends on marital status but, within each category of marital status, the probability of missing income is unrelated to the value of income. Missing can occur of because of design, for instance, if survey question 1 is answered "Yes", then survey question 2 is not to be answered. This fault is attributed to the wrong covariates, another type of MAR.

Not Missing at Random (NMAR)

Missing values depend on the values themselves. For example, high income households are less likely to report their income.

Step 4 Multivariate analysis

This first step is helpful in assessing the suitability of the data set and provides an understanding of the implications of the methodological choices, e.g. weighting and aggregation during the construction step of the composite indicator. Principle components analysis (PCA) and Factor analysis (FA) have usually been used. The goal of PCA is to reveal how different variables change in relation to each other and how they are associated. This is achieved by transforming correlated variables into a new set of uncorrelated variables using a covariance matrix or its standardized form–the correlation matrix. Factor analysis (FA) is similar to PCA; however, it is based on a particular statistical model. An alternative way to investigate the degree of correlation among a set of variables is to employ the Cronbach coefficient alpha (c-alpha), which is the most common estimate of internal consistency of items in a model or survey. These multivariate analysis techniques are useful for gaining insight into the structure of the data set of the composite.

Step 5 Normalization of data

Normalization is required prior to any data aggregation since the indicators in a data set often have different measurement units. There exist a number of normalization methods (Table 8) (Freudenberg, 2003; Jacobs et al., 2004):

1. *Ranking* is the simplest normalization technique. This method is done without being affected by outliers and allows the performance of countries to be followed over time in terms of relative positions (rankings).

2. Standardization (or z-score) converts indicators to a common scale with a mean of zero and standard deviation of one. Indicators with extreme values thus have a greater effect on the composite indicator. This might not be desirable if the intention is to reward exceptional behavior, i.e., if an extremely good result on a few indicators is thought to be better than a lot of average scores. This effect can be corrected in the aggregation methodology by excluding the best and worst individual indicator scores from inclusion in the index or by assigning differential weights based on the desirability of the individual indicator scores.

3. Min-Max normalizes indicators to have an identical range [0,1] by subtracting the minimum value and dividing the range of the indicator values. However, extreme values or outliers may distort the transformed indicator. On the other hand, Min-Max normalization can widen the range of indicators lying within a small interval, increasing a better effect on the composite indicator than does the z-score transformation.

4. Distance to a reference measures the relative position of a given indicator vis-à-vis a reference point. This could be a target to be reached in a given time frame.

5. Categorical scale assigns a score for each indicator. Categories can be numerical, such as two or three stars, or qualitative, such as fully achieved, partly achieved or not achieved. Often, the scores are based on the percentiles of the distribution of the indicator across countries. Since the same percentile transformation is employed for different years, any change in the definition of the indicator over time does not affect the transformed variable. However, it is difficult to follow increases over time. Categorical scales exclude large amounts of information about the variance of the transformed indicators. Besides, when there is little variation within the original scores, the percentile bands force the categorization on the data, irrespective of the underlying distribution. A possible solution is to adjust the percentile brackets across the individual indicators so as to obtain transformed categorical variables with almost normal distributions.

6. Indicators above or below the mean are transformed such that values around the mean receive 0, whereas those above/below a certain threshold receive 1 and -1 respectively. This normalization method is simple and is not affected by

outliers. However, the arbitrariness of the threshold level and the omission of absolute level information are often criticized.

7. Methods for cyclical indicators. The results of business tendency surveys are usually combined into composite indicators to reduce the risk of false signals, and to better forecast cycles in economic activities (Nilsson, 2000). This method implicitly gives less weight to the more irregular series in the cyclical movement of the composite indicator, unless some prior *ad hoc* smoothing is performed.

8. The latter is a special case of balance of opinions, in which managers of firms from different sectors and of varying sizes are asked to express their opinion on their firm's performance.

9. Percentage of annual differences over consecutive years represents the percentage growth with respect to the previous year instead of the absolute level. The transformation can be used only when the indicators are available for a number of years.

Table 2.3 Normalization Methods

Method	**Equation**
Ranking	$I_{qc}^{t} = Rank\,(x_{qc}^{t})$
Standardization (or z-scores)	$I_{qc}^{t} = \dfrac{x_{qc}^{t} - x_{qc-\tau}^{t}}{\sigma_{qc-\tau}^{t}}$
Re-scaling	$I_{qc}^{t} = \dfrac{x_{qc}^{t} - \min_{c}(x_{q}^{t_0})}{\max_{c}(x_{q}^{t_0}) - \min_{c}(x_{q}^{t_0})}$
Distance to a reference country	$I_{qc}^{t} = \dfrac{x_{qc}^{t}}{x_{qc-\tau}^{t_0}}$ or $I_{qc}^{t} = \dfrac{x_{qc}^{t} - x_{qc-\tau}^{t_0}}{x_{qc-\tau}^{t_0}}$

Table 2.3 Normalization Methods (continued)

Method	Equation
Categorical scales	$I_{qc}^{t} = \begin{cases} 25 if\ x_{qc}^{t} \in \{p^{25th}\} percentile \\ 50 if\ x_{qc}^{t} \in \{p^{50th} - p^{25th}\} percentile \\ 75 if\ x_{qc}^{t} \in \{p^{75th} - p^{50th}\} percentile \\ 100 if\ x_{qc}^{t} \in \{p^{100th} - p^{75th}\} percentile \end{cases}$
Indicators above or below the mean	$I_{qc}^{t} = \begin{cases} 1 \ \ if\ w > (1+p) \\ 0 \ \ if\ (1-p) \le w \le (1+p) \\ -1\ if\ w < (1+p) \end{cases}$ Where w = $\frac{x_{qc}^{t}}{x_{qc-\tau}^{t_0}}$
Cyclical indicators (OECD)	$I_{qc}^{t} = \frac{x_{qc}^{t} - E_t(x_{qc}^{t})}{E_t(\lvert x_{qc}^{t} - E_t(x_{qc}^{t}) \rvert)}$
Balance of opinions (EC)	$I_{qc}^{t} = \frac{100}{N_e} \sum_{e}^{N_e} \mathrm{sgn}_e (x_{qc}^{t} - x_{qc}^{t-1})$
Percentage of annual differences over consecutive years	$I_{qc}^{t} = \frac{x_{qc}^{t} - x_{qc}^{t-1}}{x_{qc}^{t}}$

Note: X_{qc}^{t} is the value of indicator for country *c* at time *t*. $\bar{C}$ is the reference country. The operator *sgn* gives the sign of the argument (i.e. +1 if the argument is positive, -1 if the argument is negative). N_e is the total number of experts surveyed.

The selection of a suitable method, however, is not a trivial matter and deserves special attention (Ebert and Welsh, 2004). The normalization method should take into account the data properties, as well as the objectives of the composite indicator. Different normalization methods will yield different results. Robustness tests might be needed to assess their impact on the outcomes.

Step 6 Weighting and aggregation

When used in a benchmarking framework, weights can have a significant effect on the overall composite indicator and the country rankings. There exist a number of weighting techniques. Some are derived from statistical models, such as factor analysis, data envelopment analysis and unobserved components models (UCM) or from participatory methods like budget allocation (BAL), analytic hierarchy processes (AHP) and conjoint analysis (CA). Unobserved components and conjoint analysis approaches are explained in the Toolbox for Constructors. Regardless of which method is used, weights are essentially value judgments. While some analysts might choose weights based only on statistical methods, others might reward (or punish) components that are deemed more (or less) influential, depending on their consideration, to better reflect policy priorities or theoretical factors.

Composite indicators rely on equal weighting or an unequal weighting. Weights may also be chosen to reflect the statistical quality of the data. Higher weights could be assigned to statistically reliable data with broad coverage. However, this method could be biased towards the readily available indicators, penalizing the information that is statistically more problematic to identify and measure. Moreover, the existing literature offers a rich menu of alternative weighting methods, all of which contain pros and cons. Statistical models such as principal components analysis (PCA) or factor analysis (FA) could be used to group individual indicators according to their degree of correlation. However, weights cannot be estimated with these methods if no correlation exists between indicators.

Aggregation methods also vary. While the linear aggregation method is useful when all individual indicators have the same measurement unit, provided that some mathematical properties are respected, geometric aggregations are better suited if the modeler wants some degree of non compensability between individual indicators or dimensions. Furthermore, linear aggregations reward base-indicators proportionally to the weights, while geometric aggregations reward those countries with higher score. In both linear and geometric aggregations, weights express trade-offs between indicators. A deficit in one dimension can thus be offset by surplus in another. This implies an inconsistency between how weights are conceived and the actual meaning when geometric or linear aggregations are used.

Step 7 Robustness and sensitivity

Several judgment calls have to be made when constructing composite indicators, e.g. the selection of indicators, data normalization, weights and aggregation methods, etc. The robustness of the composite indicators and the underlying policy messages may thus be contested. A combination of uncertainty and sensitivity analyses can help gauge the robustness of the composite indicator and improve transparency.

2.3.3 Quality of Composite Method

The development of a quality framework of composite indicators depends on several aspects, related to both the quality of elementary data used to build the indicator and the soundness of the procedures used in its construction. Quality is usually defined as fitness for use in terms of user needs. As far as statistics are concerned, this definition is broader than has been used in the past when quality was equated with accuracy. It is now generally recognized that there are other important dimensions. Even if data are accurate, they cannot be said to be of good quality if they are produced too late to be useful, cannot be easily accessed, or appear to conflict with other data. Thus, quality is a multi-faceted concept. The most important characteristics of quality depend on user perspectives, needs and priorities, which vary across user groups.

Quality of composite indicators depends on accuracy of data. This method of constructing composite index above is reliable and accurate due to assessing process of mathematical method, according to OECD (2008). As a result, this method was employed in constructing economic security index of the Thai elderly.

However, it has been generally accepted that human beings have many similar factors. Thus, economic security index of the elderly is the integration of all those indicators. The ability to seek and integrate all of those factors is based upon different levels and security of individuals' economic.

Economic security of each social group, therefore, has different characteristics and levels of standards. However, it is difficult to measure or evaluate an individual's economic security from other population age groups. It is essential to review the concept of the elderly and economic security related to them through previous studies.

2.3.4 Previous Studies on Economic Security

The concepts and degree of economic security have been employed as the major terms to measure the economic stability of the elderly. Before assessing economic security, it is important to discuss some ideas about economic indicators because economic indicators or economic security indicators can consist of a composite index of economic security and be employed to measure and identify the definition of economic security index.

Previous studies have shown that in order to measure of economic security among the elderly, most research studies employed an indicator, such as income or employment or working at a time. However, economic security should be measured in form of an index with several aggregated variables. Economic security is composed of basic social and living security. Moreover, it is the basic needs the elderly should meet. This approach focuses on economic measurements and analyses designed to improve our understanding of what indicators of economic security are, how they interrelate, and how these indicators are constructed.

There are many variables and indicators used to measure each of economic security domains. A selection of suitable indicator is shown in Table 2.3. It is found out individual level. In this study, domains of economic security included three sources of support: self financial support, government financial support, and family financial support.

Then each source of income support was aggregated to construct an index to measure level of economic security among the Thai elderly. Moreover, economy security of the elderly did not depend only on source of income support, but there were also other contributory factors.

2.4 Other Influential Factors on Economic Security of the Elderly

2.4.1 Socio-Demographic Factors

1) Sex

Sex is implied to a lens through which to consider the appropriateness of various policy options and how they affect the well-being of both men and women. Numerous studies argue that sex differences affect economic outcomes and well-being

due to (1) differentials in sex roles, associations, and resources, and (2) the sex context in which they are experienced (Moen, 2001). In many societies, there are disparities and inequities between sexes that lead to differences between sex in societies, especially for women who generally have lower socioeconomic when compared to the elderly men (Burholt & Windle, 2006; Knodel & Ofstedal, 2003; Sobieszczyk, Knodel & Chayovan, 2003). Although women tend to have greater longevity, they are identified as vulnerable (Chayovan, 2005; Sobieszczyk, Knodel & Chayovan, 2003) due to less opportunity to access social services and resources and being widowed more than men, and more likely to suffer from famine and poverty which decrease female well-being (Pinquart & Sorensen, 2001). The studies by Williamson (1980) illustrated that being male increases the odds of aging successfully. While many studies support the notion that men have greater well-being, some studies have argued that perceived economic status between the elderly women and men is different (Moody, 1994). Similarly, Chang (quote in United Nations, 1996) studied that the elderly women were faced with poverty owing to lower education, less labor force opportunity, less savings, and less asset than did the elderly men. Bunyanupong et al. (1990) found that most of the elderly women had lower education and stopped working, whereas some had to keep working owing to economic vulnerability.

2) Age

Advancing age is related to a decline in well-being among older persons (Chayovan, 2005; Litwin, 2006) but this decline seems to be a function of other negative factors, such as physical, psychic and social dysfunction. According to several studies, the older age will change from being as an economic producer to a consumer, like children. Therefore, society has the elderly being dependency group the society and the working age populations have to take care of. The studies of Chayovan (2005); Liang et al. (2005); McCullough & Laurenceau (2005); Porrapakkam & Punyaratabandhu (2006) showed that the poorer health and poorer economic status increased when people became older. So, age is a factor that determines economic status of the elderly. Moreover, the different characteristics of the elderly cannot be identified within the same group. The age level of the elderly will be a main factor to identify the economic security. The findings by Moody (1994) revealed that the higher life expectancy resulting from medical, technology and public health advances caused

higher expenditure in the rest time of the elderly since the older age often comes with illness (Suvittayaporn, 1991). The illness or poor health resulted in the increased expenditure on health care. In addition, the older age caused the retirement of the elderly, as found in the study of Rattanavijit (1995).

However, Sung (1994) found that the economic well-being of the elderly after retirement would be more secure than the working and the younger elderly. So, regarding age, Lamp & Myers (1999) state that younger age is positively associated with well-being aging.

3) Education

Education is important to increase and/or improve knowledge, skills, and attitudes of self-care and security of life. Moreover, education levels are associated with income, as confirmed by Crandall (1980), who viewed that financial status of the elderly was related directly to education. Higher education has been found in several studies to be associated with dignity work and social security, receiving pension, as well as assets. Thomson (2000) viewed that education was the important factor to determine the lifetime-income earning of human and greater well-being in later life. Education provides people with greater control over life circumstances and equips them with an access to health information and resources, leading to enhanced opportunities for economic security. The study by Hanjangsit (2000) also found that the difference in economic status and economic well-being between high and low educational attainments among people aged 18-90 years was increasing with age. The elderly with higher education achieved greater economic advantages than those who were poorly educated.

4) Area of residence

Economic security of the elderly living in municipal and non municipal area is different (NSO, 2002; 2007). Many existing studies indicate that persons living in rural areas are disadvantaged owing to differences in socio-economic characteristics, lifestyle, resources, physical and social environment that produce differences in susceptibility to poor persons (Chayovan, 2005; 2007). A study in the USA by Thomson (2000) viewed that non municipal elders were poor but their well-being was greater than the municipal elders'. In Thailand, most of the elderly people are living in non municipal areas (NSO, 2002). Several studies indicate that the non

municipal elders are more economic vulnerable than the municipal elders (Chayovan, 2005) because they are more disadvantaged with respect to education, economic security, and health care accessibility than the municipal elders. Moreover, the study of Chayovan (2005) found that the livings in municipal areas had more burden of expenditure than those living in non municipal areas. Thus, this study believed that the elderly living in non municipal areas were more likely to have better economic security than those living in municipal areas because of simple lifestyles.

5) Region

Economic security of the elderly dwelling in each region is also different (NSO, 2007). Many studies report that persons dwelling in each region have their own both pros and cons, which are different because of the unique characteristics of area, occupation, lifestyle, natural resources, and environment. Some areas are bountiful with natural resources while others have drought. This leads to the difference of economic security of the elderly.

2.4.2 Health Factors

6) Health status

Health problems are recognized as a major concern of the elderly. They usually are concerned as a sign of being old. Moreover, with regard to economic status, health status of the elderly is a factor that affects their economic security. Health status of the older persons through self-reported health status is a procedure that is widely used in surveys. Although the subjective evaluation of an individual's own health seems to be a complex issue, Liang & Whitelaw (2003) suggest that if there is only one health measure that can be included in a survey, self-reported health status is an excellent choice. With this procedure older people may be asked to evaluate their own health ranging from as good (including very good, good, fair) to as poor (including very poor and poor) to compare their health with that of their friends or other people they know. It has been found that, with self-assessment, the elderly are likely to report themselves as healthy (Gary, 2004). In general, the poor elderly did not feel as healthy as their elderly counterparts. In turn, the elderly with good economic status felt less healthy than those with the poor economic status elderly who described themselves as healthy (Baltazar & Lopez, 2000).

7) Sickness

In general, the elderly suffer from illness than younger people. It is sometimes claimed that ageing is a time of multiple illnesses: arthritis, rheumatism and vascular lesions of the central nervous system, strokes, heart condition and high blood pressure (Sloane, 2002). To identify the health problems faced by the elderly, respondents were asked whether they had been sick during the previous year. According to the National Health Examination Survey (NHES II and III) in 1997 and 2004 by the Health System Research Institute, it was reported that the Thai population had experienced sickness in higher proportion (about 73 percent in 2004), fifty percent of whom were the elderly (Chooprapavan, 2000). Illness among the Thai elderly affects both their family's expenses and the country's economy.

8) Activities of daily living

The deterioration of physical health causes older people to encounter health problems, thus decreasing abilities in daily activities and primary physical functions. These conditions have an effect on economic status because physical health has a relationship with economic security. When the bodily system is frail, other systems can also have negative consequences. This includes daily activities such as eating, bathing, dressing. The inability of activities of daily living among the Thai elderly affects their economy since they have to hire a nurse or servant to look after them.

9) Physical functionality

Physical function refers to standing up/sitting down, carrying things of 5 kg, walking 1-5 km or taking a few steps, travelling by bus/ship alone. The elderly who had limitation of physical functions had financial difficulties and it also affected the household's economy (NSO, 2002 and 2007).

10) Chronic disease

Physical changes in terms of the degeneration of the respiratory system, circulatory system, digestive system, nervous system and sense organs determine the health status of the elderly. Almost three in four older people were those who had problems of the musculoskeletal system and connective tissue, diseases of the respiratory system and diseases of the digestive system.

It is not surprising that prevalence of chronic diseases was found among the elderly. The study of Chayovan (1988) assessed the elderly's health and physical sickness and it revealed that arthritis or joint pain was the most common health problem, accounting for about 75 percent. Other chronic diseases, in order of frequency, were insomnia, faintness and constipation, reaching by 59, 46 and 40 percent. High blood pressure, hemorrhoids, health disease, and diabetes were less frequent at 11, 10, 7 and 2 percent, respectively, revealing a relationship between health problems and socio-economic background of the elderly. Since high blood pressure, hemorrhoids, heart disease and diabetes needed to be diagnosed by physicians, and those who had these problems were the ones who could afford the cost of medical care. Similar results are found in the studies of Baltazar and Lopez (2000), Porrapakkam and Punyaratabandhu (2006).

2.4.3 Family Factors

11) Living arrangement

Living arrangement is comprised as an indicator contributing to a number of dimensions pertaining to the well-being of older persons. Traditionally, the Thai elderly live with or nearby their children, typically in a stem-family configuration which is a predominant pattern that establishes family financial support (Cowgill, 1968, 1972). Living arrangement of the Thai elderly is associated with their well-being, according to the study of Knodel et al. (1995). At present, co-residence and living alone increased over the age of the elderly, while living only with a spouse decreased (NSO, 2007). Moreover, the proportions of who lived with a child and of who lived alone were higher among the female elderly. In contrast, the male elderly had more remarriage and the likelihood that women would outlive their husbands was greater. Given living arrangements in Thai context, several studies supported that living arrangement of the elderly was associated with their economic status, especially of those living with no relatives and hiring a nurse or servant (Knodel and Chayovan, 2009; Knodel et al., 1995; Cowgill, 1972).

12) Care giver of daily living

As aforementioned, most elders lived with their children or relatives, according to Knodel and Chayovan (2008). The current situation of Thailand's living

arrangements among the Thai elderly changed; many adult children migrated to marry or to seek work opportunities. As a result, the number of older persons living in skip generation households was higher. Moreover, the increase is greater in rural areas than urban areas, posing a threat to Thai society. Most of the elderly feel they need children to depend on, particularly when they are sick. Such care is seen as repayment for having raised their children. Their adult children generally share this view and feel a moral obligation to care for their parents out of gratitude (Knodel et al., 1995; Jitapunkul et al., 2002). One of the surveys on older persons in Thailand revealed that a number of the elderly could assist and take care of themselves, while the 2002 study found that most of them needed their family member's support. The majority (over 90 percent) of the elderly received assistance in performing daily living activities. These family caregivers were co-resident and some of them were next-door neighbors. The older elderly needed to depend on others in eating, dressing, bathing or using the toilet, indicating the most serious limitations to functioning on daily activities. However, the care giver for daily living of the elderly was also related to the aged population's economic status. The elderly were given care by those who were not their family members such as nurses and servants, so they had to earn more for this additional expense (NSO, 2007).

2.5 Conceptual Framework

The conceptual framework of the study was developed from a literature review on theories and concepts related to the elderly, economic status, resources of support, economic security, and factors affecting their economic security. It has been found that there were several concepts, which attempted to explain the cause of economic uncertainty among the Thai elderly. Although a number of Thai studies on economic security employed only one indicator at a time to measure it, some previous researches found out more economic indicators that could exhibit economic security. However, those indicators were not aggregated to account for the elderly's economic status.

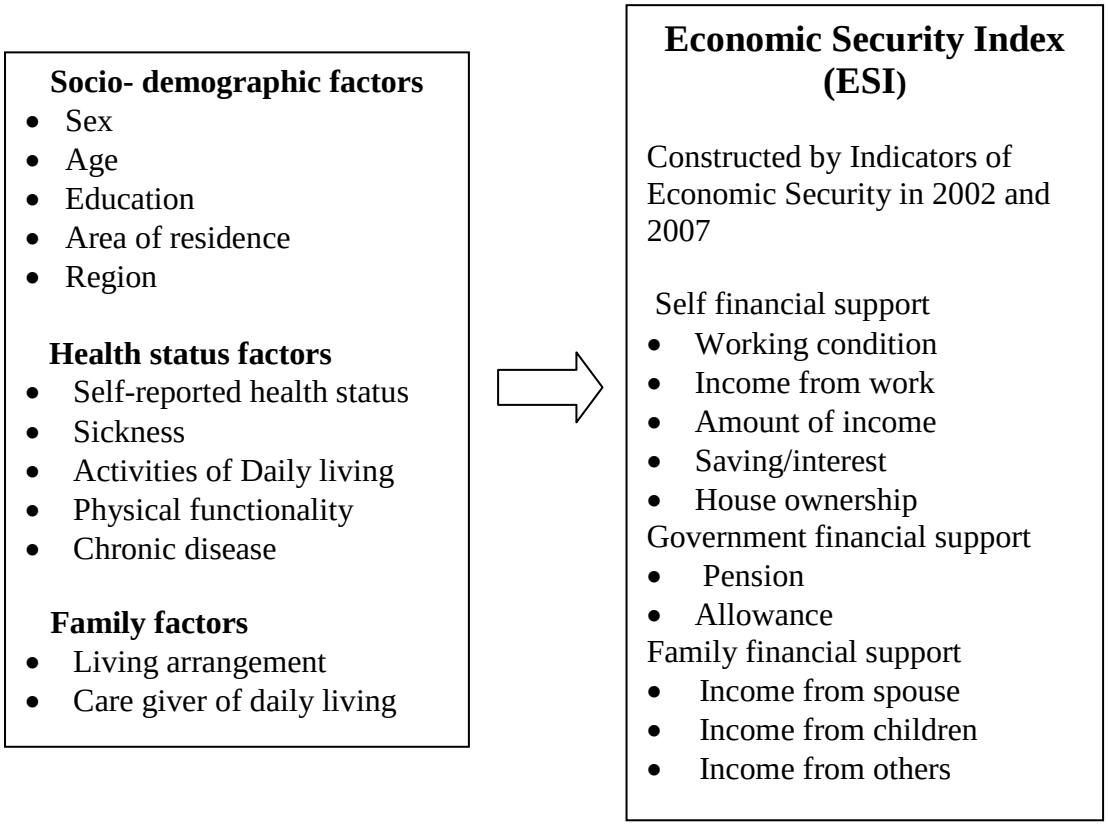
A great deal of literature has suggested that economic security is expressed in terms of income earned for daily expenses. Economic security was based on sources

of income support, especially for the older persons' economy. They needed to receive regular income. Sources of economic security among the Thai elderly were self financial support, government financial support, and family financial support. First, self financial support included working condition, income from work, amount of income, income from saving/ interest, house ownership. Second, government financial support was composed of pension and allowance. Last, family financial support was based on income from spouse, children, and others.

Each source of financial support was expressed as a part of economic security. After aggregating these sources, an index of economic security could be constructed. This study constructed an index to measure the elderly's economic security using the composite index method. A study of several related theories and studies has suggested that the elderly had lower economic security due to declining health and difficulties in working. Although the government established policies to assist them, such as allowance or other several funds, they could not help all poor elders across the country. Therefore, family played an important role in supporting the elderly as Thai tradition and culture. Family financial support was a component that showed the economic security of the elderly. Due to the declining health, their wellbeing was adversely affected, especially the poor elderly with poor health being the ones most affected because they could not meet health care fees. Therefore, health status of the elderly was regarded as one contributory factor of their economic security. Moreover, economic security of the elderly depended on other factors, such as socio-demographic factors (sex, age, residence, region, and education), health factors (self-reported health status, sickness, activities of daily living, physical function, and chronic diseases), and family factors (living arrangement, and care giver for daily living of the elderly).

Figure 2.1 graphically summarizes the structure of this study to clarify its content and data analysis. According to the availability of data, this study employed the 2002 and the 2007 Surveys of Older Persons in Thailand to investigate the level of economic security of the elderly by constructing the economic security indices for those two years and a comparison was made based on socio-demographic, health, and family factors. One of the study's objectives is to examine the determinants of economic security among the Thai elderly in 2002 and 2007.

Figure 2.1 Conceptual Framework of the Determinants of Economic Security among the Thai Elderly in 2002 and 2007



2.6 Hypotheses

From the literature reviews, the research hypotheses in this study are:

1. The elderly in 2007 are more likely to have better economic security than those in 2002.

2. The elderly who have different socio-demographic, health, and family factors are likely to have different economic security.

3. The elderly who are faced with health problems are more likely to carry the risk of economic insecurity than those who are not.

CHAPTER III
METHODOLOGY

This chapter describes research methodology used in this study, which includes data, procedure of constructing sources of economic support index and economic security index, measurements of initial variables, operationalization of variables, and method of analysis.

3.1 Data Used in the Study

3.1.1 Data

This study used the data from the 2002 and 2007 Surveys of the Older Persons in Thailand conducted by the National Statistical Office. These surveys contained major components of related concepts of the elderly, namely, health, community, participation and security. This study focused on economic security and factors contributing to economic security of the Thai elderly. The indicators of economic security were applied to construct an economic security index by combining these variables: 1) self financial support (income from work, amount of income, savings/interests, and house ownership), 2) family financial support (income from spouse, income from children, and income from others), and 3) government financial support (pension and monthly allowance). The questionnaire used for data collection was completed by the Thai elderly nationwide. The informants aged 60 years and over and were selected from the sample households.

3.1.2 Sample and Sample Design

This survey employed information of representative samples of 56,002 people in 2007 and 48,002 people in 2002, who completed interviews. After cleaning these data and selecting only the population aged 60 years and over living across the

country, a stratified two-stage sampling was adopted for the survey. The primary and secondary sampling units were blocks for municipal areas and villages for non-municipal areas and private households/persons in special households respectively. Provinces were treated as strata. There were altogether 76 strata, each of which was divided into three parts according to the type of local administration, namely municipal areas, sanitary districts and non-municipal areas. In selecting the primary sampling unit, the sample selection of blocks/villages was performed separately and independently in each part by using probability proportional to size of total numbers of households. The total sample of blocks/villages was 5,793 from 109,966 blocks/villages. The total number of sample blocks/villages was selected for enumeration by region and type of local administration. As for the secondary sampling unit, private households were the ultimate sampling units of this survey. A new listing of private households was made for every sample block/village to serve as the sampling frame. In each sample block/village, a systematic sample of private households was selected with the following sample size: municipal areas: 15 sample households per block; and non-municipal areas: 12 sample households per village. Before selecting sample private households in each sample block/village, the list of private households was rearranged by household's size-member. All special households located within the sample areas were included in the sample and the persons in the special household were systematically selected for the interviewing. The total number of sample private households was selected for enumeration by region and type of local administration in order to obtain the national sample representative. The results were appropriately weighted by calculating new weights in order to make the number of the elderly used in the analysis equal to the actual number of samples, expressed in the following formula.

New weight = (Total of interviewee/ weighted total population) * old weight of NSO

This study analyzed only information of the people aged 60 years and over. Thus, the number of samples reduced to 28,072 persons and 22,380 in 2007 and 2002 Surveys respectively.

3.2 Procedure of Constructing Sources of Economic Support Index and Economic Security Index

This study was interested in both 1) sources of financial supporting the Thai elderly and 2) economic security index. First, the study brought together all sources of income support. Then all the variables contained in the sources of income support were used to construct an index of economic security. While some previous studies of Thanakwang and Soonthorndhada (2007) and Chayovan (2005) studied the economic security by using only an income variable as measurement of economic security, Moon (1977) employed income, assets, main source of income at a time as the measure of economic security among the elderly, like Bengtson et al (1977), Cantor (1986), Thomas (1988) & Thangtong (2000). However, although their studies used various indicators to measure economic security, they were not aggregated as one variable to show such quality. The present study attempted to construct a valid, reliable an index to measure the economic security among the Thai elderly.

There were two main steps in constructing an index. The first step was the selection and consideration of sources of income support among the Thai elderly i.e. 1) self financial support included income from work, amount of income, income from savings/interest, and house ownership, 2) government financial support consisted of pension and monthly allowance, and 3) family financial support comprised income from spouse, children, and others. The last step was to aggregate nine variables in the first step to make an index. The process of constructing the index for both each source of income support and economic security index was done with the assistance of the composite index as shown in the details below.

3.2.1 Methods of Constructing Index

The composite index represents the measurement derived from empirical aggregate economic variables (Sainz, 1989 and Active Ageing Taskforce, 2003). Composite indexing entails the aggregation of a number of indicators and involves four steps: selection, scaling, weighting and aggregation, and validation (McGranahan et al., 1972). It is important to note that composite indexing does not necessarily have to follow this sequence. It is a concurrent effort during which selection can be altered, weights adjusted and variables rescaled in order to reach at final index estimates.

The first stage of constructing an index was to produce score of the composite. The composite score was the sum of answers to several variables in order to create one variable, which was called an index. This composite score was constructed by employing a score of each indicator and the weighted value of each indicator, which was calculated by factor analysis with principal component analysis (PCA). However, since there was variability in the range of possible answers to the questions within a single composite, a simple summation of answers would not have insured equal contribution of the total variability of the composite score. This method was applied to adjust the composite for the answer range of this indicator and for the total number of the indicator in the composite. The composite scores for both each source of economic support index and economic security index were managed mathematically as shown in the formula below:

$$\text{Composite score} = \sum_{i=1}^{n}(\chi_i * W_i)$$

Where: X_i = the score of the each indicator (i=1,…..,n)

W_i = the weighted value of each indicator (i=1,…..,n)

3.2.2 Procedure of Constructing Weighted Value

To create a valid and reliable index, the index should be weighted by value of factor loading from the method of factor analysis with principal component analysis. Factor analysis is a powerful technique for exploring the item correlations during scale validation. This technique attempts to identify groups of variables that have strong correlations among all the variables within a group and those outside the group. The main goal of factor analysis is data reduction and aggregation of variables (Munda & Nardo, 2005; and Nardo et al., 2008).

Theoretically, the principal component analysis (PCA) is a statistical technique of factor analysis. PCA can determine the weight as a factor score for each economic security variable. It seeks a linear combination of variables from which the maximum variance is extracted. It then removes this variance and seeks a second linear combination which explains the maximum proportion of the remaining variance, and so on. This is called the Principal Axis Method and results in orthogonal (uncorrelated) factors. In fact, PCA often provides a good approximation to common

factor analysis. The first principal component is the linear index of variables with the largest amount of information common to all of the variables. The result of the index derived from PCA for economic security can be presented by the following formula of Filmer & Pritchett (1988):

$$Aj = f1*(aj1-a1)/ (s1)+\ldots+fn*(ajn - an)/ (sn)$$

or

$$Aj = \sum_{i=1}^{n} f_i * (a_{ij} - a_i) / S_i$$

Where

A*j* = an index for economic security (j=1,…..,n)

f_i = the scoring factor or weights for each variable (i=1,….,n)

a_{ij} = the value of variable (i, j =1,….n)

a_i = the mean of i^{th} variable (i=1,….,n)

S_i = the standardized variables of variable (i=1,….,n)

Derived from PCA, scoring factors of the first principal component (the efficient component) can be used for constructing the index of economic security. This means that a new factor which has a linear correlation with original variables would be developed. A weight is assigned to each variable in order to maximize variation of new variable, subject to the number of constraints. The mean value of the index is zero by construction. Since all variables are dichotomous and take only a value or one, then the weight is easy to be interpreted. A move from 0 to 1 changes the index by ***fi / Si***.

This study attempted to obtain factor loading, eigen values, and percentage of variance. The eigen values are obtained by matrix algebra to employ the weighted value of calculating the composite score. Thus, the eigen values indicate the importance of each value in explaining the variability and correlations in the observed sample of data. The eigen values are normally used to determine how many factors are presented. A commonly used criterion is the so-called “eigen values greater than 1 rule”. In addition, sometimes other two-factor solutions are equally good at explaining the same percentage of the variability, and in fact there are an infinite variety of

alternative solutions. It is usual to rotate the factors until a solution with the simplest structure is found. This study used orthogonal rotation with varimax method to minimize the number of variables having high loadings on each factor and considering factor loading as weighted value (Organization for Economic Co-operation and Development (OECD), 2008). Therefore, the new set of loadings for the factors, with fewer items having high values for each other, but with the same amount of the total variance, is still explained by the factors.

There were nine initial variables in each source of economic support in 2002 and 2007 prepared for identifying the economic security index. The importance of each variable was derived from eigen values. After reviewing the concept of economic security of the elderly, the questions in the instrument were selected. This study selected nine questions asked in 2002 and 2007 survey, to be initial variables and, then, a criterion was set based on numerous literature reviews. All of the initial variables were analyzed using factor analysis through factor extraction and factor rotation. This study selected components that had eigen values of more than 1 and selected indicators to show sources of economic support index and economic security index among the Thai elderly as a whole.

The second stage described that the set of index was assessed in the form of scores. The scores of index referred to average level of economic security from sources of economic support; a higher score meant a higher support in each source. The combination of variables in each source of economic security was used as the value to calculate the total number of each source of economic support score by using normalization of re-scaling method. Re-scaling is the formula whose objective is to make different values to be in the same range of score 0-1 as below:

$$\textbf{Score of economic security} = \frac{\textbf{(actual value – minimum value)}}{\textbf{(maximum value – minimum value)}}$$

Each source of economic support index was classified based on its mean value (Barbara & Linda, 2007; Vanishbuncha, 2006; Agresti & Finlay, 1997), which constituted an indicator of the economic security, as follows:

1) Low support = Mean score – SD

2) Moderate support = Mean

3) High support = Mean + SD

While economic security index was grouped by quintile to classify into level of economic security (Morris, 2005; Brockerhoff & Hewett, 1999). This index constituted five quintiles. These quintiles were divided into two groups, quintiles 1-2 as economic insecurity, and quintiles 3-5 as economic security to enter Binary Logistic Regression Model. However, the steps of constructing an index to measure economic security were produced by initial variables below.

3. 3 Measurements of Initial Variables

The initial variables were based on literature reviews and concepts related to economic security as shown in Table 3.1. Nine variables were prepared for identifying the indicators and components by employing composite index method, covering whole variables selected to study economic security of the elderly.

Table 3.1 Initial Variables for Identifying the ESI both in 2002 and 2007

2002: Sources of income	2007: Sources of income
Working condition (c1, c4)	Working condition (a52, a55)
Income from work (c12)	Income from work (a65)
Amount of income (c24)	Amount of income (a79)
Income from saving/ interest (c15)	Income from saving/ interest (a68)
House ownership (b10, b11)	House ownership (a31, a32)
Pension (c13)	Pension (a66)
Allowance (c14)	Allowance (a67)
Income from spouse (c16)	Income from spouse (a69)
Income from children (c17-c20)	Income from children (a70-a73)
Income from others (c21-c23)	Income from others (a74-a77)

Source: NSO (2002 & 2007).

These variables were grouped into three sources of economic support taken from both 2002 and 2007 survey, all of which showed variables of economic security. The score for each variable was assigned by 0 expressing an insecurity indicator and 1 expressing a security indicator as follows:

1. Self financial support

1) Working condition: it referred to types of employment which included as follows:

Paid working	scored as	1
Unpaid working	scored as	0

2) Income from work: it referred to income earned from self employment as follows:

Yes	scored as	1
No	scored as	0

3) Amount of income: it referred to average income per year based on poverty line in each year. The criterion was provided as follows:

In 2002:	10,000 baht and over	scored as	1
	Less than 10,000 baht	scored as	0
In 2007:	20,000 baht and over	scored as	1
	Less than 20,000 baht	scored as	0

4) Income from savings/interest: it referred to income/interest from savings throughout an elder's working life. The criterion was provided as follows:

Yes	scored as	1
No	scored as	0

5) House ownership: it referred to the ownership of the housing. This criterion is provided as house ownership as follows:

Yes	scored as	1
No	scored as	0

2) Government financial support

6) Pension: it referred to earned income after retirement as a previous civil servant. The criterion was provided as follows:

Yes	scored as	1
No	scored as	0

7) Monthly allowance: it referred to earned income from social security system of government as an old person aged 60 years or over. The criterion was provided as follows:

Yes	scored as	1
No	scored as	0

3) Family financial support

8) Income from spouse: it referred to income received from spouse living in the same residence. The criterion was provided as follows:

Yes	scored as	1
No	scored as	0

9) Income from children: it referred to receiving financial support from children of an older person. This criterion was provided as follows:

Receive	scored as	1
Not receive	scored as	0

10) Income from others: it referred to income received from others, such as parents, siblings, relatives, others. This criterion was provided as follows:

Yes	scored as	1
No	scored as	0

These variables were constructed by the composite index method. They were classified as three sources of economic support index. Firstly, self financial support consisted of working condition, income from work, amount of income, savings/interest, and house ownership. However, it was found that the relationship between working condition variable and income from work variable was of multicollinearity after testing the pair correlation higher than 0.75 (Prasitrattasin, 1994). Thus, this study employed income from work variable, which was identified in the same way as other variables. Secondly, government financial support was composed of income from pension variable, and income from monthly allowance. Lastly, family financial support consisted of income from spouse, income from children, and income from others. These variables were then constructed as three sources of economic support index and economic security index. They were dependent variables of this study.

3.4 Operationalization of Variables

3.4.1 Dependent Variables

Each source of economic support was constructed as a dependent variable of this study to compare the difference of economic security levels in 2002 and 2007 by socio-demographic, health and family factors. All variables were contained in each source of economic support index.

1) Self financial support

Low	coded as	2
Moderate	coded as	1
High	coded as	0

2) Government financial support

Low	coded as	2
Moderate	coded as	1
High	coded as	0

3) Family financial support

Low	coded as	2
Moderate	coded as	1
High	coded as	0

To examine the determinants of economic security among the Thai elderly in 2002 and 2007, nine variables shown as the economic security were constructed as an index at the same time by method of composite index and computed new weighted value by factor analysis method with principal component analysis (PCA). The economic security index was classified by quintile, first. Then they were considered as quintiles 1-2 = insecurity and quintiles 3-5 = security, according to the steps of constructing index mentioned above.

Economic Security Index (ESI)

Economic security	scored as	1
Economic insecurity	scored as	0

3.4.2 Independent Variables

Independent variables were classified by three factors affecting economic security among the Thai elderly as follows:

Socio-demographic factors

1. Age: it referred to the complete age. Age was treated as a continuous variable for multivariate analysis. There were three age groups.

60-69 years	coded as	2
70-79 years	coded as	1
80 years and above	coded as	0

2. Sex: A dichotomized variable, which was divided as follows:

Male	coded as	1
Female	coded as	0

3. Education: it referred to complete education of an elder. The criterion was provided as follows:

Secondary and higher	scored as	2
Primary school and lower	scored as	1
No education	scored as	0

4. Area of residence: it referred to a dichotomized variable.

Municipal	coded as	1
Non municipal	coded as	0

5. Region: it referred to five regional categories; it was employed as nominal level of variable as follows:

South	coded as	4
North-East	coded as	3
North	coded as	2
Central	coded as	1
Bangkok	coded as	0

Health factors

6. Self-reported health status: it referred to an individual's own assessment of his or her health. The criterion was provided as follows:

Good	scored as	1
Poor	scored as	0

7. Sickness: it referred to previous sickness of an elder. The criterion was provided as follows:

In 2002: the previous sickness a year

Not sick	scored as	1
Sick	scored as	0

In 2007: the previous sickness during 5 years (2002-2007)

Not sick	scored as	1
Sick	scored as	0

8. Activities of daily living limitation: it referred to activities of daily living limitation of the elderly, which included inabilities in performing one of these three activities: bathing, dressing, and eating. The criterion was provided as follows:

No limitation	scored as	1
Have at least 1 or more	scored as	0

9. Limitation of physical function: it referred to physical functional limitation such as standing up/sitting down, lifting up object weighing 5 km., walking about 1-5 km., and climbing stairs (2-3 steps), and travelling by bus/step alone. The criterion was provided as follows:

No limitation	scored as	1
Have at least 1 or more	scored as	0

10. Chronic diseases: it referred to chronic diseases of the elderly such as hypertension, diabetes, heart disease, inability to control urination, cancer, paralysis/ hemiplegic. The criterion was provided as follows;

Not have	scored as	1
Have at least 1 disease or more	scored as	0

Family factors

11. Living arrangement: it referred to the co-residence of the elderly with family members or others in their place. The criterion was provided as follows:

Living alone	coded as	4
With spouse	coded as	3
With offspring	coded as	2
With relatives	coded as	1
With non relatives	coded as	0

12. Care giver of daily living of the elderly: it referred to a person who was currently a main care giver of the elderly. The criterion was provided as follows:

Own	coded as	4
Relatives	coded as	3
Offspring	coded as	2
Spouse	coded as	1
Others	coded as	0

3.5 Method of Analysis

Univariate, bivariate, and multivariate analysis methods were used. Firstly, univariate analysis was exploited to indicate indicators of economic security and the general characteristics of sample, health status, and family. Secondly, bivariate analysis was used to compare the difference of economic security levels in 2002 and 2007 by socio-demographic, health, and family factors both in 2002 and in 2007 with Chi-square analysis. The strength of this relationship could not be identified at this level of analysis since the independent variables interacted with each other in a more complex way.

Finally, multivariate analysis was used to examine the determinant of economic security among the Thai elderly in 2002 and 2007. To analyze factors and an economic security index, logistic regression models were applied (Deleire & Kalil, 2002). In this study, since the dependent variables were dichotomous variables, binary logistic regression was employed. It was used for predicting the probability of economic security index. In order to obtain adequate descriptions and useful predictions, there were a number of independent variables included in the regression model.

Logistic Regression Model

The general logit model is:

$P(Y = 1 \mid X) = \exp(\sum bkXk) / [1 + \exp(\sum bkXk)]$

Where: Y: economic security index

P: the probability that Y equals 1 (or P = P(Y=1))

X_k: independent variable

b_k: parameter/ coefficients of independent variables, k = 1, 2,…., K

Three sets of factors i.e. socio-demographic factors, health factors, and family factors were identified. Those three sets of variables were added in the regression model. The regression model was run for the whole population.

This chapter described the methods which were applied in the study. The data collection was also refined. It is important to understand the methods thoroughly since they identify the findings of the study which will be presented in the chapters that follow.

CHAPTER IV
MEASUREMENT OF ECONOMIC SECURITY

Two sets of data were employed in this study, that is, the 2002 Survey of Older Persons in Thailand and the 2007 Survey of Older Persons in Thailand. This chapter describes the data taken from the two samples. Moreover, it explains the process of constructing the economic security index among the Thai elderly to answer the first objective as to investigate the level of economic security of the Thai elderly by constructing the economic security index in 2002 and 2007. The details are set out below.

4.1 Description of Variables Sample

The samples in these 2002 and 2007 data included 22,380 persons and 28,072 persons who aged 60 years and over in Thailand. The univariate descriptions of the elderly in both years are shown in Table 4.1. The descriptive results have shown that there were more females than males in those studies. In 2002, most of them were aged 60-69 years old. Mean age was 68.61 years and standard deviation was 7.24. The minimum age was 60 years and the maximum age was more than 98 years. Similarly, in 2007 most elders were aged 60-69 years and over. Mean age was 69.03 years and standard deviation was 7.37. The minimum age was 60 years and the maximum age was more than 98 years.

Slightly, more than half of the elderly attained primary education level and lower as shown in both years (2002 and 2007). These subjects attained primary education level and lower (about 70 percent in both years) and lived in non municipal area (about 70 percent in both years, also). The samples in 2002 living in the northeast region accounted for about 30.6 percent and in 2007 about 33.6 percent followed by those living in the central region (excluding Bangkok) around 25.7 percent in 2002 and 23.6 percent in 2007.

Table 4.1 Descriptive Statistics, the 2002 and the 2007 Surveys of Older Persons in Thailand

Variables	2002		2007	
	N	Percentage	N	Percentage
Socio-Demographic factors				
Sex				
Female	12,148	54.3	15,554	55.4
Male	10,232	45.7	12,518	44.6
Age				
60 – 69 years	14,029	62.7	16,494	58.8
70 – 79 years	6,324	28.3	8,903	31.7
80 years and over	2,027	9.1	2,675	9.5
Mean		68.61		69.03
Standard Deviation		7.244		7.372
Minimum		60		60
Maximum		98+		98+
Education				
No education	4,722	21.1	4,615	16.4
Primary and lower	16,103	72.0	19,346	68.9
Secondary and higher	1,555	6.9	4,111	14.6
Area of residence				
Non municipal	15,436	69.0	20,055	71.4
Municipal	6,944	31.0	8,018	28.6
Region				
Bangkok	2,322	10.4	2,588	9.2
Central (exclude BKK)	5,743	25.7	6,611	23.6
North	4,713	21.1	5,868	20.9
North /East	6,841	30.6	9,432	33.6
South	2,761	12.3	3,572	12.7
Health factors				
Self-assessed health status				
Poor	12,347	55.2	14,943	53.2
Good	10,032	44.8	13,129	46.8
Sickness	during a year (2002)		during the past 5 years (2002-2007)	
Sick	6,271	28.0	17,817	63.5
Not sick	16,108	72.0	10,255	36.5
Activity of daily living (ADL) limitation				
Have	1,534	6.9	1,210	4.3
Not have	20,846	93.1	26,862	95.7
Physical functional limitation				
Have	1,894	8.5	7,278	25.9
Not have	11,508	51.4	20,794	74.1

Table 4.1 Descriptive Statistics, the 2007 and the 2002 Surveys of Older Persons in Thailand (continued)

Variables	2002		2007	
	N	Percentage	N	Percentage
Health factors (continued)				
Chronic diseases				
Have	20,486	91.5	22,841	81.4
Not have	1,894	8.5	5,231	18.6
Family factors				
Living arrangement				
Alone	1,400	6.3	2,151	7.7
With spouse	3,563	15.9	4,575	16.3
With offspring	14,566	65.1	18,275	65.1
With relatives	1,679	7.5	2,728	9.7
With non relatives	1,172	5.2	344	1.2
Care giver for daily living				
Own	---------	---------	24,706	88.0
Spouse	8,853	39.6	858	3.1
Offspring	11,805	52.8	1,922	6.8
Relatives	918	4.1	161	0.6
Others	803	3.6	426	1.5
Total	22,380	100.0	28,072	100.0

Note: ---- is no data

Almost half of the samples both in 2002 and 2007 reported their self-assessed health status as good (44.8 percent and 46.8 percent, respectively), while some elders were sick during the past year (only 28 percent in 2002). In 2007 sickness of the elderly during the past 5 years (2002-2007) was about 64 percent. They had at least 1 chronic disease (inability to control urination, hypertension, diabetes, cardiovascular heart disease and cancer), which accounted for about 92 percent in 2002 and it decreased to about 82 percent in 2007. About 7 percent of the elderly in 2002 had activities of daily living (ADL) limitation (eating, dressing, and bathing) and it was 4.3 percent for those old people in 2007. In 2002, 8.5 percent of the elderly had physical functional limitation (such as standing up/sitting down, carrying things of 5 kg., walking at least 1 km., and a few steps, as well as travelling by bus/boat alone), while those in 2007 had relatively more functional limitations, accounting for about 26 percent. This may have been because of age.

Most old people were living with their offspring accounting for about 65 percent both in 2002 and 2007 datasets. About 16 percent of the elderly were living with spouse only in both years. Those who took care of the elderly were their offspring (about 53 percent) and spouse (about 40 percent) in 2002, while approximately 88 percent of the elderly in 2007 took care of themselves. The finding is interesting. This phenomenon may have risen from the economic fluctuation and life patterned transformation, which forced the elderly to support themselves more.

Nevertheless, this study was interested in constructing an index to measure economic security of the Thai elderly. It is found that previous studies on economic security of the elderly employed only one variable such as income or employment status to measure such quality. Alternatively, this study attempted to construct the index which consisted of multi-variables to measure economic security among the Thai elderly.

4.2 Measurement of Economic Security Index on the Thai Elderly

4.2.1 Description of Sources of Economic Security

The descriptions of variables used to construct Economic Security Index (ESI) both in 2002 and 2007 are shown in Table 4.2. The descriptive results of the elderly in 2002 showed three domains of economic security among the Thai elderly: self financial support, government financial support, and family financial support. In details, self financial support source consisted of income from work, amount of income per year, income from savings/interest, and assets of the elderly in the form of house ownership. Government financial support source was composed of pension and monthly allowance. Family financial support source comprised income from spouse, children, and others (parents, relatives, others).

Table 4.2 shows that the elderly in 2007 had less income from work (about 30 percent) than did the elderly in 2002 (38 percent). About two-thirds of the elderly had higher income than poverty line (10,000 Baht cited in NESDB, 2002 and 20,000 Baht cited in NESDB, 2007) in both years (about 67 percent in 2002 and 66 percent in 2007). 18 percent of the elderly in 2002 had income from saving/interest, while in

2007 this sort of income went up to about 58 percent. Almost the Thai elderly had their own houses, accounting for 82 percent in 2002 and 80 percent in 2007.

With regard to government financial support, almost the elderly did not work for the government offices or organizations, so they did not receive pension or allowance, as shown in both years. About 3 percent of the elderly received pension in 2002 and 6 percent in 2007, while the elderly who received monthly allowance from government was about 18 percent and 24 percent in 2002 and 2007, respectively. Moreover, a small number of the elderly did not receive support from family members. Only 17 percent of the elderly in 2002 and 23 percent in 2007 received income from spouse. Only a few received income from children (about 2 percent in both years), and from others (about 0.2 percent and 0.1 percent, respectively).

Table 4.2 Initial Variables for Identifying Economic Security Index (ESI) in 2002 and 2007

Variables	2002		2007	
	N	Percentage	N	Percentage
Self financial support				
Income from work				
No	13,950	62.3	19,766	70.4
Yes	8,430	37.7	8,306	29.6
Amount of income per year (Compared to poverty line)*				
Lower than poverty line	7,330	32.8	9,611	34.2
Poverty line and over	15,050	67.2	18,461	65.8
Mean = 40,228.35; Standard Deviation = 70,164.06			----	----
Minimum= 0; Maximum = more than 999,998			----	----
Income from saving/interest				
No	18,359	82.0	11,770	41.9
Yes	4,021	18.0	16,302	58.1

Table 4.2 Initial Variables for Identifying Economic Security Index (ESI) in 2002 and 2007 (continued)

Variables	2002		2007	
	N	Percentage	N	Percentage
Self financial support (continued)				
House ownership				
No	4,143	18.5	5,595	19.9
Yes	18,237	81.5	22,477	80.1
Government financial support				
Pension				
No	21,704	97.0	26,566	94.6
Yes	675	3.0	1,506	5.4
Monthly allowance				
No	18,359	82.0	21,219	75.6
Yes	4,021	18.0	6,853	24.4
Family financial support				
Income from spouse				
No	18,492	82.6	21,540	76.7
Yes	3,888	17.4	6,532	23.3
Income from children				
No	21,978	98.2	27,594	98.3
Yes	401	1.8	478	1.7
Income from others				
No	22,341	99.8	28,053	99.9
Yes	39	0.2	19	0.1
Total	**22,380**	**100.0**	**28,072**	**100.0**

* Poverty line is at 10,000 Baht in 2002 while at about 20,000 Baht in 2007 (NESDB, 2008)

Note: ---- is no data

4.2.2 Constructing Index from Each Economic Support Source

This study was interested in three types of support sources of economic security among the Thai elderly: self financial support, government financial support, and family financial support. Self financial support consisted of income from work, amount of income compared to poverty line, savings/interest and house ownership. Government financial support included pension and allowance. Family financial support was measured by income from spouse, income from children, and income from others. The steps in constructing the index are as follows:

Step 1: Calculating weighted score

Weighting value was derived from factor analysis with the use of Principal Component Analysis (PCA). Factor loading scores were used as weight value to calculate score of index as shown in Table 4.3.

Table 4.3 Weighting Value Calculated by Using PCA both in 2002 and 2007

Sources of income support	2002			2007		
	Factor loading	Eigen value	% of variance	Factor loading	Eigen value	% of variance
Self financial support		1.270	31.750		1.324	33.088
Income from work	0.585			0.668		
Amount of income	0.803			0.611		
Saving/interest	0.526			0.409		
House ownership	0.077			0.580		
Government financial support		1.012	50.605		1.089	54.445
Pension	0.711			0.738		
Monthly allowance	0.711			0.738		
Family financial support		1.028	34.252		1.041	34.699
Income from spouse	0.484			0.520		
Income from children	0.643			0.471		
Income from others	0.617			0.741		

Step 2: Scoring of each source of support

Each source of support was constructed by applying the formula of McGahan & others (1986). Based on the formula of composite score for each source of support, it is mathematically done as follows:

For example: scoring of all variables by using weighted value from Table 4.3 for self financial support in 2002

$$\textbf{Total Self-FS} = W_k(0.585)+I_c(0.803)+S_v(0.526)+H_s(0.077)$$

Where: Total Self-FS = Total score of self financial support with weighting of each one of the elderly

Wk = the score of income from work variable

Ic = the score of amount of income variable

Sv = the score of income from saving/interest variable

Hs = the score of house ownership variable

Step 3: Total score of each support source index

Then an index of three domains (self financial support, government financial support, and family financial support) of economic security was constructed in accordance with the Human Development Index developed by the United Nations Development Programme (UNDP, 2005). To calculate the score for each of the domain indices, the minimum and maximum value were used and the total score of three domains was expressed as from 0 to 1 with the formula below;

$$\textbf{Domain Index} = \sum \left\{ \frac{\textbf{(actual value – minimum value)}}{\textbf{(maximum value – minimum value)}} \right\}$$

To consider each index of each domain by socio-demographic, health, and family factors, the index of each domain was categorized to investigate the level of economic security of the Thai elderly by employing mean value and standard

deviation value (Barbara & Linda, 2007; Vanibuncha, 2005; Agresti & Finlay, 1997), which constituted an index of each domain of economic security as follows:

1) Low support = Mean of score –SD
2) Moderate support = Mean ± SD
3) High support = Mean + SD

Tables 4.4, 4.6, and 4.8 provide calculating levels of each domain of economic security by employing mean value, while Tables 4.5, 4.7, and 4.9 show levels of economic security on each domain. Table 4.4 also shows steps of calculating level of economic security when considering self financial support. Mean value of self financial support score was 0.5109 and standard deviation was 0.25044 in 2002. The results showed that low level of self financial support was less than 0.26046, medium level was 0.26046 to 0.76134, and high level was more than 0.76134. In 2007, mean value of self financial support score was 0.5384 and standard deviation was 0.26197. Low self financial support was less than 0.27643, medium level was 0.27643 to 0.80037, and high level was more than 0.80037.

Table 4.4 Value and Scores of Self Financial Support shown as a Domain of Economic Security in 2002 and 2007

Self financial support	Value	Mean	SD	Calculation	Scores
In 2002	Low	0.5109	0.25044	0.5109 – 0.25044	< 0.26046
	Medium			0.5109 ± 0.25044	0.26046 – 0.76134
	High			0.5109 + 0.25044	> 0.76134
In 2007	Low	0.5384	0.26197	0.5384 – 0.26197	< 0.27643
	Medium			0.5384 ± 0.26197	0.27643 – 0.80037
	High			0.5384 + 0.26197	> 0.80037

Table 4.5 shows levels of self financial support among the Thai elderly. The findings revealed that most of the elderly had moderate self financial support in both years (64 percent in 2002 and 63 percent in 2007) followed by low self financial

support about 31 percent in 2002 and 28 percent in 2007. 5.3 percent in 2002 and 9.3 percent in 2007 showed high self financial support.

Table 4.5 Levels of Self Financial Support among the Thai Elderly in 2002 and 2007

Self financial support	2002		2007	
	N	%	N	%
Low	6,884	30.8	7,764	27.7
Moderate	14,310	63.9	17,697	63.0
High	1,186	5.3	2,612	9.3
Total	22,380	100.0	28072	100.0

Table 4.6 shows that in 2002 mean value of government financial support score was 0.2492 and standard deviation was 0.19398. Low level was lower than 0.05522, medium level was from 0.05522 to 0.44318, and high level was more than 0.44318. In 2007, mean value of government financial support score was 0.2335 and 0.14890 was standard deviation. In addition, the results found that low level of government financial support was less than 0.0846, medium level was from 0.0846 to 0.3824, and high level was more than 0.3824.

Table 4.7 shows levels of government financial support among the Thai elderly. The findings showed that most of the elderly had low government financial support for both years (about 80 percent in 2002 and 70 percent in 2007) followed by moderate government financial support accounting for about 20 percent in 2002 and 29 percent in 2007. Only 0.6 percent in 2002 and 0.4 percent in 2007 showed high government financial support.

Table 4.6 Value and Scores of Government Financial Support shown as a Domain of Economic Security in 2002 and 2007

Government financial support	Value	Mean	SD	Calculation	Score
In 2002	Low	0.2492	0.19398	0.2492 – 0.19398	< 0.05522
	Medium			0.2492 ± 0.19398	0.05522 – 0.44318
	High			0.2492 + 0.19398	> 0.44318
In 2007	Low	0.2335	0.14890	0.2335 – 0.14890	< 0.0846
	Medium			0.2335 ± 0.14890	0.0846 – 0.3824
	High			0.2335 + 0.14890	> 0.3824

Table 4.7 Levels of Government Financial Supports of the Thai Elderly in 2002 and 2007

Government financial supports	2002		2007	
	N	%	N	%
Low	17,823	79.6	19,839	70.7
Moderate	4,418	19.7	8,107	28.9
High	139	0.6	126	0.4
Total	22,380	100.0	28072	100.0

Moreover, Table 4.8 shows calculating of levels of family financial support. Mean value of self financial support score was 0.13523 and 0.0645 was standard deviation in 2002. The result of low level of family financial support was less than 0.07073, of medium level from 0.07073 to 0.19973, and high level more than 0.19973. In 2007 mean value was 0.16717 and standard deviation was 0.1008. Low level of family financial support was less than 0.06637, while medium level of family financial support was from 0.06637 to 0.26797. High level of family financial support was more than 0.26797.

Table 4.8 Value and Scores of Family Financial Support shown as a Domain of Economic Security in 2002 and 2007

Family financial support	Value	Mean	SD	Calculation	Score
In 2002	Low	0.13523	0.0645	0.13523 – 0.0645	< 0.07073
	Medium			0.13523 ± 0.0645	0.07073 – 0.19973
	High			0.13523 + 0.0645	> 0.19973
In 2007	Low	0.16717	0.1008	0.16717 – 0.1008	< 0.06637
	Medium			0.16717 ± 0.1008	0.06637 – 0.26797
	High			0.16717 + 0.1008	> 0.26797

Table 4.9 shows levels of family financial support among the Thai elderly. Most of the elderly had low family financial support in both years (about 81 percent in 2002 and 71 percent in 2007), followed by moderate family financial support about 19 percent in 2002 and 29 percent in 2007. Only 0.4 percent both in 2002 and in 2007 showed high family financial support.

Table 4.9 Levels of Family Financial Supports of the Thai Elderly in 2002 and 2007

Family financial supports	2002		2007	
	N	%	N	%
Low	18,146	81.1	19,839	70.7
Moderate	4,141	18.5	8,107	28.9
High	93	0.4	126	0.4
Total	22,380	100.0	28072	100.0

4.2.3 Constructing the Economic Security Index (ESI) among the Thai Elderly

After considering each domain of economic security, the index of economic security was constructed by aggregating these nine variables–income from work, amount of income, saving/interest, house ownership, pension, monthly

allowance, income from spouse, income from offspring, and income from others. To be valid and reliable, the index should be weighted by value from the Principal Component Analysis. The factor loading score of this method was brought to calculate the economic security index. It is shown in Table 4.10.

Table 4.10 Summary of Factor Loading for Economic Security Indicators

Indicators	2002			2007		
	Factor loading	**Eigen value**	**% of variance**	**Factor loading**	**Eigen value**	**% of variance**
Economic Security		2.072	23.025		1.551	17.239
Income from work	0.066			0.550		
Amount of income	0.356			0.559		
Saving/ interest	0.981			0.406		
House ownership	0.003			0.492		
Pension	0.009			0.238		
Monthly allowance	0.981			0.357		
Income from spouse	0.102			0.580		
Income from children	0.064			0.005		
Income from others	0.015			0.092		

Calculating score of economic security

According to the formula mentioned above the calculation is done as follows:

Step 1: **Constructing Economic Security Score**

For example: scoring of all variables by using weighted value from Table 4.10 for 2002 and 2007:

For 2002:

ESS = Wk(0.066)+Ic(0.356)+Sv(0.981)+Hs(0.003)+Ps(0.009)+Aw(0.981)+Sp(0.102)+Ch(0.064)+ Oth(0.015)

For 2007:

ESS = Wk(0.550)+Ic(0.559)+Sv(0.406)+Hs(0.492)+Ps(0.238)+Aw(0.357)+Sp(0.580)+Ch(0.005)+ Oth(0.092)

Where:

ESS = total score of self financial support with weighting

Wk = the score of income from work variable

Ic = the score of amount of income variable

Sv = the score of income from saving/interest variable

Hs = the score of house ownership variable

Ps = the score of pension variable

Aw = the score of monthly allowance variable

Sp = the score of income from spouse variable

Ch = the score of income from children variable

Oth = the score of income from others variable

Step 2: Adjusting Economic Security Score

After developing the three domains of economic security, each domain could be employed to measure a portion of the score of economic security. Normalization was required prior to any data aggregation because the variables showing economic security in this study had different units of measurement. Re-scaling is one of method that can normalize the variables to have an identical range from 0 to 1. Based on the formula of adjusting score above, the actual value in 2002 was economic security score; minimum value was zero, and maximum value 2.58. In 2007, the actual value was economic security score from the calculation above. Minimum value was zero and maximum value was 3.18. The equation for the re-scaling method is shown below:

$$\textbf{In 2002: Economic security Index (ESI)} = \frac{\textbf{(Economic security score – 0.00)}}{\textbf{(2.58 – 0.00)}}$$

$$\textbf{In 2007: Economic security Index (ESI)} = \frac{\textbf{(Economic security score – 0.00)}}{\textbf{(3.18 – 0.00)}}$$

Step 3: Classifying Economic Security Index by Quintile

In aggregating nine variables (income from work, amount of income, saving/interest, house ownership, pension, monthly allowance, income from spouse, offspring, and others) to measure economic security, the composite index method and weighting by factor loading value of Principal Component Method were applied. After adjusting the score into the range from 0 to 1, the index was classified by quintile. The results were as follows:

Table 4.11 Quintile of Economic Security Index Classified by Year

Quintile	Level	2002		2007	
		Percent	N	Percent	N
1	Least secure	20.0	4,472	19.1	5,372
2	Less secure	20.0	4,485	21.3	5,990
3	Moderate secure	20.8	4,645	19.5	5,478
4	More secure	18.4	4,114	20.8	5,844
5	Most secure	20.8	4,664	19.2	5,388
Total		100.0	22,380	100.0	28072

In order to examine the determinant of economic security among the Thai elderly in 2002 and 2007, the indices were classified into two categories shown in Table 4.12. In 2002 data showed that the elderly had economic security by combination of quintiles 1 and 2 suggesting insecurity about 40% in 2002 and 40.5% in 2007, and quintiles 3-5 suggesting security about 60% in 2002 and 59.5% in 2007 as follows:

Table 4.12 Economic Security of the Thai Elderly in 2002 and in 2007

Economic Security	2002		2007	
	N	Percentage	N	Percentage
Insecurity	**8,957**	**40.0**	**11,362**	**40.5**
Security	**13,423**	**60.0**	**16,710**	**59.5**

The examination of the difference of economic security indices in 2002 and 2007 showed that the economic security among the Thai elderly in these two years decreased a little bit about 0.5 percent (ESI equal 60 percent in 2002 and 59.5 percent in 2007). The change of economic security of the Thai elderly showed an insignificant decrease in 2007 compared to 2002. This meant that most of the elderly were still secure when three domains of economic support security (self financial support, government financial support, and family financial support) were involved in both years.

In summary, to answer the first objective the investigation of the level of economic security of the Thai elderly by constructing the economic security indices for 2002 and 2007 based on the data of the 2002 and the 2007 Surveys of Older Persons in Thailand was made. Then the current study identified domains of economic security, which consisted of three sources i.e. self financial support (income from work, amount of income, income from saving and house ownership), government financial support (pension and allowance), and family financial support (income from spouse, offspring, and others). Each domain was constructed by the composite index method by using the weights of factor scores from the principal component analysis and classifying levels of each domain by mean value. The results of each domain showed that self financial support of most of the elderly was in medium level, while government financial support and family financial support were in low level for both years. Finally, the Economic Security Index was constructed with the same method from each domain above by aggregating all components from three domains and calculating the new factor loading values from the principal component analysis. The findings showed that approximately 60 percent of the Thai elderly had economic security in both years (2002 and 2007).

CHAPTER V
THE DETERMINANTS OF ECONOMIC SECURITY

This chapter presents research findings in both of the datasets. The 2002 and the 2007 Survey of Older Persons in Thailand were studies 1) to investigate the level of economic security of the Thai elderly by constructing the economic security index in 2002 and 2007, 2) to compare the difference of economic security in 2002 and 2007 in relation to socio-demographic, health, and family factors, and 3) to examine the determinants of economic security among the Thai elderly in 2002 and 2007. This chapter will answer the last two objectives as follows:

5.1 The Difference of Economic Security among the Thai Elderly in 2002 and 2007

5.1.1 The Difference of Samples in 2002 and 2007

Many literatures of economic security revealed that the Thai elderly's different socio-demographic factors (i.e. sex, age, education, and area of residence, region), health factors (i.e. self-reported health status, sickness, limitation of activities of daily living (ADL), physical functional limitation, chronic diseases), as well as family factors (i.e. living arrangement, and care giver of daily living) brought about the different economic security. Therefore, it is essential to examine the association between economic security among the Thai elderly and these variables by examining the 2002 and the 2007 Survey of Older Persons in Thailand.

5.1.1.1 Self Financial Support

The self financial support in Table 5.1 was constructed based on four variables (income from work, amount of income, saving/ interest, and house ownership) in both years (in 2002 and 2007). The majority of the elderly in both years received self financial support at a moderate level accounting for 64 percent in 2002 and 63 percent in

2007, approximately 30 percent in 2002 and 27.7 percent in 2007 had self financial support at low level, and 5.3 percent in 2002 and 9.3 percent in 2007 had high self financial support. Moderate and high self financial support was found among males more than females for both years (in 2002 and 2007). Moreover, the elderly in 2007 had an increasing self financial support from in 2002. Moderate and high levels of self financial support decreased with age while low level of self financial support increased with age both in 2002 and 2007. Older persons who had completed secondary school and over had better self financial support at moderate and high levels than those who had completed only primary, lower education or no formal education at all in both years. In addition, the elderly who lived in municipal area and the south of Thailand in 2002 had better self financial support at moderate and high levels than those living in non municipal area and other regions, except in 2007 that those who lived in non municipal area and in the south had better self financial support at high level than those living in municipal area and other regions.

Older persons who had good health, not sick, no limitation of activities of daily living (ADL), no limitation of physical function, and no chronic disease had better self financial support at moderate and high levels than those who had poor health, sick, limitation of ADL and physical function, and suffered from one or more chronic diseases both in 2002 and 2007.

The elderly who lived alone and those living with spouse had better self financial support at moderate and high levels than the elderly living with others in 2007. However, the elderly both in 2002 and 2007 who were given care for daily living by spouse had better self financial support at moderate level than those receiving such care by others. In 2007, the findings showed that most of the elderly who took care of themselves had better self financial support at high level than those nursed by others.

Table 5.1 the Difference of Self Financial Support among the Thai Elderly in 2002 and 2007 by Socio-demographic, health, and family factors

Variables	2002				2007			
	Low	Moderate	High		Low	Moderate	High	
	%	%	%	χ^2	%	%	%	χ^2
Socio-Demographic Factors								
Sex				407.566***				1149.386***
Female	45.1 (5,476)	52.4 (6,371)	2.5 (300)		34.8 (5,416)	59.2 (9,212)	6.0 (926)	
Male	32.1 (3,281)	64.0 (6,545)	4.0 (406)		18.7 (2,347)	67.8 (8,485)	13.5 (1,686)	
Age				1569.638***				2183.961***
60-69 years	30.2 (4,231)	65.6 (9,209)	4.2 (590)		19.0 (3,127)	68.2 (11,248)	12.8 (2,119)	
70-79 years	49.4 (3,123)	49.0 (3,101)	1.6 (100)		35.6 (3,172)	59.3 (5,279)	5.1 (452)	
80 years +	69.3 (1,404)	29.9 (607)	0.8 (16)		54.8 (1,465)	43.7 (1,169)	1.5 (40)	
Education				745.502***				1145.608***
No education	53.9 (2,547)	44.6 (2,104)	1.5 (71)		45.8 (2,111)	50.7 (2,337)	3.6 (166)	
Primary	36.6 (5,901)	60.0 (9,657)	3.4 (546)		25.8 (4,993)	64.1 (12,404)	10.1 (1,949)	
Secondary	19.9 (309)	74.3 (1,156)	5.8 (90)		16.0 (659)	71.9 (2,955)	12.1 (496)	
Area of residence				107.812***				25.413***
Non municipal	41.4 (6,389)	55.6 (8,590)	3.0 (457)		27.7 (5,551)	62.5 (12,530)	9.8 (1,974)	
Municipal	34.1 (2,368)	62.3 (4,327)	3.6 (249)		27.6 (2,213)	64.4 (5,167)	8.0 (638)	

Table 5.1 the Difference of Self Financial Support among the Thai Elderly in 2002 and 2007 by Socio-demographic, health, and family factors (continued)

Variables	2002				2007			
	Low	Moderate	High		Low	Moderate	High	
	%	%	%	χ^2	%	%	%	χ^2
Socio-demographic factors (continued)								
Region				374.022***				256.168***
Bangkok	33.9 (788)	62.1 (1,443)	4.0 (92)		27.3 (707)	66.9 (1,732)	5.8 (150)	
Central	33.8 (1,941)	62.6 (3,595)	3.6 (207)		28.2 (1,867)	62.8 (4,149)	9.0 (595)	
North	41.5 (1,957)	55.5 (2,615)	3.0 (141)		29.5 (1,732)	62.4 (3,661)	8.1 (475)	
East/ North	47.1 (3,220)	50.6 (3,458)	2.4 (162)		27.6 (2,605)	63.7 (6,005)	8.7 (823)	
South	30.8 (851)	65.4 (1,806)	3.8 (104)		23.9 (852)	60.2 (2,150)	16.0 (570)	
Health factors								
Self-reported health status				1050.245***				1006.050***
Poor	48.4 (5,970)	49.8 (6,151)	1.8 (226)		35.1 (5,247)	58.3 (8,709)	6.6 (988)	
Good	27.8 (2,786)	67.4 (6,766)	4.8 (480)		19.2 (2,517)	68.5 (8,988)	12.4 (1,624)	
Sickness				281.113***				270.991***
Sick	47.6 (2,985)	50.5 (3,167)	1.9 (120)		30.9 (5,499)	60.8 (10,836)	8.3 (1,482)	
Not sick	35.8 (5,772)	60.5 (9,750)	3.6 (587)		22.1 (2,264)	66.9 (6,861)	11.0 (1,130)	

Table 5.1 the Difference of Self Financial Support among the Thai Elderly in 2002 and 2007 by Socio-demographic, health, and family factors (continued)

Variables	2002				2007			
	Low	Moderate	High		Low	Moderate	High	
	%	%	%	χ^2	%	%	%	χ^2
Health factors (continued)								
Limitation of ADL				183.737***				290.078***
At least 1	55.0 (844)	43.9 (674)	1.0 (16)		47.9 (579)	50.0 (605)	2.1 (26)	
No	38.0 (7,913)	58.7 (12,243)	3.3 (690)		26.7 (7,185)	63.6 (17,091)	9.6 (2,585)	
Physical functional limitation				1389.903***				2132.499***
At least 1	50.7 (5,839)	47.5 (5,466)	1.8 (203)		47.5 (3,455)	49.9 (3,629)	2.7 (193)	
No	26.8 (2,918)	68.5 (7,451)	4.6 (503)		20.7 (4,309)	67.6 (14,067)	11.6 (2,418)	
Chronic disease				144.641***				251.170***
At least 1	52.0 (984)	46.0 (870)	2.1 (39)		25.7 (5,861)	64.6 (14,749)	9.8 (2,232)	
No	37. 9 (7,773)	58.8 (12,046)	3.3 (667)		36.4 (1,903)	56.4 (2,948)	7.3 (380)	

Table 5.1 the Difference of Self Financial Support among the Thai Elderly in 2002 and 2007 by Socio-demographic, health, and family factors (continued)

Variables	2002				2007			
	Low	Moderate	High		Low	Moderate	High	
	%	%	%	χ^2	%	%	%	χ^2
Family factors (continued)								
Living arrangement				175.735***				567.424***
Alone	30.9 (433)	65.6 (919)	3.5 (49)		32.5 (699)	61.1 (1,314)	6.4 (138)	
Spouse	31.3 (1,114)	65.0 (2,315)	3.8 (134)		16.6 (759)	69.5 (3,180)	13.9 (636)	
Offspring	41.4 (6,028)	55.6 (8,098)	3.0 (440)		28.5 (5,203)	62.8 (11,475)	8.7 (1,597)	
Relatives	43.2 (725)	53.9 (905)	2.9 (48)		38.4 (1,047)	54.1 (1,475)	7.5 (205)	
Non relatives	39.1 (458)	57.9 (679)	3.0 (35)		16.0 (55)	73.5 (252)	10.5 (36)	
Care giver of daily living				676.1 20***				1013.735***
Own	--------	--------	--------		25.2 (6,214)	64.6 (15,967)	10.2 (2,525)	
Spouse	29.2 (2,586)	66.5 (5,884)	4.3 (383)		29.5 (253)	66.5 (570)	4.0 (34)	
Offspring	46.5 (5,486)	51.3 (6,058)	2.2 (262)		52.7 (1,013)	46.2 (888)	1.0 (20)	
Relatives	44.3 (407)	52.1 (479)	3.6 (33)		79.4 (127)	20.6 (33)	0.0 (0)	
Others	34.7 (278)	61.8 (496)	3.5 (28)		36.6 (156)	55.9 (238)	7.5 (32)	
Total	**39.1 (8,757)**	**57.7 (12,916)**	**3.2 (706)**		**27.7 (7,763)**	**63.0 (17,697)**	**9.3 (2,612)**	

Note: *P< 0.05, **P< 0.01, ***P<0.001; and ------ is no data.

5.1.1.2 Government Financial Support

The government financial support in Table 5.2 is another source of income of the elderly who aged 60 years and distributed by Thai government. While civil servants receive pension after retirement, the general senior citizens and those who have worked in the private sector receive allowance of 500 Baht for living. In this study, the government financial support was measured by employing two variables (pension, and allowance) in both years (in 2002 and 2007). The majority of the elderly received government financial support at low level accounting for about 80 percent in 2002, and 70 percent in 2007. The male elderly received a little more government financial support at moderate and high levels than did the female elderly. Moreover, in 2002 the elderly aged 70 - 79 years had more government financial support at moderate level than those in other age groups. In contrast, the older age in 2007 received more government financial support. The elderly who had completed secondary school and over had better government financial support at moderate and high levels than those with only primary, lower or no formal education in 2007. The elderly living in municipal area in 2002 had better government financial support than those living in non municipal area but the elderly living in non municipal area got better support in 2007 for moderate level. However, the elderly living in Bangkok in 2002 had better government financial support than those living in other regions while the elderly living in northeast of Thailand had better government financial support than those living in other regions in 2007.

The elderly who had good health, not sick, no limitation of activities of daily living (ADL), no limitation of physical function, and no chronic disease had better government financial support than those who had poor health, sick, limitation of ADL and physical function, and suffered from one or more chronic diseases in 2002. On the contrary, the elderly in 2007 who had poor health, were sick, and had limitation of ADL, and physical functional limitation, but without chronic disease had better government financial support than those who had good health, not sick, no limitation of ADL, no limitation of physical function, but suffered from one or more chronic disease. Due to the effective policies of government for older persons' health service, it is improved to support the elderly more.

Moreover, the elderly who lived with non relatives (i.e. nurse/ servant, friends/ neighbors, etc) had better government financial support than the elderly living with other groups in 2002, while the elderly living alone had better government financial support than those living with other groups in 2007. However, the elderly both in 2002 and 2007 who were given care for daily living by relatives (i.e. parents, sibling, and relatives) had better government financial support than the elderly receiving such care by others. Moreover, it has been found that the elderly living with relatives in 2002 received government financial support at good level also. It may have been because they were living with home care for the elderly, so they received better government financial support than those living with other groups. In 2007, the elderly given care by relatives received better government financial support than those who were not. The elderly who received care by their offspring received government financial support at good level, too. This may have been the effects of policies for the elderly that Thai government encouraged families to give more support to the elderly.

Table 5.2 the Difference of Government Financial Support among the Thai Elderly in 2002 and 2007 by Socio-demographic, health, and family factors

Variables	2002				2007			
	Low	Moderate	High		Low	Moderate	High	
	%	%	%	χ^2	%	%	%	χ^2
Socio-Demographic Factors								
Sex				22.949***				63.253***
Female	80.7 (9,800)	18.9 (2,290)	0.5 (58)		71.8 (11,176)	27.9 (4,347)	0.2 (32)	
Male	78.4 (8,023)	20.8 (2,127)	0.8 (81)		69.2 (8,664)	30.0 (3,760)	0.8 (94)	
Age				9.555*				775.396***
60-69 years	80.0 (11,220)	19.5 (2,731)	0.6 (78)		76.6 (12,642)	22.8 (3,762)	0.5 (90)	
70-79 years	78.8 (4,981)	20.6 (1,301)	0.7 (42)		63.9 (5,688)	35.8 (3,187)	0.3 (28)	
80 years +	80.0 (1,622)	19.0 (386)	1.0 (20)		56.4 (1,509)	43.3 (1,157)	0.3 (9)	
Education				746.893***				745.686***
No education	84.2 (3,977)	15.3 (724)	0.4 (21)		69.8 (3,222)	30.2 (1,392)	0.0 (1)	
Primary	80.6 (12,975)	19.0 (3,067)	0.4 (62)		73.8 (14,284)	26.0 (5,028)	0.2 (34)	
Secondary	56.0 (871)	40.3 (627)	3.6 (56)		56.8 (2,333)	41.0 (1,687)	2.2 (91)	
Area of residence				447.875***				186.628***
Non municipal	83.5 (12,883)	16.0 (2,476)	0.5 (78)		69.1 (13,850)	30.7 (6,160)	0.2 (45)	
Municipal	71.1 (4,940)	28.0 (1,942)	0.9 (62)		74.7 (5,989)	24.3 (1,947)	1.0 (81)	

Table 5.2 the Difference of Government Financial Support among the Thai Elderly in 2002 and 2007 by Socio-demographic, health, and family factors (continued)

Variables	2002				2007			
	Low	Moderate	High		Low	Moderate	High	
	%	%	%	χ^2	%	%	%	χ^2
Socio-demographic factors (continued)								
Region				517.135***				1178.943***
Bangkok	64.6 (1,500)	34.5 (801)	0.9 (22)		83.9 (2,171)	15.6 (405)	0.5 (12)	
Central	79.3 (4,555)	20.1 (1,157)	0.6 (32)		75.8 (5,010)	23.5 (1,551)	0.8 (50)	
North	79.3 (3,737)	20.1 (947)	0.6 (29)		71.0 (4,165)	28.9 (1,696)	0.1 (7)	
East/ North	85.6 (5,854)	14.2 (972)	0.2 (15)		59.3 (5,590)	40.5 (3,817)	0.3 (26)	
South	78.9 (2,178)	19.6 (541)	1.5 (42)		81.3 (2,904)	17.9 (638)	0.8 (30)	
Health factors								
Self-reported health status				67.264***				139.633***
Poor	81.6 (10,077)	17.9 (2,206)	0.5 (64)		68.2 (10,193)	31.6 (4,716)	0.2 (35)	
Good	77.2 (7,745)	22.0 (2,212)	0.7 (75)		73.5 (9,646)	25.8 (3,391)	0.7 (91)	
Sickness				54.373***				18.284***
Sick	82.5 (5,175)	16.7 (1,047)	0.8 (50)		69.9 (12,462)	29.7 (5,286)	0.4 (69)	
Not sick	78.5 (12,648)	20.9 (3,371)	0.6 (89)		71.9 (7,377)	27.5 (2,821)	0.6 (57)	

Table 5.2 the Difference of Government Financial Support among the Thai Elderly in 2002 and 2007 by Socio-demographic, health, and family factors (continued)

Variables	2002				2007			
	Low	Moderate	High		Low	Moderate	High	
	%	%	%	χ^2	%	%	%	χ^2
Health factors (continued)								
Limitation of ADL				22.099***				8.129*
At least 1	84.3 (1,294)	15.2 (234)	0.5 (7)		67.2 (814)	32.5 (393)	0.3 (4)	
No	79.3 (16,529)	20.1 (4,184)	0.6 (132)		70.8 (19,025)	28.7 (7,714)	0.5 (122)	
Limitation of physical function				2.441				276.400***
At least 1	80.0 (9,207)	19.3 (2,226)	0.6 (74)		63.5 (4,618)	36.3 (2,645)	0.2 (14)	
No	79.2 (8,616)	20.2 (2,191)	0.6 (65)		73.2 (15,221)	26.3 (5,462)	0.5 (112)	
Chronic disease				19.273***				34.961***
At least 1	83.0 (1,571)	16.1 (305)	0.9 (17)		71.4 (16,304)	28.1 (6,427)	0.5 (110)	
No	79.3 (16,251)	20.1 (4,113)	0.6 (122)		67.6 (3,535)	32.1 (1,680)	0.3 (16)	

Table 5.2 the Difference of Government Financial Support among the Thai Elderly in 2002 and 2007 by Socio-demographic, health, and family factors (continued)

Variables	2002				2007			
	Low	Moderate	High		Low	Moderate	High	
	%	%	%	χ^2	%	%	%	χ^2
Family factors								
Living arrangement				77.186***				180.482***
Alone	77.7 (1,088)	21.2 (297)	1.1 (15)		60.8 (1,308)	38.8 (834)	0.5 (10)	
Spouse	78.0 (2,777)	21.3 (757)	0.8 (28)		74.6 (3,412)	25.0 (1,144)	0.4 (19)	
Offspring	81.1 (11,815)	18.4 (2,676)	0.5 (75)		71.3 (13,037)	28.3 (5,172)	0.4 (66)	
Relatives	76.7 (1,287)	22.8 (383)	0.5 (8)		67.3 (1,836)	31.7 (865)	1.0 (27)	
Non relatives	73.0 (855)	26.0 (304)	1.0 (12)		71.8 (247)	26.7 (92)	1.5 (5)	
Care giver of daily living				106.328***				49.120***
Own	--------	--------	--------		71.2 (17,588)	28.4 (7,009)	0.4 (109)	
Spouse	77.9 (6,898)	21.4 (1,897)	0.7 (58)		70.6 (606)	28.9 (248)	0.5 (4)	
Offspring	81.9 (9,664)	17.5 (2,071)	0.6 (71)		65.1 (1,250)	34.5 (663)	0.4 (8)	
Relatives	71.2 (654)	28.4 (261)	0.3 (3)		59.4 (95)	40.6 (65)	0.0 (0)	
Others	75.5 (607)	23.5 (189)	1.0 (8)		70.3 (300)	28.6 (122)	1.2 (5)	
Total	**79.6 (17, 823)**	**19.7 (4,418)**	**0.6 (140)**		**70.7 (19,839)**	**28.9 (8,107)**	**0.4 (126)**	

Note: *P< 0.05, **P< 0.01, ***P<0.001; and ----- is no data.

5.1.1.3 Family Financial Support

Family financial support in this study was considered in terms of income from spouse, income from children, and income from others (i.e. siblings, relatives, others) in both years (in 2002 and 2007) as shown in Table 5.3. The majority of the female elderly received family financial support at a low level both years, accounting for 81 percent in 2002 and 71 percent in 2007. Approximately 19 percent in 2002 and 29 percent in 2007 had family financial support at moderate level. The male elderly received more family financial support at moderate and high levels than the female elderly in 2007. The younger elderly, the more they received family financial support in 2002 while in 2007 the older elderly, the more they received family financial support. Older persons who had completed secondary school and over had better family financial support at moderate level than those who had attained only primary or no formal education at all both in 2002 and 2007. In addition, the elderly who lived in non municipal area both in 2002 and 2007 were had better family financial support than those living in non municipal area. The elderly living in the south of Thailand had better family financial support than the elderly living in other regions in 2002 while the elderly living in the north of Thailand had better family financial support than the elderly living in other regions in 2007.

The elderly who had good health, not sick, no limitation of activities of daily living (ADL), no limitation of physical function, and no chronic disease had better family financial support at moderate and high levels than the elderly who had poor health, sick, limitation of ADL and physical function, and suffered from one or more chronic diseases only in 2002. In contrast, the elderly in 2007 who were in poor health and sick, had at least one or more limitation of ADL and limitation of physical function, but without chronic disease had better family financial support at moderate and high levels than those having good health, not sick, no limitation of ADL, no limitation of physical function, but stricken with at least one or more chronic disease.

In 2002, the elderly living with spouse had better family financial support at moderate and high levels than the elderly living with others while in 2007, the elderly who lived alone had better family financial support at moderate level than the elderly living with spouse, offspring, relatives, and non relatives. With regard to care given to the elderly for their daily living, it has been found that in 2002 the elderly who were given care by spouse had better family financial support at moderate and high levels than the

elderly given care by offspring, relatives (i.e. parents, siblings, relatives), and others (i.e. nurse/ servant, friends/ neighbors, others). In 2007, the elderly who were given care by relatives had better family financial support at moderate level than those receiving care by others.

Table 5.3 the Difference of Family Financial Support among the Thai Elderly in 2002 and 2007 by Socio-demographic, health, and family factors

Variables	2002				2007			
	Low	Moderate	High		Low	Moderate	High	
	%	%	%	χ^2	%	%	%	χ^2
Socio-Demographic Factors								
Sex				10.803**				63.253***
Female	80.3 (9,758)	19.2 (2,333)	0.5(57)		71.8 (11,176)	27.9 (4,347)	0.2 (32)	
Male	82.0 (8,389)	17.7 (1,808)	0.4(36)		69.2 (8,664)	30.0 (3,760)	0.8 (94)	
Age				779.452***				775.396***
60-69 years	75.6 (10,609)	23.8 (3,340)	0.6 (80)		76.6 (12,642)	22.8 (3,762)	0.5 (90)	
70-79 years	88.6 (5,603)	11.2 (709)	0.2 (11)		63.9 (5,688)	35.8 (3,187)	0.3 (28)	
80 years+	95.4 (1,934)	4.5 (92)	0.0 (1)		56.4 (1,509)	43.3 (1,157)	0.3 (9)	
Education				150.415***				745.686***
No education	87.2 (4,118)	12.6 (594)	0.2 (10)		69.8 (3,222)	30.2 (1,392)	0.0 (1)	
Primary	79.5 (12,807)	20.0 (3,217)	0.5 (79)		73.8 (14,284)	26.0 (5,028)	0.2 (34)	
Secondary	78.5 (2,221)	21.2 (330)	0.3 (4)		56.8 (2,333)	41.0 (1,687)	2.2 (91)	
Area of residence				13.607**				186.628***
Non municipal	80.5 (12,424)	19.1 (2,953)	0.4 (59)		69.1 (13,850)	30.7 (6,160)	0.2 (45)	
Municipal	82.4 (5,722)	17.1 (1,189)	0.5 (33)		74.7 (5,989)	24.3 (1,947)	1.0 (81)	

Table 5.3 the Difference of Family Financial Support among the Thai Elderly in 2002 and 2007 by Socio-demographic, health, and family factors (continued)

Variables	2002				2007			
	Low	Moderate	High		Low	Moderate	High	
	%	%	%	χ^2	%	%	%	χ^2
Socio-demographic factors (continued)								
Region				192.515***				1178.943***
Bangkok	84.2 (1,955)	15.0 (348)	0.8 (19)		83.9 (2,171)	15.6 (405)	0.5 (12)	
Central	84.6 (4,858)	15.1 (867)	0.3 (18)		75.8 (5,010)	23.5 (1,551)	0.8 (50)	
North	81.7 (3,851)	18.1 (853)	0.2 (9)		71.0 (4,165)	28.9 (1,696)	0.1 (7)	
East/ North	79.5 (5,442)	20.1 (1,377)	0.3 (22)		59.3 (5,590)	40.5 (3,817)	0.3 (26)	
South	73.9 (2,040)	25.2 (697)	0.9 (24)		81.3 (2,904)	17.9 (638)	0.8 (30)	
Health factors								
Self-reported health status				54. 475***				139.633***
Poor	82.7 (10,211)	17.0 (2,102)	0.3 (34)		68.2 (10,193)	31.6 (4,716)	0.2 (35)	
Good	79.1 (7,935)	20.3 (2,039)	0.6 (59)		73.5 (9,646)	25.8 (3,391)	0.7 (91)	
Sickness				45.125***				18.284***
Sick	83.7 (5,250)	16.1 (1,009)	0.2 (12)		69.9 (12,462)	29.7 (5,286)	0.4 (69)	
Not sick	80.1 (12,896)	19.4 (3,132)	0.5 (80)		71.9 (7,377)	27.5 (2,821)	0.6 (57)	

Table 5.3 the Difference of Family Financial Support among the Thai Elderly in 2002 and 2007 by Socio-demographic, health, and family factors (continued)

Variables	2002				2007			
	Low	Moderate	High		Low	Moderate	High	
	%	%	%	χ^2	%	%	%	χ^2
Health factors (continued)								
Limitation of ADL				6.992*				8.129*
At least 1	83.4 (1,280)	16.0 (246)	0.5 (8)		67.2 (814)	32.5 (393)	0.3 (4)	
No	80.9 (16,866)	18.7 (3,895)	0.4 (85)		70.8 (19,025)	28.7 (7,714)	0.5 (122)	
Limitation of physical functional limitation				146.265***				276.400***
At least 1	84.2 (9,685)	15.5 (1,783)	0.3 (40)		63.5 (4,618)	36.3 (2,645)	0.2 (14)	
No	77.8 (8,461)	21.7 (2,358)	0.5 (53)		73.2 (15,221)	26.3 (5,462)	0.5 (112)	
Chronic disease				2.245				34.961***
At least 1	82.3 (1,557)	17.3 (327)	0.5 (9)		71.4 (16,304)	28.1 (6,427)	0.5 (110)	
No	81.0 (16,589)	18.6 (3,814)	0.4 (83)		67.6 (3,535)	32.1 (1,680)	0.3 (16)	

Table 5.3 the Difference of Family Financial Support among the Thai Elderly in 2002 and 2007 by Socio-demographic, health, and family factors (continued)

Variables	2002				2007			
	Low	Moderate	High		Low	Moderate	High	
	%	%	%	χ^2	%	%	%	χ^2
Family factors								
Living arrangement				642.717***				180.482***
Alone	97.1 (1,361)	2.8 (39)	0.1 (1)		60.8 (1,308)	38.8 (834)	0.5 (10)	
Spouse	68.8 (2,453)	30.6 (1,091)	0.5 (19)		74.6 (3,412)	25.0 (1,144)	0.4 (19)	
Offspring	81.7 (11,903)	17.8 (2,593)	0.5 (70)		71.3 (13,037)	28.3 (5,172)	0.4 (66)	
Relatives	87.7 (1,472)	12.3 (206)	0.1 (1)		67.3 (1,836)	31.7 (865)	1.0 (27)	
Non relatives	81.7 (958)	18.1 (212)	0.2 (2)		71.8 (247)	26.7 (92)	1.5 (5)	
Care giver of daily living				1748.274***				49.120***
Own	----	----	----	----	71.2 (17,588)	28.4 (7,009)	0.4 (109)	
Spouse	67.7 (5,994)	31.6 (2,798)	0.7 (60)		70.6 (606)	28.9 (248)	0.5 (4)	
Offspring	89.3 (10,546)	10.4 (1,228)	0.3 (33)		65.1 (1,250)	34.5 (663)	0.4 (8)	
Relatives	97.6 (896)	2.4 (22)	0.0 (0)		59.4 (95)	40.6 (65)	0.0 (0)	
Others	88.4 (710)	11.6 (99)	0.0 (0)		70.3 (300)	28.6 (122)	1.2 (5)	
Total	**81.1 (18,146)**	**18.5 (4,141)**	**0.4 (93)**		**70.7 (19,839)**	**28.9 (8,107)**	**0.4 (126)**	

Note: *P< 0.05, **P< 0.01, ***P<0.001; and ----- is no data.

5.2 The Determinants of Economic Security among the Thai elderly in 2002 and 2007

The results from the first objective were expected to investigate the level of economic security of the Thai elderly by constructing the economic security index in 2002 and 2007. The measurement of Economic Security Index (ESI) employed to answer the third objectives, that is, to examine the determinant of economic security among the Thai elderly in 2002 and 2007. These two datasets were manipulated with binary logistic regression models.

As the outcome variables are dichotomous in nature, binary logistic regression is the most appropriate method and two dataset of the 2002 and 2007 Survey of Older Persons in Thailand were employed to model the odds of economic security. It is important to observe that the values expressed in Table 5.4 are odds ratio; values greater than one indicate greater odds of economic security.

The determinants of economic security among the Thai elderly included three factors on a basis that they would affect on economic security of the elderly. Firstly, socio-demographic factors were based upon sex, age, education attainment, area of residence, and region. Secondly, health factors consisted of self-reported health status, sickness, and activities of daily living, physical function, and chronic diseases. Lastly, family factors pertained to living arrangement, and care giver for the elderly's daily living.

Table 5.4 shows socio-demographic factors that both in 2002 and 2007 the male elderly are more likely to have economic security than the female elderly about 1.2 times and 1.7 times in 2002 and 2007, respectively (at $\alpha = 0.001$) and odd ratio (OR) are between 1.148-1.304 in 2002 and 1.639-1.828 in 2007.

Regarding age, it was found that the younger the elderly, the better economic security they had. The elderly in 2002 who aged 60-69 years and 70-79 years are 2.7 times and 1.6 times, respectively, more likely to have economic security than those aged 80 years and over. The relationship was statistically significant at 99.99% confidence interval (or $\alpha = 0.001$) and OR were between 2.382-2.975 and 1.401-1.755, respectively. Similarly, in 2002, the elderly in 2007 aged 60-69 years and 70-79 years were 2.8 times and 1.5 times, respectively, more likely to have economic security than those aged 80 years and over. The relationship was statistically significant at $\alpha = 0.001$ and OR were between 2.515-3.079 and 1.325-1.620, respectively.

In terms of education level, the elderly who had secondary and higher, and primary and lower education had 3.2 times and 1.7 times more likely to have economic security than those who had no education in 2002 (at $\alpha = 0.001$) and OR were between 2.382-2.975 and 1.401-1.755, respectively. The findings of education attainment of 2007 were similar to that of 2002. The elderly who had secondary and higher, and primary and lower education had 3.1 times and 1.6 times more likely to have economic security than those who had no education (at $\alpha = 0.001$) and OR were between 2.820-3.464 and 1.478-1.711, respectively.

Regarding area of residence, the elderly living in non municipal area in 2002 were 30.2 percent more likely to have economic security than the elderly living in municipal area (at $\alpha = 0.001$) and OR were between 0.721-0.935 while the elderly in 2007 living in non municipal area were 1.1 times more economic security than those living in municipal area at $\alpha = 0.05$ and OR were between 1.017-1.165.

With concerning to region, the elderly in 2002 who lived in other regions, such as, central (excluding Bangkok) and the south of Thailand were more likely to have economic security than those who lived in Bangkok about 1.1 times, and 1.3 times, respectively, at $\alpha = 0.001$, and OR were between 1.142-1.464 and 1.146 – 1.522, respectively. The elderly living in the north and the northeast of Thailand were less likely to have economic security than the elderly living in Bangkok about 18 percent and 39 percent at $\alpha = 0.001$ and OR were between 0.724-0.938, and 0.536-0.689, respectively. In 2007, the elderly living in central, north, northeast, and south were more likely to have economic security than those living in Bangkok about 1.3 times, 1.2 times, 1.4 times, and 1.7 times, respectively, at $\alpha = 0.001$, and OR were between 1.174-1.472, 1.062-1.344, 1.277-1.608, and 1.532-1.974, respectively.

Health factors became significant since they also controlled the other factors. It can be seen that in terms of self-reported health status, the good health elderly were 1.5 times more likely to have economic security than the elderly with poor health (at $\alpha = 0.001$) and OR were between 1.454-1.648. The elderly who were not sick in a previous year were about 1.1 times more likely to have economic security than the elderly who were sick, but this was not statistically significant. The elderly who had no limitations of ADL (eating, dressing, and bathing), no limitation of physical function (standing up/ sitting down, carrying things 1 kg., working 1-5 km., and a few step, travelling by bus/

boat step alone) and without chronic diseases (inability to control urination, hypertension, diabetes, heart disease, cancer), had economic security about 1.2 times, 1.4 times and 1.2 times (at $\alpha = 0.001$) and OR were between 1.101-1.396, 1.279-1.457, and 1.091-1.341.

In 2007, the elderly who were in good health, were not sick, and had no limitation of physical function were 1.3 times, 1.1 times, and 1.5 times, respectively, more likely to have economic security than the elderly who were in poor health, were sick, and had limitation of physical function (at $\alpha = 0.001$) and OR were between 1.201-1.342, 1.022-1.143, and 1.433-1.641, respectively. The elderly who had no limitations of ADL (eating, dressing, and bathing) were 0.7 percent less likely to have economic security than the elderly with at least one or more limitations of ADL; however, this was statistically insignificant. The elderly who had no chronic disease were about 1.1 times less likely to have economic security than the elderly who had one; however, this was statistically insignificant.

Family factors were considered in terms of living arrangement, and care giver for the elderly's daily living. In 2002, Table 5.4 shows the effects of family factors as another control factor. The elderly living alone were 1.4 times more likely to have economic security than the elderly living with non relatives. The relationship is statistically significant at $\alpha = 0.01$ and OR were between 1.138-1.617. However, the elderly living with spouse, offspring, and relatives were 3.4 percent, 14.8 percent, and 16.3 percent, respectively, less likely to have economic security than the elderly living with non relatives; the relationship is at $\alpha = 0.05$ only the elderly living with offspring and OR were between 0.744-0.976.

In 2007, the elderly living alone, with offspring, and with relatives were 54.3 percent, 37.1 percent, and 48.5 percent, respectively, less likely to have economic security than the elderly living with non relatives (at $\alpha = 0.001$, and at $\alpha = 0.01$, respectively) and OR were between 0.347-0.603, 0.483-0.818, and 0.392-0.677, respectively. However, the elderly living with spouse were 1.1 times more likely to have economic security than the elderly living with non relatives; the relationship is not statistically significant.

Moreover, in 2002 the elderly's care given for daily living by spouse, offspring, and relatives (parents, siblings, and friend/ neighbors) were 11 percent, 37.7 percent, and 49.5 percent, respectively less likely to have economic security than those

whose care given for daily living by others (nurse/ servants, friend/ neighbors, etc.). The relationship is statistically significant only the elderly living with offspring, and relatives at $\alpha = 0.001$ and OR were between 0.526-0.737, and 0.403-0.631. In 2007 the elderly who were given care by spouse and who took care of themselves were 1.4 times, and 1.3 times more likely to have economic security than those who were given care by others (nurse/ servants, friend/ neighbors, etc.), with statistically significant at $\alpha = 0.05$ and $\alpha = 0.001$ and OR were between 1.074-1.807, and 1.087-1.667, respectively. The elderly who were given care by offspring, and relatives were 23 percent, and 79 percent, less likely to have economic security than those receiving care by others at $\alpha = 0.05$ and $\alpha = 0.001$ and OR were between 0.609-0.976 and 0.118-0.378, respectively.

Table 5.4: Odds Ratio of Economic Security among the Thai Elderly in 2002 and 2007

Variables	2002			2007		
	Odds Ratio	95% Conf. interval		Odds Ratio	95% Conf. interval	
		Lower	Upper		Lower	Upper
Socio-Demographic Factors						
Sex						
Female (ref)	-------	-------	--------	-------	-------	-------
Male	1.224***	1.148	1.304	1.731***	1.639	1.828
Age						
80 years + (ref)	-------	-------	--------	-------	-------	--------
70 – 79 years	1.566***	1.401	1.755	1.465***	1.325	1.620
60 – 69 years	2.662***	1.401	3.744	2.783***	2.515	3.079
Education						
No education (ref)	-------	-------	--------	-------	-------	--------
Primary and lower	1.682***	1.563	1.811	1.590***	1.478	1.711
Secondary and higher	3.244***	2.769	3.799	3.126***	2.820	3.464
Area of residence						
Municipal (ref)	-------	-------	--------	-------	-------	--------
Non municipal	0.698***	0.647	0.753	1.088***	1.017	1.165
Region						
Bangkok (ref)	-------	-------	--------	-------	-------	--------
Central	1.142***	1.142	1.464	1.315***	1.174	1.472
North	0.824**	0.724	0.938	1.195**	1.062	1.344
East/ North	0.608***	0.536	0.689	1.433***	1.277	1.608
South	1.321***	1.146	1.522	1.739***	1.532	1.974
Health factors						
Self-reported health status						
Poor health (ref)	-------	-------	--------	-------	-------	--------
Good health	1.548***	1.454	1.648	1.270***	1.201	1.342
Sickness						
Sick (ref.)	-------	--------	--------	-------	--------	--------
Not sick	1.063	0.995	1.135	1.081**	1.022	1.143

Table 5.4: Odds Ratio of Economic Security among the Thai Elderly in 2002 and 2007 (continued)

Variables	2002			2007		
	Odds Ratio	95% Conf. interval		Odds Ratio	95% Conf. interval	
		Lower	Upper		Lower	Upper
Health factors						
Limitation of activity of daily living						
At least 1 (ref.)	-------	--------	-------	-------	--------	--------
No	1.240***	1.101	1.396	0.993	0.860	1.146
Limitation of physical function						
At least 1(ref.)	-------	--------	-------	-------	--------	--------
No	1.365***	1.279	1.457	1.533***	1.433	1.641
Chronic diseases						
At least 1(ref.)	--------	--------	-------	-------	--------	--------
No	1.209***	1.091	1.341	1.049	0.980	1.123
Family factors						
Living arrangement						
Non relatives (ref.)	--------	--------	--------	-------	--------	-------
Alone	1.357**	1.138	1.617	0.457***	0.347	0.603
Spouse	0.966	0.828	1.127	1.086	0.827	1.427
Offspring	0.852*	0.744	0.976	0.629**	0.483	0.818
Relatives	0.837	0.704	0.994	0.515***	0.392	0.677
Care giver of daily living						
Others (ref.)	--------	--------	-------	-------	--------	-------
Spouse	0.890	0.748	1.059	1.393*	1.074	1.807
Offspring	0.623***	0.526	0.737	0.771*	0.609	0.976
Relatives	0.505***	0.403	0.631	0.221***	0.118	0.378
Own	--------	--------	-------	1.346**	1.087	1.667
-2Log likelihood		26715.423			33290.966	
Degree of freedom		22			23	
Pseudo R^2		0.141			0.151	

Note: ref. = reference, *P< 0.05, **P< 0.01, ***P<0.001

This study attempted to meet the second objective, i.e. to compare the difference of economic security levels in 2002 and 2007 by socio-demographic factors, health factors, and family factors, and the third objective, i.e. to examine determinants of economic security among the Thai elderly in 2002 and 2007.

The findings of second objectives were considered as sources of economic support among the Thai elderly. Firstly, with regard to self financial support of the Thai elderly in 2002 and in 2007, most of them had self financial support at moderate and high levels. Specifically, in 2002 the male elderly who were younger, attained higher education, lived in municipal area, and in Bangkok and the south of Thailand had more self financial support at moderate and high levels than the female elderly who attained lower education, and lived in non municipal area, and other regions, statistically significant at $\alpha = 0.001$. Similar to that of 2007, the male elderly who were younger old, attained higher education , and lived in municipal area, in Bangkok and the south had more self financial support their counterparts, statistically significant at $\alpha = 0.001$. Health factors (self-reported health status, sickness, limitation of activities of daily living, limitation of physical function, and chronic disease) affected self financial support among the Thai elderly, that is, the healthier, the more self financial support they had in both years (2002 and 2007) (at $\alpha = 0.001$).

Regarding family factors of the Thai elderly in 2002, the elderly living alone and living with spouse had more self financial support at moderate and high levels than the elderly living with others. However, the elderly whose care for daily living provided by spouse and others (nurse/ servants, friends/ neighbors, etc.) had more self financial support than the elderly living with offspring, and relatives (parents, siblings, etc.). In 2007 the elderly living with spouse and non relatives had more self financial support at moderate and high levels than the elderly living with others. The elderly who those receiving care by spouse and those taking care of themselves had more self financial support at moderate and high levels than the elderly living with others, statistically significant at $\alpha = 0.001$.

For the government financial support of the Thai elderly, most of them received government financial support in terms of pension and allowance at low level both in 2002 and 2007. However, in 2002 the elderly who were the male elderly, attained higher education, living municipal area, and in Bangkok had more government financial

support than the female elderly, attained lower education, living in non municipal area, and in other regions. Aged of the elderly was closely associated with government financial support. Some of socio-demographic factors among the elderly in 2002 and those of 2007 were alike, except age, area of residence, and regions. The older persons living in non municipal area and in the northeast received more government financial support at moderate and high levels than the elderly who lived elsewhere. Regarding health factors, in 2002 and 2007 results were different. In 2002 the elderly who had good health and had no limitation of activities of daily living and chronic disease received more government financial support at moderate level than the poor elderly who were sick and at least one or more limitation of activities of daily living and chronic disease. The relation of limitation of physical function to government financial support of the elderly in 2002 was not statistically significant, while in 2007 the poor elderly who were sick and had at least one or more limitation of activities of daily living and physical function received more government financial support than the opposite, statistically significant at $\alpha = 0.001$. With concerning to family factors, the elderly living alone and receiving care for daily living by relatives received more government financial support at moderate level than the elderly living with others and given care by others, statistically significant at $\alpha = 0.001$.

Lastly, almost all of the elderly received family financial support at low level in both years (2002 and 2007). The female elderly, the younger old, those with higher education, and those living in non municipal area, and in the south received more family financial support than their counterparts, statistically significant at $\alpha = 0.001$, similar to findings of in 2007. The exception was age; the older elderly in 2007 receive more family financial support. Concerning health factors in 2002, the elderly who were in good health and had not sickness, no limitation of ADL, no limitation of physical function, and no chronic disease received more family financial support than the opposite. The findings in 2002 were different from the findings in 2007. In 2007, the poorer health, the more the elderly received family financial support, statistically significant. The elderly living with spouse and obtaining care by spouse received family financial support at moderate level in 2002, while the elderly living alone and given care by relatives received family financial support at moderate level in 2007.

To answer the third objectives on examining the determinants of economic security among the Thai elderly in 2002 and 2007, Logistic Regression Analysis was

used to analyze both the 2002 and the 2007 datasets. The analysis found that in 2002, certain of socio-demographic factor such as male, younger old, attained high education, living in municipal area, in central (exclude Bangkok), and the south, of health factors, such as good self-reported health status, not sick, and the limitation activity of daily living (ADL), physical functional limitation, and chronic disease, and of family factors, such as living alone, and care given by others (such as nurse/ servants, friends/ neighbors, etc.) had an association with economic security of the Thai elderly. The relations were statistically significant at $\alpha = 0.001$, $\alpha = 0.01$, and $\alpha = 0.05$.

Like those in 2002, the socio-demographic factors of the elderly in 2007 had a huge impact on their economic security. The relation of socio-demographic factors, some of health factors, and family factors and economic security was statistically significant level at $\alpha = 0.001$ in male, younger old, attained high education, living in non municipal area, in the central, north, northeast, and south, statistically significant at $\alpha = 0.001$, $\alpha = 0.01$, and $\alpha = 0.05$. Moreover, it has revealed that health factors of the elderly were important for their economic security, statistically significant at $\alpha = 0.05$, and $\alpha = 0.01$, although some characteristics of health factors were not statistically significant. Furthermore, the elderly living alone and the elderly who were given care by others (nurse/ servants, friends/ neighbors, etc.) had economic security, statistically significant at $\alpha = 0.01$, and $\alpha = 0.001$ in 2002, while in 2007 the elderly living with non relatives and those receiving care by spouse and taking care of themselves had economic security, statistically significant.

5.3 Discussion

The objectives of the present study was to investigate the level of economic security of the Thai elderly by constructing the economic security index in 2002 and 2007. The study employed datasets of two years (2002 and 2007) to account for trends of economic security among the Thai elderly during 5 years. Moreover, this study attempted to compare the difference of economic security levels in 2002 and 2007 by looking at socio-demographic, health status, and family factors as well as examine the determinants of economic security among the Thai elderly in 2002 and 2007 through composite index (Nardo et al., 2005, Active Ageing Taskforce, 2003, Buttedahl,

1994), McGahan et al.,1986, and Moon, 1977). To construct a valid and reliable index, this study employed score calculated by Principal Component Analysis so as to create the weighted value. Then economic security was classified by quintile to consider level of economic security among the Thai elderly.

Moreover, this study considered each source of income support shown as domains of economic security of the Thai elderly. Firstly, this study constructed the index for each source of income support among the Thai elderly, in parallel to the studies of Hosseini & Samimi, 2007 & 2009; and Thanakwang & Soonthorndhada, 2007). Each source of income support consisted of 1) self financial support which included income from work, amount of income, income from saving/ interest, house ownership, 2) government financial support covering pension and allowance, and 3) family financial support covering income from spouse, income from children, and income from others both in 2002 and 2007.

Each source of income support was constructed by using composite index and weighted score by Principal Component Analysis, like Economic Security Index. However, some sources of income support consisted of a few variables, such government financial support which only included pension, and allowance, and family financial support that consisted of income from spouse, children, others, so they could not be classified by employing quintile as they lost some quintiles. Thus, these sources were classified by mean value (Vanichbuncha, 2002). Each source of income support among the Thai elderly was at different levels. Self financial support of the elderly was at moderate level, which their government financial support and family financial support were at low level, according to NSO (2002 and 2007) and Knodel (2007).

The findings revealed that the male, the younger old, those with higher education, and those living in municipal area, and in the south of Thailand were more likely to received self financial support than to depend on family support. This conformed to previous studies that showed that most of the male elderly attained higher education than the female elderly (Knodel & Chayovan, 2009, and NSO, 2002 and 2007). Moreover, females, on average, live longer than males (Institute for Population and Social Research, 2006). The female elderly were thus more faced with economic difficulties than the male elderly. Fortunately, the female elderly who were

older aged were more likely to receive family financial support (Chayovan, 2005, Thanakwang & Soonthorndhada, 2007, Knodel & Chayovan, 2009).

Moreover, an area of residence was associated with sources of income support and economic security. The elderly living in municipal area were more likely to have self financial support than the elderly living in non municipal area, while the elderly living in non municipal area some received family financial support, in accordance with the studies of Glasgow (1993) and NSO (2002 and 2007). Municipal area implied higher education and work opportunities, thus giving more available sources of higher income. This led to self financial support, and government financial support. Government financial support was able to provide pensions after retirement to civil servant and provide allowance to all the Thai elderly aged 60 years and over facing economic vulnerabilities. Moreover, formal government financial support was done simultaneously with the elderly's working and rights under the Thai government policies.

Furthermore, in 2007 of the study found that the male elderly who were older aged, had higher education, and lived in non municipal area received more government financial support than the female elderly who were younger old, attained lower education, and lived in municipal area, and in the northeast. Also, health factors were associated with sources of income support, statistically significant. The good health, not being sick, no limitation of activities of daily living and physical function and no chronic disease contributed to economic security in term of self financial support. Moreover, family factors had an impact on sources of income support of the Thai elderly.

Importantly, the aim of this study was to investigate an index of economic security. First, nine initial variables were gathered to identify the economic security both in 2002 and 2007 datasets by composite index method and weighted value by factor analysis with principal components analysis (PCA). The index was then classified by quintile. It was divided two groups, that is, quintile 1-2 included into insecurity, and quintile 3-5 included into security. The results showed that the index constructed by composite index was reliable and valid as it was actually able to answer the research questions.

Another aim was to examines the difference of economic security level in both (2002 and 2007). Economic security in both years was at close level (60 percent in 2002 and 59.5 percent in 2007), although in 2007 the index of economic security of the elderly was likely to decrease a little. Moreover, it was found that the different determinants led to the different level of economic security among the Thai elderly and it was statistically significant at 0.001.

Accordingly, this study showed an interesting point that economic security of the elderly in 2002 and 2007 was almost no different. Most of the elderly still possessed economic security. This may have been because of the benefits from support rendered by the government or other organizations for the elderly in particular. They therefore received social welfare and family support and built their economic security in spite of the fact that most of them supported themselves with paid working, especially those living in municipal area (Knodel & Chayovan, 2009).

The third aim was to examine the determinants of economic security among the Thai elderly in 2002 and 2007 by economic security index. The findings showed that some of the elderly subgroups were faced with economic difficulties. Specifically, socio-demographic factors of the elderly were related to their economic security. The female elderly had less economic security than the male. The older age had less economic security. In addition, in 2002 and 2007 the elderly with lower education, and living in non-municipal area, and not living at Bangkok had less economic security than those who had higher education, and living in municipal area, and in Bangkok. In 2007 the elderly living in non municipal area and in the south had more economic security than the elderly living in Bangkok. According to Thai policies, the government tried to distribute support to all of the Thai elderly.

The study of Smeeding & Weaver (2002) found that older females were facing with poverty, like the studies of Vu & Doughney (2009), which revealed that ageing women were unable to have affordable education when they were older age owing to being jobless, having no savings, and lacking fair financial outcomes. These are results of unfairness of deprived people in social, especially female who obtain less than primary education. Moreover, these findings were similar to Australian Bureau of Statistics (2002), which stated that economic security of ageing women was related especially to support income, home ownership and lower superannuation

savings. Moreover, previous studies of IPSR found that the Thai women elderly had longer life expectancy than men, so the number of this particular senior group was greater. Because of the patriarchal family system in Thailand, women attained lower education and most females' economic status depended on her husband (Institute for Population and Social Research, 2006).

Another interesting finding was that levels of education of the elderly were closely related to economic security. The higher education they attained, the more economic security they had when older. Higher education supported them to get more job opportunities. This is in accordance with the study of Vu & Doughney (2009), which found that high education prompted economic security. The elderly living with non relatives had more economic security because they had their dependence. Those who had salary had more economic security because of their abilities in doing several tasks, including their own business. With regard to area of residence, the elderly in the year 2007 who lived in non-municipal area were more likely to face precarious economic security than others, similar to the study of Lloyd-Sherlock (2006).

Moreover, health factors of the elderly were relates to their economic security because older age caused a decline in physical capacities triggering limitations of daily living activities and poor health. Poor health required high cost for treatment. The results above were similar to findings of the study of Chayovan (2005), which showed that Thai older women were among the most economically vulnerable and they were stricken with poor health. In addition, health status affected the ability of older persons to work.

This study also revealed that the proportion of economic security decreased when the elderly had poor health and limitations of physical function and chronic disease. The studies of Thanakwang & Soonthorndhada (2007), of Porrapakkam & Punyaratabandhu (2006), and of Chooprapavan (2000) found the older persons' economic vulnerability was often triggered poor health. When their physical system could not function normally as usual, the elderly had to meet additional expense for taking better care of themselves and other health care services. The burdens associated with poor health varied considerably depending on several other factors, including job skills, type of occupation, and absence of a spouse or

support from other family members. This implies that a disabled older person should thus receive more health care coverage than a healthy one (Moon & Ruggles, 1994).

Socio-economic transformation and depressed economic worldwide were also responsible for the elderly's living arrangements and care given for their daily activities. Most of the other family members had to shoulder burden until they could not support them anymore (Vu & Doughney (2009); Porrapakkam & Punyaratabandhu, 2006). The findings showed that the elderly living alone and able to hire nurse/ servants to look after them still tended to have economic security.

The determinants of economic security of the Thai elderly revealed a strong relation to socio-demographic factors i.e. age, sex, education, area of residence, and region in some groups. Health factors i.e. self-reported health status, being sick, limitation of activity of daily living, limitation of physical function, chronic disease in both 2002 and 2007 had an impact on economic security among the Thai elderly. However, sickness was not significant in 2002 but it showed a strong effect on economic security in 2007. While the relations of ability of activities of daily living and having chronic disease and economic security among the Thai elderly were statistically significant in 2002, those appeared not to be so in 2007.

The limitations of the study were that secondary data in 2002 and 2007 were used. The information may have been somehow limited. More sources of income support could have made the present study better reflect the state of economic security, assess economic security index of the Thai elderly, and examine the difference of economic security index in 2002 and 2007. However, this index for both years was reliable enough to make a comparison in order to examine the determinants of economic security among the Thai elderly in 2002 and 2007 by employing Logistic Regression Analysis with economic security index (ESI) as the index constructed by multi- indicator of economic security.

CHAPTER VI
CONCLUSION AND RECOMMENDATION

This concluding chapter summarizes the findings of the research. The answers to the research questions set in chapter 1, which are 1) what kinds of methods and the domains of indicators use for construct economic security index of the Thai elderly?; 2) what are the differences of economic security level of the Thai elderly in 2002 and 2007?; and 3) what are the factors affecting economic security of the Thai elderly?, are reported. To answer the research questions, the 2002 and 2007 data of the Survey of Older Persons in Thailand which were gathered by the National Statistical Office (NSO), were employed. This chapter also contributes recommendations from the present study and for future research.

6.1 Conclusion

Firstly, the measurement of economic security cited literature review found that income was an important indicator of economic security among the elderly. Moreover, sources of income support were important indicator to protect the elderly from economic insecurity. Thus, economic security should be constructed by several indicators reflecting economic security, especially variables of the main source of income support. From literature reviews and data availability, nine variables in 2002 and 2007 were prepared for analysis. They were classified three sources of income support, included, 1) self financial support which consisted of income from work, amount of income, saving/ interest, house ownership, 2) government financial support which was composed of pension, and monthly allowance, and 3) family financial support which was based on income from spouse, income from children, and income from others. Each source of income support was constructed by employing composite index and weighted score by Principal Component Analysis, like Economic Security Index (ESI).

The results revealed that three sources of economic support were aggregated as three indexes and classified by mean value. The results revealed that the most important source of economic security of the Thai elderly were from their self financial support (69.2 % and 71.3% for moderate and high levels in 2002 and 2007), while the elderly received government financial support and family financial support at low and moderate levels for equally proportion both in 2002 and in 2007. In addition, the economic security was recomputed at the same time by composite index method, the 9 indicators most fitted for constructing economic security index were , income from work, amount of income, saving/ interest, house ownership, pension, monthly allowance, income from spouse, income from children, and income from other sources. The results additionally revealed that 1) the Economic Security Index (ESI) was classified by five quintiles; and 2) percentage of economic security was classified as two categories shown economic security or insecurity. Most of the Thai elderly had economic security approximately 60 percent in 2002 and 2007.

Secondly, it examined the difference of economic security level in 2002 and 2007. Changing economic security of the Thai elderly showed a little decreased in 2007 compare to 2002 (ESI equal 60 percent in 2002 and 59.5 percent in 2007). This implied that economic status of most Thai elderly was still security. In addition, about 66-67% of the elderly had income higher than poverty line in 2002 and 2007 (at 10,000 baht and 20,000 baht respectively, NESDB, 2008).

The findings of this study showed the relationships between economic support index and socio-demographic factors, health factors, and family factors among the Thai elderly. Firstly, most of the elderly depending self financial support both in 2002 and 2007 were represented as the male elderly, the younger old, those with higher education, and those living in municipal area, and in Bangkok and the south, good health status, not sick, no limitation of activities of daily living (ADL), no limitation of physical function, and spouse giving care of daily living had more self financial support at moderate level and higher than the elderly those not.

Interestingly, the elderly depending self financial support at moderate level and higher in 2007 it was found that they lived with non relatives in the higher proportion, and the elderly living with spouse were depending self financial support at high level, as well. Moreover, the elderly who were taken care of daily by spouse or others

(nurse/ servants, friends/ neighbors, etc.) had higher self financial support than the elderly living with offspring, relatives (parents, siblings, etc.), statistically significant at α = 0.001. The elderly who were taken care of daily by spouse and own, respectively, had higher self financial support at moderate and high levels than the elderly who were taken care by others in 2007 as well. The data shown the elderly living on their own appeared in 2007 data. It was shown that the elderly were more likely to depend on self financial support.

The finding showed that most of the Thai elderly received government financial support in terms of pension and monthly allowance at low level in 2002 and 2007. However, in 2002 the elderly who were the male elderly, those with higher education, and those living municipal area, and in Bangkok received more government financial support than the female elderly, those with lower education, and those living in non municipal area, and in other regions, while the closely proportions of each age among old persons received government financial support. Some socio-demographic factors among the elderly in 2002 were similar to those in 2007, excluding age, area of residence, and region. The older persons, living in non municipal area, and living in the northeast received more government financial support at moderate and high levels than the elderly those not. Regarding health factors, in 2002 and 2007 found that the different results. In 2002, it was reported that the good health elderly, no limitation of activities of daily living, no chronic disease received more government financial support at moderate level than the poor elderly, sick, limitation of activities of daily living at least one or more, and chronic disease at least one or more. The relation of limitation of physical function was not statistically significant with government financial support of the elderly in 2002.While in 2007 the poor elderly, sick, limitation of activities of daily living at least one or more, and limitation of physical function at least one or more were reported received more government financial support that the elderly those not, statistically significant at α = 0.001. Moreover, family factors, the elderly living alone or taken care by relatives received more government financial support at moderate level than the elderly who were living in others and given care by others, statistically significant.

Almost all of the elderly received the family financial support at low level in 2002 and in 2007. The female elderly, younger old, attained higher education, living in non municipal area, and in the south, received more family financial support at moderate

level and higher than the elderly those not, statistically significant at $\alpha = 0.001$. While in 2007 data found that the elderly who were older age will receive family financial support more. Concerning health factors, in 2002 found that the elderly who were good health, no limitation of ADL, no limitation of physical function, no chronic disease received higher family financial support than those who had health problems. However, the 2007 data reported different finding while in 2007, the poorer health, the more they received family financial support, statistically significant. In 2002 the elderly living with spouse and taken care by spouse received family financial support at moderate level while the elderly living alone and taken care by relatives received family financial support at moderate level in 2007.

Lastly, the determinants of economic security among the Thai elderly in 2002 and 2007 analyzed by Logistic Regression Analysis both the 2002 and the 2007 datasets were examined to answer the third objectives. It was found that in 2002, socio-demographic factor (male, younger old, attained high education, living municipal area, in central (exclude Bangkok), and the south, regarding health factors (good self-assessed health status, and the limitation activity of daily living (ADL), physical functional limitation, and chronic disease, and family factors (living alone, and given care by others had an association with economic security of the Thai elderly. The relations were statistically significant at $\alpha = 0.001$, $\alpha = 0.01$, and $\alpha = 0.05$.

In 2007, socio-demographic factors had an association with economic security of the Thai elderly. The relations of socio-demographic factors, some of health factors, and family factors and economic security were significant level at $\alpha = 0.01$ in male, younger old, attained high education, living in non municipal area, in the Central, North, Northeast, and South region were significant at $\alpha = 0.001$, $\alpha = 0.01$, and $\alpha = 0.05$. Moreover, it was that health factors of the elderly were important factor affecting their economic security, statistically significant at $\alpha = 0.01$, and $\alpha = 0.05$although some characteristics of health factors were not statistically significant. In addition, it was found that the elderly living alone had economic security and the elderly given care by others had economic security, statistically significant at $\alpha = 0.001$, and $\alpha = 0.01$ in 2002. While 2007, the elderly living with non relatives had economic security and given care by spouse, and own, statistically significant, which was a hypothesis in this study.

Moreover, these results above were in accordance with the findings in 2007, the proportion of economic security increased in the elderly who paid working. This reflected wage work related to economic security among the elderly. The wage of the elderly was important factor resulting economic security for the elderly. Although physical health declining, the elderly realized that working for wages was a main factor related to their economic security. It was difficult to receive support from some relatives thoroughly.

The determinants of economic security among the Thai elderly revealed a strong link to socio-demographic characteristics (age, sex, education, residential area, and region), health status (self-reported health status, sickness, and activities of daily living, physical function, and chronic disease) in both 2002 and 2007. Except for sick it was not significant in 2002 but it had strongly impact on economic security in 2007. These reflected economic changes, the elderly still needed to work to support themselves. However, it was suggested that policies regarding the elderly welfare should be made.

6.2 Limitations and Suggestions for Further Study

The findings of this study support most of the initial hypotheses and contribute to an understanding of constructing an economic security index and the relationships of socio-demographic, health, and family factors and economic security among the Thai elderly. However, its limitations must be acknowledged. First, the 2007 Survey of Older Persons in Thailand did not include various variables, such as amount of expenditure, amount of debt, etc. to indicate economic security indicators, and the grouping of amount of income and amount of saving variables by normal scale measurement was another limitation of this study. It was suggested that further research cover more variables to assess economic security indicators of the elderly and the answer of several variables should be continuous variable. Moreover, it was suggested that primary data in future studies be appropriately utilized to cover economic security index of the elderly as a whole.

Second, there were changes of the allowance policy planning for the elderly in 2007-2009; it was adapted to cover the entire aged population. This study

did not focus on the vulnerable elderly, who suffered from poverty, lived alone, or were unable to support themselves. Even worse, income from government allowance could not sufficiently support their living. It was suggested that future studies regarding the access and income sufficiency from allowance seek their sources of economic assistance within community.

Third, this study employed indicators of economic security at individual level. It may not show economic security of some of the elderly who lived with family and had income and expenditure together within their household. Future studies should study economic security among the Thai elderly at household level, also.

Fourth, socio-demographic, health, and family factors were closely associated with economic security among the Thai elderly, especially health status. Because healthy aging is a process, a study cultivated at one point in time may not reflect a change in health care expenditure, which contributed to economic security. Due to chronic disease among the elderly, they needed to maintain their health continuously. It may be another contributory cause for their economic security. It is suggested that future studies should follow up these elderly facing chronic diseases in longer periods.

6.3 Policy Implications and Recommendations

Based on the findings of this study, it is possible to suggest some policy implications for constructing an index and selecting reliable and valid indicators to reflect economic security among the Thai elderly, including socio-demographic, health, and family factors associated with economic security of the Thai elderly. For the detail of policy implications for general Thai elderly and the vulnerable elderly as follows;

1. The findings of this study showed that the most source of economic support among the Thai elderly was self financial support, such as income from work, income from saving/interest, assets. This suggested that these elderly may have realized financial preparation for their old age. They had abilities to manage their own financial investment, savings, and income to maintain their economic well-being in the long term.

Government and other organization professionals who work with the older population should promote policy and intervention programs for them to build self economic stability in terms of training and learning to work when they become aged. Their characteristics of work may depend on local materials or local knowledge, such as handicrafts, pottery, culturing herbs, Thai traditional massage, and local tradition, etc. Similarly, the study of Soonthorndhada (2007) suggested that the local administrators (Tambol Administrative Organization) should establish and manage the elderly club in the community to look for sources of income for them.

Pension and allowance system were supported by the government. It is necessary that the older persons' welfare meet the elderly needs. Although the government provided allowance system to support the vulnerable elderly, it was not enough for them. Based upon 500-baht allowance per month, it was a good policy but it was a small amount of money when compared to a higher living cost in the present time. It was suggested that policies should be made concerning the benefit of the elderly, cost of living, and human dignity. Moreover, monthly allowance should be based on evidence of the elderly's need, especially the elderly who were female, attained lower education, poor health, and given care for daily living by oneself.

Another source of economic support for the Thai elderly was family, which consisted of income from spouse, children, and others. The findings showed that family financial support for the elderly was less than self financial support. It was suggested that policies should design to promote community support for the elderly, especially those who are childless or do not have caregivers, so they need assistance from their neighbors, community, and local organizations. Moreover, the government should develop local economy to decrease a number of the working-age population who move to work in urban areas.

2. According to the analysis of determinants of economic security among the Thai elderly, it was suggested that policies should be made to promote economic support for the female elderly, the oldest old, the uneducated, those living in Bangkok, those with poor health, those having limited physical functionality, those having chronic disease, those living with household members, and those whose offspring gave care to them. The suggested policies are as follows.

First, government or organization agencies that assist the vulnerable elderly should pay special attention to the elderly mentioned above and provide sources of income support for their needs; for example, a program to improve their knowledge, skills, and abilities in self-care with respect to both health and economic features. This policy should be directed to females at all stage of life with respect to the equality of education, socio-economic opportunities, and health care utilization to enhance their quality of life.

Second, health problems became one of the most crucial challenges that affected economic security among the Thai elderly, especially those stricken by the poor health, limited physical functionality, and chronic disease. It was suggested that policies should be made to manage budgets for long-term care for the elderly through collaborating with health care units, family, and community. In fact, the prevention of chronic disease should begin at younger age, under supervision of the Ministry of Public Health to advise, screen, and detect non-communicable and communicable diseases in all of the Thai population so as to decrease the prevalence of chronic disease among the elderly.

Third, the role of family support in taking care of the elderly was likely to decrease. Consequently, policies regarding familial support are urgently needed. Thai government has tried to promote family caregiver and requiring offspring involvement through campaigns of publication, laudation, and giving rewards for the good persons who take good care of their parents. Additionally, government may need to provide financial support for low income families.

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