



Demographic and Health Transition: Health Systems Challenges and Future Direction

As noted earlier in the report, Thailand has undergone rapid demographic and epidemiological transition during the last 20 years. The national population policy, in concert with socio-economic development over the period, brought down total fertility rate below the replacement level in the 1990s (Van Landingham and Hirschman, 2001; Greenspan, 1994). By 2002 universal health coverage was achieved (Tangcharoensathien et al, 2009) whereby the whole population was covered by one of the three public insurance schemes. Undeniably, the national family planning program contributed to successful health development in Thailand (Patcharanarumol et al, 2010).

In the light of the increase in number of elderly and prevalence of chronic non-communicable diseases (NCD), this chapter (1) investigates the profile of the burden of diseases—as measured by Disability Adjusted Life Year (DALY) loss among pre-elderly compared to the elderly, self assessed health status and effective coverage of essential interventions for chronic NCD; (2) reviews outpatient and inpatient utilization rates between 2002 and 2009, and estimates total expenditure on outpatient and inpatient services for the pre-elderly and elderly from 2008 to 2015; (3) reviews the current situation of the health workforce in providing care to the elderly, and estimates future demand and current production capacities of carers for the elderly. In this review, the pre-elderly group (45-59 years) is compared with three subgroups of elderly, 60-69, 70-79 and 80+ years. Based on this review, policies are recommended on health delivery systems, financing and health personnel

in order to respond to changing demand posed by demographic and epidemiologic transition.

Profile of the burden of disease

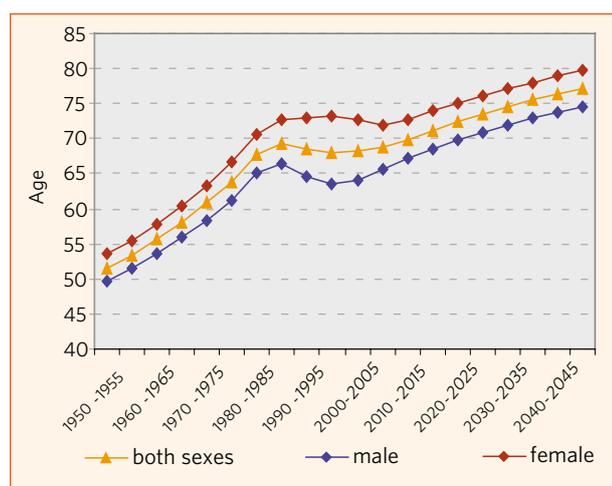
Trend and profile of demographic and epidemiological transition

Life expectancy in Thailand has increased substantially from 1950 to 1980 with a slightly different pace of achievement between men and women (Figure 4.1). An actual decline in life expectancy was observed among men for a decade, between 1995 and 2005; but men started to catch up thereafter. Female life expectancy rose rapidly from 1950 until 1990 when stagnation was observed up to 2010, though there was no drop as observed for men. It was projected to grow from 2010 at a similar speed to men's (see Figure 4.1).

Between 1975 and 1985, average life expectancy increased by 4 years for both women and men. The increase in life expectancy before 1985 could primarily be attributed to a rapid decline in the infant mortality rate over that time. Along with declining fertility, this resulted in rapid demographic change (Knodel & Chayovan, 2008). After 1990, the interruption in the increase in life expectancy probably resulted mainly from the HIV/AIDS epidemic (Tantivess and Walt, 2008) but also from traffic injuries (Patcharanarumol et al, 2010). The improvement in life expectancy thereafter is a result of successful HIV/AIDS prevention when the epidemic started to reverse around the late 1990s.

While longevity is on the rise, this does not always mean that the years gained are lived in healthiness. Katz and others (1983) developed the concept of active life expectancy to measure expected years of life in a healthy state. According to this concept, differences between active life expectancy and overall life expectancy indicate the losses of healthy years due to poor health or disability.

FIGURE 4.1 LIFE EXPECTANCY AT BIRTH OF THAI POPULATION, 1955-2050



Source United Nations Population Division (2008) using constant fertility rate

Evidence is inconclusive as to whether healthy year losses of Thai older people have been decreasing over the period. The series of studies are not comparable due to changes in methodological approaches (Thai Health Research Institute, 1992; NSO: 1994, 2002, 2007; MOPH: 1997, 2004). In addition, the disability survey, with changes in sampling methods and definition, showed increasing prevalence of disability (NSO: 1986, 2002, 2007).

Burden of disease in pre-elderly and elderly

A widely accepted measurement of burden of diseases is the application of Disability Adjusted Life Years (DALY) introduced in 1999 by WHO aiming at international comparison. DALY is the combination of number of years of life losses—YLL—due to premature deaths, and years living with disability—YLD. Fatal and non-fatal health outcomes are measured in a comparable unit, i.e. equivalent healthy years.

The disease burden as measured by DALY losses for the Thai population in 2004 (The Thai Working Group on Burden of Disease, 2008) is examined for the pre-elderly (45-59 years) and elderly (60 years and over) (Tables 4.1-4.4).

TABLE 4.1 TOP TEN DALY BY DISEASE CATEGORY IN PRE-ELDERLY (45-59 YEARS), 2004

Rank	Disease category	Male		Female		Disease category
		DALY per 1,000	YLD/DALY (%)	DALY per 1,000	YLD/DALY (%)	
1	Cancer	47	2	34	3	Cancer
2	Cardiovascular diseases	36	15	23	17	Cardiovascular diseases
3	Unintentional injuries	26	10	18	97	Mental disorders
4	HIV/AIDS	22	0	16	39	Diabetes
5	Mental disorders	22	91	15	89	Musculo-skeletal diseases
6	Digestive disorders	17	8	8	11	Unintentional injuries
7	Genito-urinary diseases	11	51	7	23	Infectious diseases
8	Diabetes	11	42	7	14	Digestive disorders
9	Musculo-skeletal diseases	11	91	7	0	HIV/AIDS
10	Infectious diseases	10	12	7	65	Chronic respiratory diseases
11	All others	33	42	26	55	All others
	Total	246	26	167	39	

Source: The Thai Working Group on Burden of Disease 2004 (2008)

In Table 4.1, DALY loss in pre-ageing women is smaller, 167 per 1,000 women than for men, 246 per 1000 men. Cancer and cardiovascular diseases are the two major causes of loss in both men and women 45-59 years. The percent of YLD to DALY reflects the magnitude of non-fatal loss, for example, 0% for HIV/AIDS means the DALY loss is all fatal loss. The larger the percentage is, the more the health care burden from non-fatal conditions.

As shown in Table 4.2, unlike the burden among pre-elderly adults, the burden among older people (60 years and over) shows little gender difference-422 per 1000 women and 460 per 1000 men.

The profile of the burden in the pre-elderly and elderly groups showed a large increase for some particular diseases. Cardiovascular diseases ranks first among the elderly group, being three to four times higher compared to the pre-elderly group in both men and women, as measured by DALY loss per 1000 population. Cancer ranks second after cardiovascular diseases. The burden from cancer among the elderly group is double that of the pre-elderly. HIV/AIDS, which was among the top ten causes of DALY losses in the pre-elderly

group, disappeared from the top ten list among the elderly group. Conditions which replaced these two disease categories in the top ten list among the elderly population were disorders of sensory organs such as vision and hearing loss and neurological disorders such as dementia. This reflects the frequent development of degenerative conditions during the ageing process.

Disorders of the sensory organs rank fourth in the top ten DALY losses among older people and have a wholly non-fatal burden. Cataracts were the largest cause of disability in this disease group. In 2009, cataracts were diagnosed in 18% and 24% of men and women respectively (Ekpalakorn et al, 2009). Older people living in rural areas showed higher prevalence than those in the urban areas. Approximately 57% and 50% of men and women diagnosed with cataract received treatment respectively. Hearing loss was found to be a problem for 30% and 26% of older men and women respectively. Those with severe problem such as cannot hear in at least one ear were 5% and 3% in older men and women respectively. They have limited access to elderly support and services, as evident from the fact that only 3% and 2% of them were using hearing aids, respectively.

TABLE 4.2 TOP TEN DALY BY DISEASE CATEGORY AT AGE 60 YEARS AND OVER (2004)

Rank	Disease category	Male		Female		Disease category
		DALY per 1,000	YLD/DALY (%)	DALY per 1,000	YLD/DALY (%)	
1	Cardiovascular diseases	100	10	97	9	Cardiovascular diseases
2	Cancer	99	2	66	3	Cancer
3	Chronic respiratory diseases	48	26	44	28	Diabetes
4	Sense disorders	33	100	37	100	Sense disorders
5	Diabetes	25	28	27	9	Infectious diseases
6	Infectious diseases	25	10	26	80	Neurological disorders
7	Digestive disorders	22	12	22	34	Chronic respiratory diseases
8	Genito-urinary diseases	20	32	21	79	Musculo-skeletal diseases
9	Unintentional injuries	19	7	18	13	Digestive disorders
10	Neurological disorders	17	77	15	6	Genito-urinary diseases
11	Others	53	47	50	35	All others
	Total	460	25	422	30	

Source: The Thai Working Group on Burden of Disease 2004 (2008)

TABLE 4.3 DALY PROFILE OF PRE-ELDERLY AND ELDERLY MEN, 2004

Rank	Male age 45-59		Male Age 60-69		Male Age 70-79		Male age80+	
	Disease category	DALY (% of Total)	Disease category	DALY (% of Total)	Disease category	DALY (% of Total)	Disease category	DALY (% of Total)
1	Cancer	19%	Cancer	24%	Cardiovascular diseases	22%	Cardiovascular diseases	25%
2	Cardiovascular diseases	15%	Cardiovascular diseases	21%	Cancer	20%	Chronic respiratory diseases	15%
3	Unintentional injuries	11%	Chronic respiratory diseases	8%	Chronic respiratory diseases	11%	Cancer	15%
4	HIV/AIDS	9%	Sense disorders	7%	Sense disorders	8%	Infectious diseases	7%
5	Mental disorders	9%	Diabetes	6%	Infectious diseases	6%	Neurological disorders	7%
6	Digestive disorders	7%	Unintentional injuries	5%	Diabetes	5%	Sense disorders	5%
7	Genito-urinary diseases	4%	Infectious diseases	5%	Digestive disorders	5%	Diabetes	5%
8	Diabetes	4%	Digestive disorders	5%	Neurological disorders	4%	Genito-urinary diseases	5%
9	Musculo-skeletal diseases	4%	Musculo-skeletal diseases	4%	Genito-urinary diseases	4%	Respiratory infections	5%
10	Infectious diseases	4%	Genito-urinary diseases	4%	Unintentional injuries	3%	Digestive disorders	5%
	Top five	63%		66%		67%		69%
	Top ten	87%		89%		89%		93%
	All others	13%		11%		11%		7%
	Total %	100%		100%		100%		100%
	Total DALY per 1000	246		389		535		654

Source: The Thai Working Group on Burden of Disease 2004 (2008)

Table 4.3 compares the burden profile between pre-elderly and three groups of elderly males. Total DALY per 1000 men increased consistently with age, from 246 per 1000 in the pre-elderly group to 654 per 1000 in the oldest group of >80 years old. Interestingly, the top ten disease categories had the lion's share: between 87% of total DALY rate among the pre-elderly group, and 93% of total DALY loss among the very old. Indeed, there

is a heavy concentration in the top five disease categories which constitute around two thirds of total DALY per 1000.

Except in pre-elderly men, the top three disease categories in men are the same: prevention of cancers, cardiovascular and chronic respiratory diseases, thus requiring major policy attention in maintaining healthy ageing.

TABLE 4.4 DALY PROFILE PRE-ELDERLY AND ELDERLY WOMEN, 2004

Rank	Female age 45-59		Female Age 60-69		Female Age 70-79		Female age80+	
	Disease category	DALY (% of Total)						
1	Cancer	20%	Cancer	19%	Cardiovascular diseases	24%	Cardiovascular diseases	32%
2	Cardiovascular diseases	14%	Cardiovascular diseases	19%	Cancer	15%	Cancer	10%
3	Mental disorders	11%	Diabetes	13%	Diabetes	10%	Neurological disorders	10%
4	Diabetes	10%	Sense disorders	10%	Sense disorders	9%	Infectious diseases	9%
5	Musculo-skeletal diseases	9%	Musculo-skeletal diseases	6%	Infectious diseases	7%	Chronic respiratory diseases	6%
6	Unintentional injuries	5%	Chronic respiratory diseases	5%	Neurological disorders	7%	Diabetes	6%
7	Infectious diseases	4%	Infectious diseases	5%	Chronic respiratory diseases	5%	Sense disorders	5%
8	Digestive disorders	4%	Neurological disorders	4%	Musculo-skeletal diseases	5%	Respiratory infections	5%
9	HIV/AIDS	4%	Digestive disorders	4%	Digestive disorders	4%	Digestive disorders	4%
10	Chronic respiratory diseases	4%	Genito-urinary diseases	3%	Genito-urinary diseases	3%	Genito-urinary diseases	4%
	Top five	64%		67%		65%		67%
	Top ten	85%		88%		89%		91%
	All others	15%		12%		11%		9%
	Total %	100%		100%		100%		100%
	Total DALY per 1000	167		329		495		645

Source: The Thai Working Group on Burden of Disease 2004 (2008)

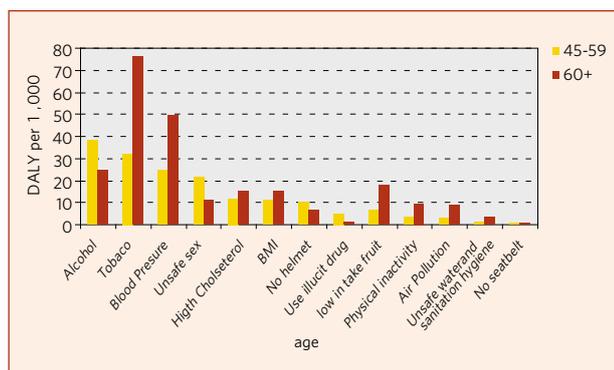
Table 4.4 compares the burden profile between pre-elderly and three groups of elderly women. Total DALY per 1000 women increased consistently by age, from 167 per 1000 in the pre-elderly group to 645 per 1000 in the oldest group.

The top ten disease categories had the lion's share-between 85% of total DALY rate among the pre-elderly group and 91% of total DALY loss among the very old. The top five disease categories make up around two thirds of total DALY per 1000. The top causes of DALY loss among Thai women in all four age groups are cancers, cardiovascular disease and diabetes. In achieving healthy ageing, policy should focus on prevention of these three

diseases. Note that diabetes is more common among women than men.

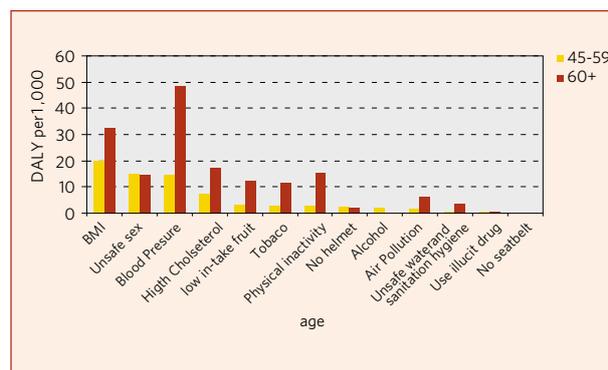
Comparing the risk burden between pre-elderly and elderly people, risk profile is concurrent with disease burden. The burden attributable to physiochemical risks such as high blood pressure, high BMI, and cholesterol is noticeably higher in elderly people than in the pre-elderly group. By contrast, the burden attributable to alcohol is lower in the elderly than the pre-elderly group. Hypertension and diabetes are major risk burdens among elderly women while tobacco and hypertension are major risks among older men. Elderly women had a higher risk burden from high BMI than men (See Figures 4.2 and 4.3).

FIGURE 4.2 RISK BURDEN AMONG PRE-ELDERLY AND ELDERLY MEN



Source: The Thai Working Group on Burden of Disease 2004 (2008)

FIGURE 4.3 RISK BURDEN AMONG PRE-ELDERLY AND ELDERLY WOMEN



Source: The Thai Working Group on Burden of Disease 2004 (2008)

TABLE 4.5 EFFECTIVE COVERAGE OF HYPERTENSION SERVICES (%)

	45-59		60-69		70-79		80+	
	2004	2009	2004	2009	2004	2009	2004	2009
Male								
Prevalence, %	36	28	47	43	52	51	59	54
• not aware	74	59	61	45	62	38	65	47
• know but do not treat	6	11	8	9	7	6	4	6
• treat but uncontrolled	14	17	22	25	20	23	23	23
• treat controlled	6	13	10	22	11	25	9	25
Female								
Prevalence, %	34	31	48	45	54	52	62	57
• not aware	59	42	52	32	50	33	61	37
• know but do not treat	6	7	7	7	7	7	8	8
• treat but uncontrolled	22	23	26	27	28	33	20	32
• treat controlled	13	28	15	34	15	28	11	23

Source: NHES (2004, 2009)

Effective coverage of services for selected non-communicable disease (NCD) conditions

Despite the high level of risk burden from hypertension and diabetes, a high proportion of elderly were unaware of their high blood pressure. For those who were treated with anti-hypertensive medicines, the proportion of well controlled blood pressure was low. Age-adjusted prevalence of hypertension among the elderly was 51.1 percent,

diabetes mellitus 14.0 percent, and diabetes mellitus with hypertension 8.0 percent.

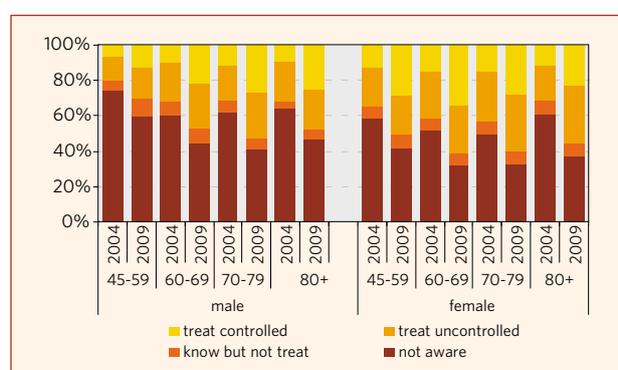
Effective coverage means the net proportion of population affected by a condition which had adequate control of the condition. This excludes the proportion who are (a) not aware of the condition and thus did not access treatment, (b) aware but did not access treatment, (c) aware, accessed treatment but the condition was poorly controlled. Overall, the proportion of those suffering from high blood pressure, diabetes mellitus or the combined

two conditions who were unaware of their condition was 56.1, 41.2 and 21.9 percent respectively. The proportion of adequate control for those undergoing treatment for blood pressure (less than 140/90 mmHg) was 12.4 percent, diabetes mellitus (fasting plasma glucose less than 140 mg/dl) 26.4 percent, and control of both combined conditions was 7.4 percent. These figures indicate level of effective coverage of interventions.

Comparing the 2004 with the 2009 National Health Examination Survey (NHES), it is clear that the proportion of treated and controlled groups in both hypertension and diabetes has increased in

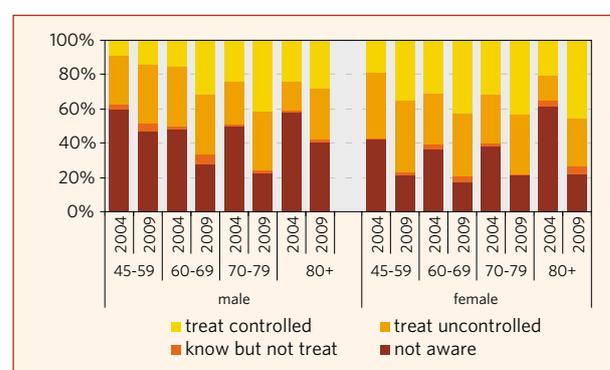
2009 (see Tables 4.5 and 4.6 and Figures 4.4 and 4.5). People with hypertension and diabetes (DM) were more aware of their condition than in the previous survey. However, those who underwent treatment but failed to control their conditions were still high. This reflects better access to treatment in 2009 but still poorer control of the conditions. Increase in awareness could partly be explained by improvement in socioeconomic conditions, as it was found that factors associated with unawareness and inadequate controls of the illnesses were living in rural areas, with low income, low educational levels, currently working and the oldest age group (Porapakkham et al, 2008).

FIGURE 4.4 EFFECTIVE COVERAGE OF HYPERTENSION SERVICES



Source: NHES (2004, 2009)

FIGURE 4.5 EFFECTIVE COVERAGE OF DIABETIC SERVICES



Source: NHES (2004, 2009)

TABLE 4.6 EFFECTIVE COVERAGE OF DIABETIC SERVICES (%)

	45-59		60-69		70-79		80+	
	2004	2009	2004	2009	2004	2009	2004	2009
Male								
Prevalence, %	11	9	14	14	12	14	10	13
• not aware	60	47	48	28	50	23	58	41
• know but do not treat	3	5	2	6	1	2	1	2
• treat but uncontrolled	28	34	35	34	25	34	17	30
• treat controlled	9	14	15	32	24	41	24	28
Female								
Prevalence, %	13	12	19	19	16	17	9	11
• not aware	42	21	37	18	38	21	62	22
• know but do not treat	1	2	3	2	2	1	4	5
• treat but uncontrolled	38	43	30	37	28	35	14	28
• treat controlled	19	35	31	43	32	43	21	46

Source: NHES (2004, 2009)

Self-perceived health

A comparison of self-perceived reported health status between 2003 and 2006 shows that for most of the measurements, health is improving (see Tables 4.7 and 4.8). Memory loss is rapidly

increasing in the very old group, compared to other functions which gradually increase with ageing. An effective prevention and promotion program for the pre-ageing group in this area could be expected to reduce the burden in the future.

TABLE 4.7 SELF REPORTED HEALTH STATUS, STATUS RELATIVE TO PEERS, COMPARING 2003 AND 2006

		Age group	2003 (%)	2006 (%)	Change between 2003-2006 (%)
Poorer health than last year	male	45-59	25	24	-2
		60-69	40	39	-4
		70-79	50	47	-7
		80+	60	58	-3
	female	45-59	30	29	-4
		60-69	48	46	-4
		70-79	55	52	-6
		80+	64	59	-7
Poorer health compare with peers	male	45-59	14	17	19
		60-69	23	24	8
		70-79	29	30	3
		80+	33	35	8
	female	45-59	19	20	3
		60-69	29	30	3
		70-79	31	34	10
		80+	30	34	10

Source: Health and Welfare Survey (2003, 2006)

TABLE 4.8 FIVE DIMENSIONS OF LIMITATION, BY GENDER, COMPARING 2003 AND 2006

Severe to very severe limitation		Age group	2003 (%)	2006 (%)	Change between 2003-2006, %
Mobility	Male	45-59	3	2	-53
		60-69	7	4	-43
		70-79	12	6	-53
		80+	19	10	-46
	Female	45-59	4	2	-52
		60-69	11	4	-63
		70-79	13	9	-29
		80+	22	11	-50
Pain, discomfort	Male	45-59	3	2	-17
		60-69	5	2	-55
		70-79	9	4	-49
		80+	15	8	-45

Severe to very severe limitation		Age group	2003 (%)	2006 (%)	Change between 2003-2006, %
	Female	45-59	3	2	-27
		60-69	8	3	-58
		70-79	9	6	-32
		80+	12	10	-18
Depression	Male	45-59	2	2	3
		60-69	3	3	-15
		70-79	5	4	-8
		80+	7	4	-39
	Female	45-59	3	3	1
		60-69	6	4	-35
		70-79	6	3	-41
		80+	9	2	-74
Concentration	Male	45-59	1	1	-7
		60-69	3	3	-10
		70-79	7	7	9
		80+	17	11	-36
	Female	45-59	2	2	-12
		60-69	4	4	-7
		70-79	9	8	-4
		80+	16	12	-25
Participation	Male	45-59	2	1	-63
		60-69	3	2	-54
		70-79	6	6	2
		80+	19	11	-41
	Female	45-59	1	1	-32
		60-69	3	2	-34
		70-79	8	6	-25
		80+	19	14	-23

Source: Health and Welfare Survey (2003, 2006)

Limitation of daily activities

Studies show that limitation in activities of daily living (ADL) increases with age. The 4th NHES shows that both limitations measured by ADL and instrumental activities of daily living (IADL) increased with age (Table 4.9). Women have higher limitation than men as measured by proportion having limitation in at least three out of the eight ADL dimensions: (1) bathing, (2) dressing, (3) eating, (4) toileting, (5) getting up from bed, (6) in-house walking, (7) bowel and (8) urine control and the ten activities of

IADL: using money, self-medication, light and hard housework, cutting own foot nail, walking outside the house, carrying heavy things, walking over 400 metres, transportation, telephoning, particularly at ages 80 and over. IADL impairment in total was double among women compared to men. Although self perceived health generally decreased from 2003 to 2006, Ekpalakorn et al (2010) compared ADL limitation of 2 activities and more to the 3rd NHES and found that it increased from 9.6 and 15.4 per cent in 2004 to 12.7 and 17.8 percent in 2009 in men and women respectively.

TABLE 4.9 OLDER PERSONS WITH ONE OR MORE ADL LIMITATION (%)

Age	ADL Limitation					
	Male			Female		
	1	2	3+	1	2	3+
60-69	5.8	4.8	0.7	7.6	6.3	0.6
70-79	4.8	7.7	1.7	9	11.2	1.2
80+	7	9.8	4.2	12.8	11.8	6.8
Total	5.6	6.3	1.4	8.6	8.6	1.5

Age	IADL Limitation					
	male			Female		
	1	2	3+	1	2	3+
60-69	19.9	6.4	6.5	23	12.8	19.5
70-79	21.6	9.3	19.1	22.3	14.5	39
80+	18.5	15.8	38.3	14.1	14.3	59.6
Total	20.4	8.3	14	21.8	13.5	30.5

Source: NHES (2009, p 252-53)

Health care utilization and expenditure

Health services utilization rate

Figure 4.6 shows outpatient utilization rate per capita per annum from 2003 to 2009, using National Statistical Office Health and Welfare Surveys (HWS). Not unexpectedly, use rates among elderly, 60-69, 70-79 and 80+ are much higher than the national average, up to more than 12 visits per year for 80+ groups in 2009. The use rate among the pre-elderly group, 45-59 years old is lower than the elderly group and much higher than the national average. Adults aged 15-44 years have the lowest utilization rate.

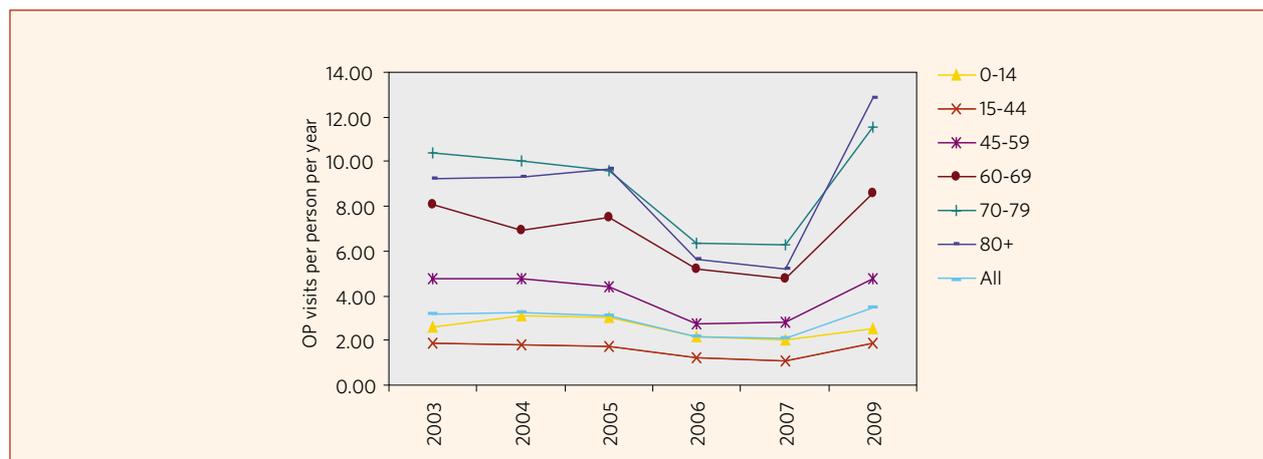
Unfortunately due to changes in the survey, in 2006 and 2007 HWS were combined with Socio-economic survey (SES). This resulted in a bulky interview questionnaire, in which the HWS module was interviewed at the end when household respondents were exhausted. The combined, lengthy

survey, more than 2 hours per household jeopardized the quality and reliability of HWS. In 2006 and 2007, there was a sharp drop in outpatient use rates despite the fact that routine administrative data show consistent increase over these years.

Having realized the reliability problem resulting from the combined HWS and SES, NSO decided to make HWS a stand alone survey from 2009 onward. Note that the annual HWS between 2003 and 2007 was conducted upon requests by the MOPH to assess the outcome of universal health coverage policy. After 2007, HWS has become a biennial survey; hence there are no figures for 2008 in Figure 4.6.

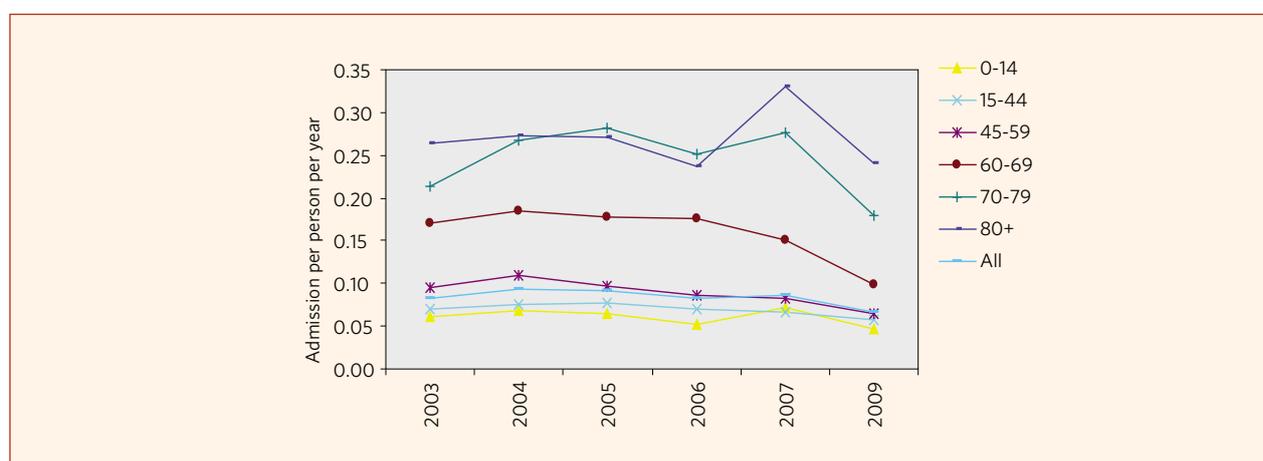
Figures for hospital admissions per capita per annum by age group also confirmed higher rates among the elderly than the national average. Due to problems of combining two surveys in one questionnaire, the admission rates for 2006, 2007 and 2009 should be interpreted with care (see Figure 4.7).

FIGURE 4.6 OLDER PERSONS USE RATE, VISIT PER PERSON PER YEAR, BY AGE GROUP, 2003-2009.



Source: Health and Welfare Survey (2003, 2006)

FIGURE 4.7 HOSPITAL ADMISSION RATE, PER PERSON PER YEAR, BY AGE GROUP, 2003-2009.



Source: Health and Welfare Survey (2003, 2006)

TABLE 4.10 AVERAGE LENGTH OF STAY FOR IN-PATIENTS BY AGE GROUP, 2003-2009

Age group	2003	2004	2005	2006	2007	2009
• 0-14	3.54	3.32	3.31	3.95	2.60	3.59
• 15-44	4.74	4.27	4.11	4.51	4.19	4.16
Pre-elderly						
• 45-49	5.87	4.71	4.98	4.80	4.15	4.37
Elderly						
• 60-69	3.88	4.04	4.13	3.53	3.53	6.34
• 70-79	4.60	4.22	4.28	4.45	3.08	4.10
• 80+	3.70	5.36	4.35	4.58	3.56	3.81
All	4.58	4.19	4.15	4.35	3.66	4.30

Source: HWS 2003-2009

Although it is likely that the elderly patients had a longer stay as in-patients in 2009, there is no clear pattern in the average length of stay by age group as different levels of hospitals admitted patients differently (see Table 4.10).

Health expenditure by the elderly

The objective of this section is to project into the future the amount of financial resources that would be spent on elderly groups compared to all other age groups. The downward trend of outpatient and inpatient use rate in 2006-2009 complicates the authors' attempts to project utilization rate of the pre-elderly and elderly groups into the future. Given these limitations, the feasible methodological approaches are;

1. Use the existing long term projection of Total Health Expenditure between 2007 and 2020 which utilizes the 1994-2006 National Health Account as a major platform.
2. Break down the projection of total health expenditure into personal and non-personal health care using data of National Health Account 2008.
3. For personal healthcare expenditure, further break down by age group using the proportion of charge for inpatient services by age group; by assuming the charge profile by age group of outpatients is similar to inpatient services. This is because of lack of data on outpatients.

Using national admission dataset on individual patient electronic records held by the National

Health Security Office for admission by three public insurance schemes (Civil Servant Medical Benefit Scheme, Social Health Insurance and Universal Coverage) in public and private hospitals, Table 4.11 analyzes charges to services rendered to each age group in 2007, 2008 and 2009 respectively. Number of admissions had a minimum increase from 6.41 million in 2007 to 6.56 million admissions in 2009. At the same time charges to patients increased from 70 billion baht in 2007 to 81 billion baht in 2009. Although the patients did not pay, as the three public health insurance schemes are the purchasers of services and pay on their behalf based on different provider payment methods, hospitals are required to report their charge data to insurance Funds. Average charge per admission also increased from 11,009 baht per admission in 2007 to 12,349 baht per admission in 2009. The average charge per admission among the elderly was more expensive than for other groups. For example, the disparity ratio in 2007 was 1.41, 1.49 and 1.66 for three elderly groups, against 1.0 for the overall population average. A consistent pattern of disparity was observed throughout 2007 to 2009.

The proportion of admissions by age group varied in 2007, 2008 and 2009. However, admission user charges by age group in 2007, 2008 and 2009 shows similar proportions. The average of these three years was the same as in 2008. Therefore, admission user charges by age group in 2008 are applied to break down personal care expenditure which includes both outpatients and inpatients, as there is no accurate information on charges to outpatients.

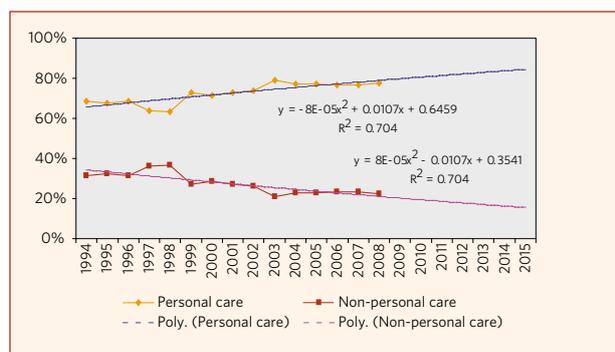
TABLE 4.11 CHARGE PROFILE FOR ADMISSION BY AGE GROUP IN 2007

Age Group	No. of admissions, million		Admission Charges, million Baht		Admission charge, Baht/admission	Disparity Ratio
2007						
0-14	1.59	25%	8,252.6	12%	5,161	0.47
15-44	2.23	35%	21,967.28	31%	9,830	0.89
45-59	1.01	16%	14,739.40	21%	14,608	1.33
60-69	0.66	10%	10,187.11	14%	15,520	1.41
70-79	0.64	10%	10,425.96	15%	16,353	1.49
80+	0.28	4%	5,017.79	7%	18,230	1.66
All groups	6.41	100%	70,590.18	100%	11,009	1.00

Age Group	No. of admissions, million		Admission Charges, million Baht		Admission charge, Baht/admission	Disparity Ratio
2008						
0-14	1.61	25%	8,855.62	12%	5,506	0.47
15-44	2.09	33%	22,318.80	30%	10,666	0.91
45-59	1.05	16%	16,300.70	22%	15,580	1.33
60-69	0.68	11%	10,955.20	15%	16,142	1.38
70-79	0.67	10%	11,063.60	15%	16,481	1.41
80+	0.30	5%	5,380.81	7%	17,644	1.51
All groups	6.40	100%	74,874.73	100%	11,695	1.00
2009						
0-14	1.69	26%	9,708.90	12%	5,728	0.46
15-44	2.10	32%	23,806.40	29%	11,346	0.92
45-59	1.09	17%	18,216.50	22%	16,740	1.36
60-69	0.70	11%	11,916.80	15%	16,991	1.38
70-79	0.67	10%	11,681.50	14%	17,319	1.40
80+	0.30	5%	5,685.52	7%	18,751	1.52
All groups	6.56	100%	81,015.62	100%	12,349	1.00

Source: analysis from national IP dataset 2009

FIGURE 4.8 PREDICTION OF PROPORTION OF PERSONAL AND NON-PERSONAL CARE EXPENDITURE, 2009-2015



Note: using actual NHA data, 1994 to 2008

With reference to the OECD Systems of Health Accounts, a long series of 1994-2008 National Health Accounts (The Thai Working Group on National Health Account, 2010) generates data on total health expenditure by health care function. From Table 4.12, it is clear that personal healthcare for the whole population took the lion's share in the Thai health system. It accounted for 77 per cent of the total health expenditure of 367 billion Baht in 2008, of which 42 per cent of total health expenditure was

FIGURE 4.9 PROJECTION OF PERSONAL CARE EXPENDITURES AS % OF TOTAL HEALTH EXPENDITURE, 2009-2015



on outpatient and rehabilitation services and 36 per cent on inpatient care including day cases.

Fortunately, the Thai NHA is available for the last fifteen consecutive years, 1994 to 2008 which furnishes a platform for a robust prediction using the polynomial formula with correlation of 0.704 for both personal and non-personal care formula for a medium term prediction between 2009 to 2015 (Figure 4.8).

TABLE 4.12 TOTAL HEALTH EXPENDITURE, BY HEALTHCARE FUNCTIONS, 1994-2008 (%)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1. Personal care	69	68	69	64	63	73	71	73	74	79	77	77	77	77	77
1.1 Outpatient & rehabilitative care	43	42	42	38	37	41	41	40	44	45	44	43	41	40	42
1.2 In-patient care including day cases	26	26	27	26	26	31	31	33	30	34	33	34	35	36	36
2. Ancillary services and medical goods dispensed to out-patients	6	6	5	4	6	6	6	6	4	4	5	5	5	4	5
3. Prevention and public health services	7	7	7	7	7	8	8	8	12	9	8	5	4	7	4
4. Health administration and health insurance	4	4	4	7	7	8	8	8	5	5	6	9	9	8	8
5. Gross capital formation	14	14	15	18	16	6	6	5	5	3	4	4	5	4	6
Total	100														
Total Health Expenditure (million baht)	127,655	147,837	177,103	189,143	172,811	162,124	167,147	170,203	201,679	211,957	228,041	251,693	291,294	319,456	367,767

Source: National Health Account 1994-2008

TABLE 4.13 PROJECTION OF HEALTH EXPENDITURE AND BREAKDOWN OF PERSONAL HEALTHCARE BY AGE GROUP, 2009-2015

Health Expenditures	Actual Figure*	Projection figure**						
	2008	2009	2010	2011	2012	2013	2014	2015
1. Total Health Expenditure (THE), million Baht	367,767	419,585	463,193	505,593	544,336	588,467	633,640	682,320
2. Annual growth rate, %		14	10	9	8	8	8	8
3. THE, % GDP	4.04	3.96	4.02	4.07	4.11	4.18	4.23	4.28
4. Non-personal care (%)	23	20	20	19	18	17	16	16
5. Personal care (%)	77	80	80	81	82	83	84	84
6. Non-personal care, million baht	82,997	85,335	90,471	94,758	97,806	101,275	104,348	107,411
7. Personal care, million baht	284,771	334,250	372,722	410,835	446,529	487,192	529,292	574,909
8. Personal care by age group, million Baht								
• 0-14	33,681	39,533	44,083	48,590	52,812	57,621	62,601	67,996
• 15-44	84,885	99,634	111,102	122,462	133,102	145,223	157,772	171,370
• 45-59	61,996	72,768	81,144	89,441	97,212	106,065	115,230	125,161
• 60-69	41,666	48,905	54,534	60,111	65,333	71,283	77,443	84,117
• 70-79	42,078	49,389	55,074	60,706	65,980	71,988	78,209	84,949
• 80+	20,465	24,021	26,785	29,524	32,089	35,012	38,037	41,315
9. Personal care as % of THE								
• 0-44	32	33	34	34	34	34	35	35
• Pre-elderly	17	17	18	18	18	18	18	18
• Elderly 60+	28	29	29	30	30	30	31	31

Sources:

- *data from National Health Account,
- Row 1-3, long term projection (Sakunpanich et al, 2009)
- Row 4-5 is the projection by authors using 1994-2008 National Health Account
- Row 6-8 is computed by authors, using percent distribution of admission charge by age group in 2008 (in Table 4.11 last column disparity ratio)
- Row 9; personal health care expenditures are re-classified into three age groups and then calculated as % of THE

Table 4.13 estimates the total personal healthcare expenditure by age group including the pre-elderly and the elderly. From the authors' projection using 1994-2008 National Health Accounts, personal health care expenditure would be at 334.2 billion baht in 2009 and would increase to 574.9 billion baht in 2015.

As data on admission charge profile are available for three years between 2007 and 2009 and these three years have a consistent pattern, the charge profile in 2008 is used to break down total health

expenditure for personal healthcare by age group for all years 2009 to 2015. With the application of the last column, disparity ratio, of Table 4.11, it was found that by 2015, the pre-elderly group 45-59 years would consume 125 billion baht while the three elderly groups (60-69, 70-79 and 80+) would use resource of 84.1, 84.9 and 41.3 billion Baht, respectively. The figures in Table 4.13 are used to produce Figure 4.9 Personal care expenditure of the elderly (60+) would increase from 29% of total health expenditure (122.3 billion baht) in 2009 to 31% (210.4 billion baht) in 2015.

Future demand for elderly caregivers

Situation and trend of the health workforce

The health workforce is the foundation of an accessible, effective and efficient health service delivery system (WHO, 2006). The shortage of health personnel, particularly in the rural areas, persists. Furthermore, the problem of inequitable distribution of the health personnel, particularly inequitable geographical distribution, has added to the magnitude of the problems.

Evidence shows that the ratio of doctors per 10,000 population in Bangkok is 10 times higher than that of the North-eastern region (Wibulpolprasert et al, 2008). At the same time, the Ministry of Public Health has not been successful in retaining doctors in the public sector; internal brain drain from the public to the private sector is a common phenomenon in particular in the economic boom time which has led to increasing demand for private health services.

The problem has been aggravated by two mismatched factors: increase in health demand and inadequate workforce supply. The government policy to implement a universal coverage scheme in 2001 has resulted in the increase of service utilization from 2.45 visits per capita in 2003 to 2.75 in 2007 (NSO: 2003, 2007). After the economic crisis of 1997, an intensive marketing policy was initiated to attract foreign patients as a means of stimulating economic growth. The policy to promote Thailand as the medical hub of Asia, initiated in 2004, had resulted in increasing demand for care by international patients (Pachanee & Wibulpolprasert, 2006). Approximately 1.39

million international patients were attracted to Thai health services in 2008 (Ministry of Commerce-Department of Export Promotion, 2008). Data is limited on the age profile of these international patients, however plausibly a large number of patients should be non-elderly, as elderly patients may have more difficulties in international travel than the non-elderly.

The demographic and epidemiological transition resulting in increased number of elderly and of chronic non-communicable diseases suggests the need for appropriate balance between home health care and facility-based health care. Health workforce requirements thus need appropriate skill-mix between the mainstream health workforce and non-formal care providers (Pagaiya, 2008). Moreover, the government measure to freeze the hiring of health workforce under the status of civil servants, as part of the public sector reform policies, has made health workforce employment in the public sector more difficult. Trends suggest that health workforce demand in the future will increase with limited opportunity of hiring in the public sector.

Though the production of health workers has been increased in order to keep up with the demand (Table 4.14), the difficulty of attracting and keeping them in rural areas has been more problematic. Not only has the high demand for health workforce not been met, but also the rapid growth in the private hospital share in the healthcare market during the time of favourable economic growth and active government promotion of medical tourism, drew doctors and nurses from the rural public facilities to the private facilities.

TABLE 4.14 NUMBER OF STUDENTS ENTERING MEDICAL AND NURSING EDUCATION DURING 2000-2010

Professional	Year									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Doctors	1,518	1,417	1,374	2,020	2,139	2,179	2,247	2,247	2,282	2,282
Nurses	4,428	4,319	4,400	4,505	5,175	7,550	10,592	7,770	7,810	7,895

Sources: Wibulpolprasert et al (2008) and Nursing Council (2010)

Over the past four decades, the Thai government has implemented financial and non-financial strategies to attract and retain doctors in rural areas (Wibulpolprasert & Pengpaiboon, 2003). A three year compulsory service was introduced in 1971, and some other non-financial measures introduced, including career advancement, best rural doctor awards, rural recruitment scheme and preferential opportunities for specialty training. Realizing the large gap between public and private sector income, another important strategy has been to increase the income of doctors serving in rural areas in the form of hardship allowance, non-private practice allowance, professional allowance and pay for overtime duty.

The strategy has been implemented in a consistent manner, in 1975, 1995, 1997, 2005 and 2009. Nevertheless, the ratio of doctors who moved out from MOPH public facilities, in relation to the new entrants, increased from 22% in 2001 to 80% in 2008 (MOPH 2008, 2010). The extraordinary increases in financial incentives implemented in 2009 had a significant effect on retention of doctors in rural areas. The turn-over ratio of doctors from MOPH to new entrants to MOPH has reduced to 63% in 2009 from 80% in 2008 (MOPH, 2010). In 2009, the total income of new graduate doctors working in rural hospitals was 29-65% higher than that of new doctors working in urban areas (Noree, 2010).

Demand for and supply of health workforce catering to the elderly

The demographic and health transition indicate the need to develop an appropriate balance of health and other related services for the elderly between home-based and facility-based care as well as a good coordination between the two. Health workforce requirements thus need appropriate skill mix between the mainstream health workforce, the community health workforce and other non-formal care providers. At home base, family members, voluntary care givers as well as paid care givers have been in higher demand.

It has been forecast that, besides the relatives of the elderly patients, a total of 106,000 care givers will be required by 2020 (Pagaiya, 2008), while a substantial increase will also be needed in the mainstream health workforce. The country needs 33,880 additional nurses to provide care for the elderly. To provide rehabilitation services, an additional 3,708 physio-therapists will be required by 2020, whereas the existing number of physio-therapists who are active in the labour market is only 2,000. Social workers as well as psychologists will be in high demand (see Table 4.15). Given that Thailand has encountered a shortage of health workers, additional health workforce requirements will only add to the health workforce shortage problems which need to be resolved.

TABLE 4.15 HEALTH WORKFORCE REQUIREMENT FOR ELDERLY CARE IN 2010 AND 2020

Type	Existing number	Additional health workforce requirement	
		By 2010	By 2020
Relatives and family members	N/A	499,873	741,766
Care givers	N/A	71,410	105,967
Nurses	97,942	23,888	33,880
Physio-Therapists	2,000	2,499	3,708
Social workers/ Psychologists	214/230	1,528	2,155

Source: Pagaiya (2008) N/A - data not available

However, the existing situation of health workforce availability and production plans do not fully match the future requirements in terms of both numbers and skill-mix.

The shortages of mainstream health workers, particularly doctors, nurses, physio-therapists, and social workers indicate that health workforce requirements for elderly and chronic diseases require immediate systematic policy intervention. In addition, only a minority of these mainstream health workers were posted in rural areas where the people need them most. High turn-over from rural to urban and from public to private of these limited personnel requires better planning and dialogues between the public and private sectors, both in relation to employment of and production of health workers.

Conclusions

This chapter contributes three major kinds of evidence in relation to pre-elderly and elderly burden of disease, estimates of total health expenditure required in 2015 and health workforce needs in general and carers for the elderly in particular.

Evidence shows that two major chronic diseases, cancers and cardio-vascular diseases are the two leading burdens of disease in elderly men and women. Sense organ disorders and neurological diseases provide a larger burden among the very old people, aged 80 and above.

Degenerative and chronic non-communicable diseases contribute a higher proportion of the burden among the pre-elderly and elderly. This calls for interventions in life-style modification for pre-elderly population in order to improve their health in old age. For people with diabetes and hypertension, the effective coverage of essential interventions such as control of blood sugar and high blood pressure is clearly far from satisfactory.

Though there is an encouraging trend of improving effective coverage in 2004-2009 as reported by the National Health Examination Surveys 2004 and 2009, the effective control of diabetes and hypertension is unsatisfactory. This requires significant improvement in the performance of delivery systems and mobilization of public awareness.

Encouraging findings show improving self-rated health status by elderly people, between the 2003 and 2006 Health and Welfare Surveys. Although self-perceived health in the very old largely improved, functional limitation in this group is inevitably much higher than among the younger old.

Frequency of health service utilization increases by age, more so among the elderly than the pre-elderly. The unreliable healthcare utilization rates in 2006-07 reported from household surveys, due to the combination of two major surveys by the National Statistical Office, namely the Socio-Economic Survey and the Health and Welfare Survey into one, prevent the authors from conducting projections of the service utilization rate which is the ground for projection of total health expenditure requirement for an ageing population.

Acknowledging these data limitations, the projection of expenditure for personal healthcare of the whole population indicates that it would gradually increase from 80% of total health expenditure in 2009 to 84% in 2015. Expenditures for the elderly would gradually increase from 29% of total health expenditure in 2009 to 31% in 2015. The modest increase is probably due to our assumption that outpatient expenditure profiles are similar to that of admission. Cautious interpretation of this finding is needed.

In the light of universal coverage achieved by 2002, demand for healthcare by domestic patients significantly increased due to geographical proximity of services in rural areas, adequate quality of service provision throughout the country and no financial barriers in access to care by people.

The active promotion of Thailand as an Asian medical hub catering to international patients significantly increased medical care demands (Smith et al, 2009) and has major ramifications for domestic brain-drain of super-specialists from teaching hospitals. The strain on the limited health workforce is further increased by the demographic and health transitions, not only on the number, but also on the skill-mix of the health workforce and non-formal care givers. These are major policy concerns.

Recommendations

A number of policy recommendations are generated from this review of the evidence though some have already been taken seriously, such as by the national non-communicable diseases plan.

First and foremost: keeping the pre-elderly cohort healthy. Using evidence from health risk assessment, effective program design aims to minimize exposure to key risk factors. Alcohol, tobacco and high blood pressure are three major risks among pre-elderly men, while among pre-elderly women, high body mass index, unsafe sex and blood pressure are three major risks.

In keeping the pre-elderly population healthy, social mobilization towards a healthy life style is required. Though there are legislative provisions for the control of alcohol and tobacco consumption, specific and effective interventions require evidence from health systems and policy research, civic movements, as well as effective law enforcement; these are less rigorous in relation to restraining alcohol consumption than in containing tobacco consumption. Active lifestyle, healthy diet and calorie expenditure are effective in containing overweight and obesity. A conducive environment is required for active lifestyle and energy consumption—for example, user friendly pedestrian walk ways in city planning, recreation parks, and support for civil society groups which are active in promoting physical activities.

Second: elderly responsive health systems. Health delivery systems are traditionally designed to cope with infectious diseases and have a treatment orientation. Public health interventions are conventionally dominated by clinical preventive

and promotive services; program efforts are not adequate to effectively reduce primary risk exposures such as use of tobacco and alcohol, and promote a healthier diet and physical activities. Home care is at the early stage of development, prompted by the era of universal coverage since 2002. Skill in home healthcare provision needs to be developed in conjunction with effective interface between home, community and institutional based care for the elderly.

Elderly-responsive systems require pre-service education and in-service training of appropriate numbers and skill-mix not only of mainstream health personnel but also of other cadres. There is neither systematic long term care services development nor clear policy to produce health and paramedical personnel for long term care, including an appropriate financing policy. As a result of limited home healthcare and long term care, the care for chronic dependent frail elderly occupies some portion of acute care hospitals or else is absorbed by home carers, often women who face a huge burden and psychological stresses. Evidence-based and constructive dialogues between public and private employment sector are two important needs.

Third: evidence-informed policies. It is strongly recommended to continue monitoring risk exposure and burden of diseases, effective coverage of essential interventions, self-assessed health status in the population, both pre-elderly and elderly. These evidences support informed policy decisions. There is a need to strengthen the institutional capacity to monitor the financing impact on the health care system of the demographic and epidemiological transitions.



Economic Impact and Human Capital

Thailand is among several countries in Asia that have experienced demographic transition from high fertility and mortality rates to currently low fertility and mortality rates. Rapid decline in fertility has led to a smaller share of the young population. During this period of demographic transition, the number of working age population has increased more rapidly than the total population. Other things being equal, such demographic trends lead to an increase in total production and higher economic growth rates. However, this favorable effect of population change is diminishing. Continual decline in fertility and mortality rates inevitably lead to population aging. A smaller share of population in the working ages and a larger share of the elderly could deter economic growth. However, this study points out that economic growth could be sustained if there is a prudent policy that encourages people to accumulate capital to improve labour productivity, finance old-age consumption and invest more in the human capital of children.

The first section of the chapter will examine the implication of demographic change for the education system. Thailand has education laws aimed at improving the educational attainment of the younger workers. However, we cannot compete with many countries in the region because of low quality of education. This has an implication for labour productivity that is discussed in section III. If Thailand chooses to grow with low labour productivity in the future, the country will need more unskilled migrant workers. If the Thai economy had a large share of population concentrated at the lifecycle surplus ages, more migrant workers would not be required. Section IV shows that Thailand enjoyed the positive effect of demographic transition on economic growth until 2010 when the first demographic dividend for Thailand is expected to end. The second demographic dividend and transfer to children for

human capital investment, shown in Section V, can help the Thai economy to continue positive growth rates. The last section discusses options to cope with demographic changes.

Demographic Change and Implications for the Education System

Thailand experienced outstanding economic growth rates in the 1960s when the first and second social and economic development plans were being implemented. Oil price crises in the early 1970s and early 1980s slowed down the growth rate. However, economic growth was still over 5 percent on a five year average (Figure 5.1). The economic booms in the decade of 1985 to 1995 were followed by the financial crisis in 1997. The country's dream of being the fifth Asian Tiger, after Hong Kong, Singapore, South Korea and Taiwan, disappeared.

Unlike economic growth, Thailand's birth and death rates have not fluctuated with business cycles. The crude birth per 1,000 people has been monotonically declining from 42.9 in the early 1960s to 14.6 in the late 2000s as shown in Figure 5.1. This is consistent with cross-country evidence that the crude birth rate declines when per capita income increases. The downward movement of the birth rate has been faster than that of the death rate. The crude death rate per 1,000 people declined from 12.5 in the early 1960s to 5.9 in the late 1980s and then turned upward, due to HIV/AIDS related deaths. HIV/AIDS was the main cause of death among those aged 20-44 (Rumakom et al., 2002). There was a sharp increase in reported deaths from tuberculosis and pneumonia after 1994. It is believed that the explosion of TB and pneumonia has been caused by HIV/AIDS. Adults aged 20-44 previously had low TB and pneumonia death rates. But, the TB death rate among those

aged 20-29 increased from 1.7 to 9.6 per 100,000 people between 1992 and 2000. The death rate from TB among those aged 30-44 increased from 4.4 per 100,000 people in 1992 to 15.7 per 100,000 people in 2000. The increased mortality affected males more than females. An increase of the death rate among fertile and working age groups can be expected to have adverse impact on the number of births and on the labour force (See more details about the causes of death in Chapter 4).

With the declining birth rate, the number of children age 0 to 14 peaked at 18.6 million in 1980 and declined thereafter. The number of children in 2010 is about the same as in 1965. The burden of raising children on private and public budgets should be declining, but with the universal access to longer periods of education and higher expectations from parents, such a hypothesis may not be true.

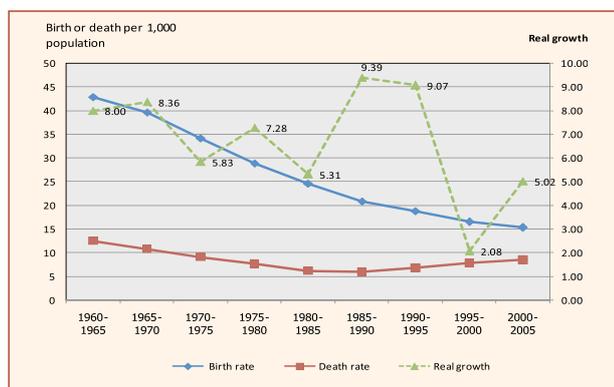
The current Thai constitution gives all children the right to a quality basic education of 12 years. Another two important laws for children's education are the education law in 1998 and compulsory education law in 2002. The law in 1998 raised compulsory education from 6 years to 9 years. The age for compulsory education is from 7 to 16 years old. The government must provide free basic education for at least 12 years to every child. The law in 2002 penalizes parents who do not send their children to school. A maximum fine of 1,000

Baht (approximately USD35) will be imposed on such parents.

It is shown in Figure 5.2 that the number of students at the primary school level has been declining, due to the lower number of children. In contrast, the number of students at the secondary school level in 2000 was much higher than in 1990. The 1998 law provides a better access to secondary school to all children. The law had an outstanding effect on the number of secondary school students in the Northeast region, which increased by more than a hundred percent between 1990 and 2000 (Figure 5.3). However, after 2000, the number of secondary school students has declined, in line with the decreasing number of children in the secondary school age group.

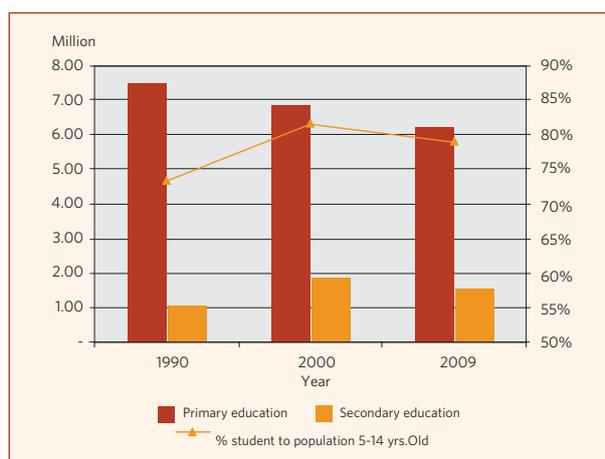
Even though Thailand has a Constitution and education laws that emphasize the right of children to universal and quality education for 12 years, the practical enforcement of the laws is not effective. In 2009, about 20 percent of children aged 5-14 (or 2 million children) were not in the school system (Figure 5.2). In the Northeast and South, about 25 percent of children age 5-14 are not in school. NESDB (2009) reports that the retention rates from entering primary school to the highest grade of primary education and from entering the upper secondary level to the highest grade of upper secondary education are 88 and 53 percent in 2008.

FIGURE 5.1 CRUDE BIRTH AND DEATH RATES AND ECONOMIC GROWTH



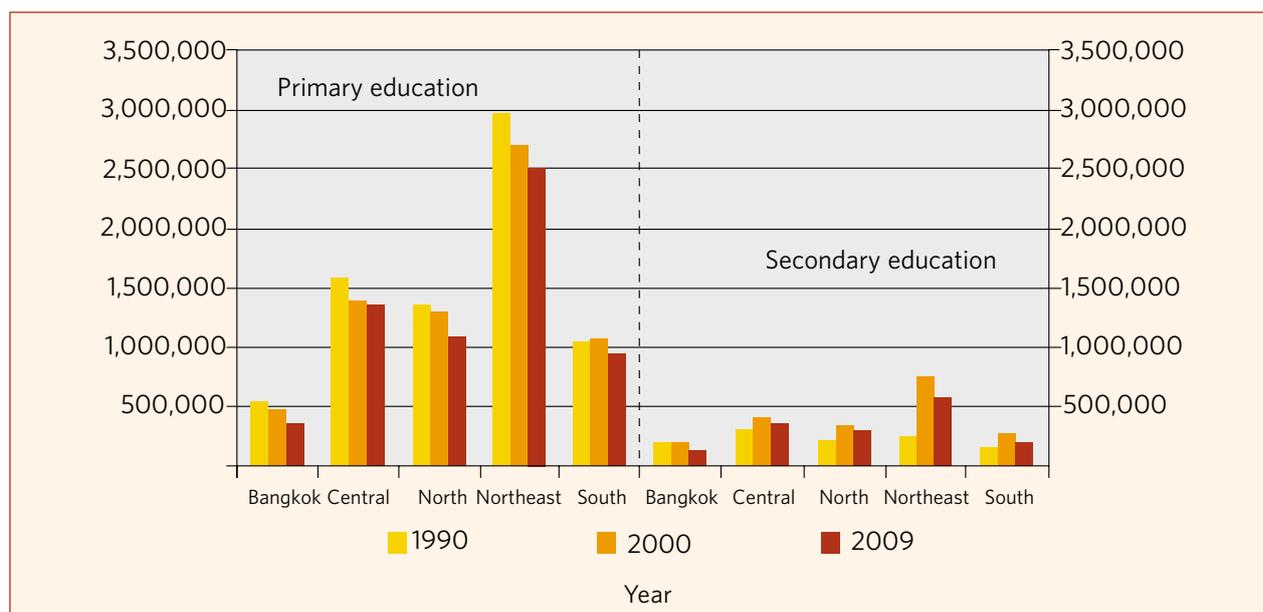
Sources: Death and birth rates are from Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2008 Revision, <http://esa.un.org/unpp>. Real Growth rates are from Thailand's National Economic and Social Development Board.

FIGURE 5.2 STUDENTS AGE 5-14 YEARS OLD



Source: National Statistical Office, Socio-Economic Survey.

FIGURE 5.3 NUMBER OF STUDENTS AGED 5-14 ATTENDING SCHOOL



Source: National Statistical Office, Socio-Economic Survey.

TABLE 5.1 NATIONAL TEST ON PRIMARY AND UPPER SECONDARY EDUCATION

Level/Subject	Average Scores (%)					
	Academic Year					
	2003	2004	2005	2006	2007	2008
Primary level (Pratom 6)						
Thai	45.3	44.2	n.a. *	42.7	36.6	42.0
Mathematics	41.7	43.8	n.a. *	38.9	47.6	43.8
English	41.1	37.3	n.a. *	34.5	38.7	37.8
Science	42.1	41.6	n.a. *	43.2	49.6	51.7
Lower Secondary Level (Mattayom 3)						
Thai	54.0	38.3	n.a. *	43.9	48.1	41.0
Mathematics	35.0	34.9	n.a. *	31.2	34.7	32.6
English	37.9	32.3	n.a. *	30.9	28.7	34.6
Science	38.1	37.2	n.a. *	39.3	35.2	39.4
Upper Secondary Level (Mattayom 6)						
Thai	44.5	49.3	48.6	50.3	50.7	46.4
Mathematics	34.0	35.1	28.5	29.6	32.5	36.0
English	39.1	32.5	29.8	32.4	30.9	30.6
Science	48.8	44.3	34.0	34.9	34.6	33.7

Source: Office of the Permanent Secretary, Ministry of Education (2008).

The quality of education is a concern in relation to both national standards and to international comparisons. The Office for National Education Standards and Quality Assessment (ONESQA) evaluated the quality and standard of Thai basic education in 15,601 schools in 2006-2007. The evaluation found that students lacked analytical skill and self learning, teachers did not focus on student centred learning or manage the curriculum effectively, and school's executive lacked academic improvement (ONESQA, 2008). Siritarunsri (2009) showed that 35 percent of 35,159 schools were up to the national standard, but another 65 percent were sub-standard. Another national test run by the Bureau of Education and Testing and National Institute of Educational Testing Service shows that the ability of students in the secondary school level is quite low. Students could achieve only 31, 34 and 36 percent of the test in English, Science, and Mathematics in 2008 (Table 5.1). Student performance has been consistently poor from 2003 to 2008. The quality of education varies between large and medium schools in the city and small schools in rural areas (Chiangkoon (2009)). Students in the city have a better opportunity to access knowledge in many ways.

International comparisons conducted by the World Economic Forum in 2009 show that Thailand may lose its competitiveness due to the low achievement

of the education system. Thailand ranked 69th from 133 countries in terms of the quality of primary education. Compared with its neighbors, Thailand was behind Malaysia and Indonesia. Thailand ranked behind Malaysia in every education indicator (Table 5.2). Singapore ranked first in the quality of mathematics and science, but Thailand ranked 62nd. Thailand ranked ahead of Indonesia in term of public education expenditure as percentage of GNI, but Thailand's quality of primary education ranked behind Indonesia's. About 80 percent of the education budget is for wages, salaries, and administrative costs. A significant increase in the education budget does not necessarily mean that the quality of education will improve significantly (McKinsey&Company, 2007).

Chiangkoon (2009) and McKinsey and Company (2007) emphasize the role of teachers in improving the quality of education. Chiangkoon points out that Thailand does not have enough good quality teachers. Thai teachers in the remote areas do not have good knowledge of languages, mathematics, and science. Teachers spend more time on administration and paper work than on acquiring new knowledge.

TABLE 5.2 RANKINGS ON EDUCATION INDICATORS, SELECTED ASIAN COUNTRIES

Indicator	Thailand	Malaysia	Singapore	Korea	Taiwan	Japan	Indonesia
Quality of primary education ¹	69	31	3	29	20	23	58
Education expenditure [*]	44	24	109	75	18	96	127
Higher education and training							
Quality of the educational system ¹	67	23	1	47	17	31	44
Quality of math and science education ¹	62	34	1	18	6	25	50
Education Infrastructure (2010 ranking) ²	46	25	11	20	17	13	55
Pupil-Teacher Ratio (Primary Education) (2007 ranking) ²	39	26	47	51	38	40	43
Pupil-Teacher Ratio (Secondary Education) (2007 ranking) ²	53	41	47	51	46	28	33

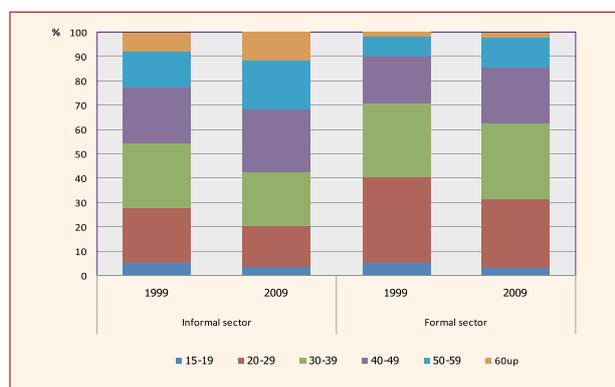
Sources: ¹The Global Competitiveness Report 2009-2010 and ²IMD World Competitiveness Yearbook 2010
 Note: * Based on public education expenditure as percentage of GNI.

TABLE 5.3 PROJECTED NUMBER OF SCHOOL-AGED POPULATION (MILLION)

	2010	2015	2020	2025	2030	2035	2040
< 3 years	2.3	2.2	2.1	1.9	1.8	1.7	1.6
pre school (3-5 yrs)	2.6	2.3	2.2	2.0	1.9	1.8	1.6
primary (6-11 yrs)	5.5	5.1	4.5	4.3	4.0	3.7	3.5
lower secondary (12-14 yrs)	2.8	2.7	2.4	2.2	2.1	2.0	1.8
upper secondary (15-17 yrs)	3.0	2.7	2.8	2.3	2.2	2.1	1.9
university (18-24 yrs)	7.0	6.8	6.3	6.2	5.4	5.1	4.8

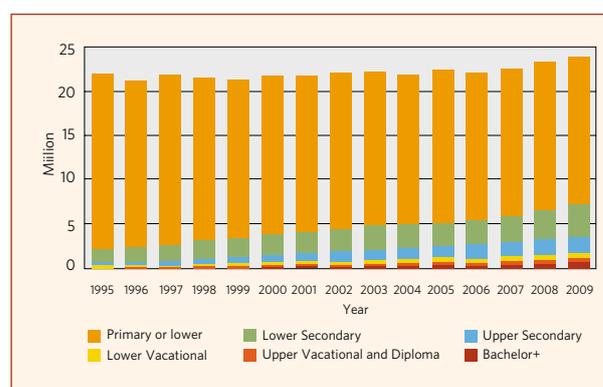
Source: IPSR, Mahidol University.

FIGURE 5.4 AGE STRUCTURE OF EMPLOYMENT IN FORMAL AND INFORMAL SECTOR



Source: National Statistical Office, Labor Force Survey quarter 3.

FIGURE 5.5 EMPLOYMENT IN THE INFORMAL SECTOR BY EDUCATION LEVEL



Source: National Statistical Office, Labor Force Survey quarter 3.

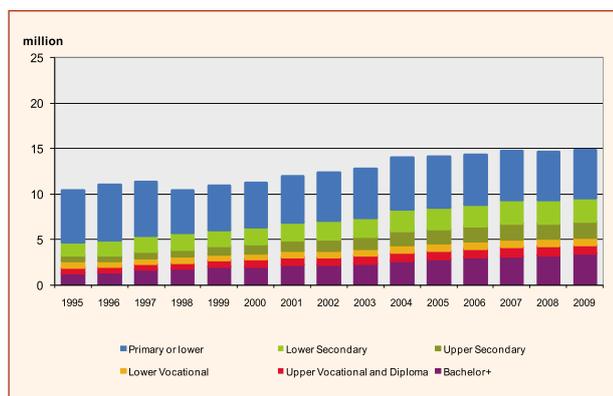
The projected number of school-aged population is declining (Table 5.3). In the next ten years, the number of students in every level will be lower than in the current period. The number of primary school students will fall from 5.5 million to 4.5 million. This provides Thailand with an unprecedented opportunity to raise the quality of its education system. Using the same amount of budget, the Thai government can focus more on the quality of education in the future. However, some hard decisions will have to be made. For example, many schools will unavoidably have to close when their administrative cost per student becomes too high.

Labor Productivity

Employment in Thailand is segmented into formal and informal sectors. The formal sector is composed of wage earners who have formal employment

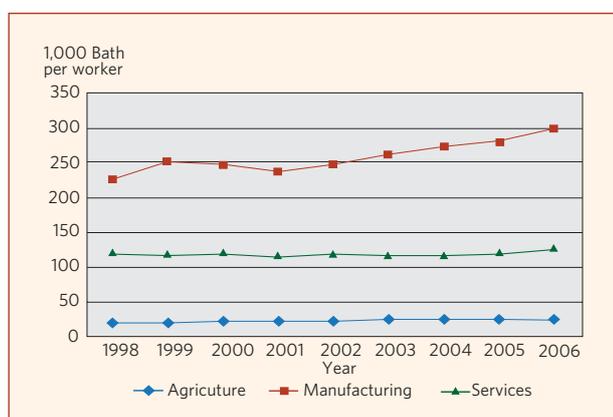
arrangement and are covered by social benefits such as medical care, disability benefit, and old age benefit. In 2009, sixty percent of employment in Thailand is in the informal sector, which mainly covers the agriculture and service sectors. Each sector has its own characteristic as well as age structure of labour. Figure 5.4 shows that the informal sector has more older workers. In 1999, almost 10 percent of workers in the informal sector were older than 60. The proportion increased to 12 percent in 2009, and is expected to increase further since the share of informal sector workers in age groups 50-59 and 40-49 is quite large. The formal sector has a large share of labour in age groups 20-29 and 30-39. Demographic changes will continuously alter the age structure of formal and informal employment.

FIGURE 5.6 EMPLOYMENT IN THE FORMAL SECTOR BY EDUCATION LEVEL



Source: National Statistical Office, Labor Force Survey quarter 3.

FIGURE 5.7 LABOUR PRODUCTIVITY

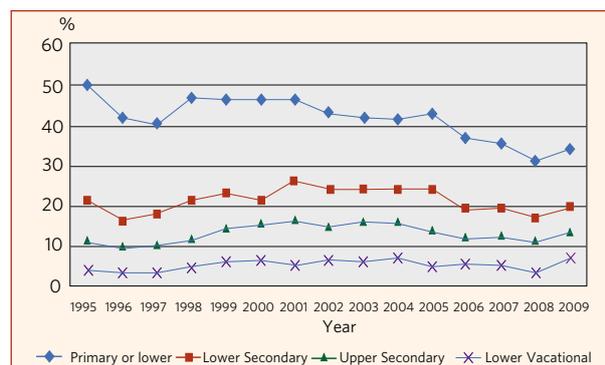


Source: Thailand Development Research Institute (2009).

Informal sector labour is also characterized by lack of skills and low productivity. This can be shown in the form of low educational attainment, with 70 percent of informal sector workers having only primary education (Figure 5.5). By contrast, half the formal sector workers have at least upper secondary education (Figure 5.6). On the positive side, however, the level of educational attainment of informal labour at present is much higher than in 1995. This trend will continue in the future.

Higher educational attainment of informal labour seems to have no impact on labour productivity. Labour productivity, measured as real value added per worker, in the agriculture and services sectors is consistently low (Figure 5.7). Both agriculture and service sectors are labour intensive. Workers in these sectors have informal employment arrangements. They move freely between sectors. Between 1998 and 2008, the share of employment

FIGURE 5.8 EMPLOYEES EARNING BELOW THE MINIMUM WAGE BY EDUCATION



Source: National Statistical Office, Labor Force Survey quarter 3.
Note: This figure uses the minimum wage for Bangkok.

in the service sector increased from 41 to 46 percent. But the share in the agriculture sector decreased from 45 to 40 percent. The main industries in service sectors include wholesale and retail trade, warehouse and transport, and hotel and restaurant (TDRI, 2009). Labour productivity for the industrial sector is more than double that of the service sector since it has more investment in capital and technology. Workers in this sector also earn a higher return to human capital.

The return to human capital increases with the level of education. The government protects those with low human capital by enforcing the minimum wage law. The minimum wage rate varies by province; in 2009, the minimum wage in Bangkok was 203 Baht per day. However, the enforcement of the minimum wage law has been ineffective, and in particular wage earners in the informal sector. In 1995, about 50 percent of employees who have primary education earned below the minimum wage. The proportion of those who earn below the minimum wage fell to 34 percent in 2009, probably because of improved law enforcement or the effect of a rising demand for labour.

Since employment in the agriculture and service sectors is labour intensive, the demand for unskilled labour in these sectors is high. However, as more Thai workers attain a higher level of education, they will divert away from low paying jobs, and older workers who tend to have low education will be too old to work. To achieve a higher economic growth rate using current technology, the gap between the demand for and supply of labour will be filled by migrant workers. An alternative to achieve high growth is to invest more in physical and human capital.

Demographic changes may have an impact on economic growth. Potipiti (2010) shows that with an aging population, and holding other things constant, Thailand's annual growth rate will be -7 percent in 2020 and -14 percent in 2040. In his study, he defines Thailand as an aging population when the proportion of working age population to total population declines by 0.25 percent annually. The counterfactual is when the proportion of working age population to total population is fixed at 60.3 percent. The proportion of labor to capital in the production process will decline. This will result in higher wages, but lower returns to capital. It was projected that wages of the aging population in 2020 will be higher than in the counterfactual by 1.8 percent, meanwhile the returns to capital will be lower than in the counterfactual by 3.1 percent. An increase in the number of unskilled migrant workers will improve the growth rate, but will lower the per capita income. In this scenario, growth of per capita GDP will be -0.8 percent in 2020 and -0.2 percent in 2040. Labour productivity of migrant workers is only half that of Thai workers.

Demographic Dividend

The First Demographic Dividend

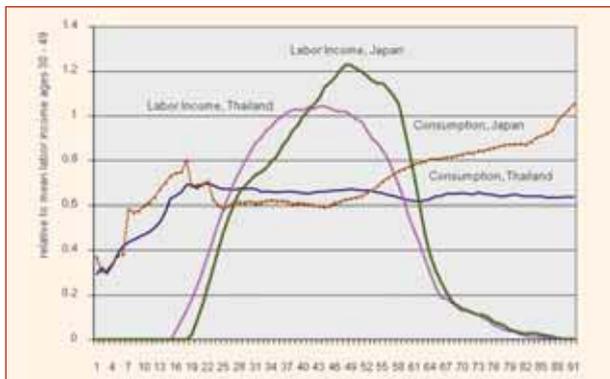
The favorable effect of an increase in the share of working aged population on economic growth is called the first demographic dividend. Several criteria have been employed to compute dependency ratios in order to evaluate whether a country has reached the dividend period. However, using demographic dependency ratios, purely based on number of children (those aged 0-14), working-age adults (those aged 15-64) and the elderly (those aged 65 and older), to measure the demographic dividend has shortcomings. This method does not capture variations in productivity of workers and consumption needs of the population in different age groups. In order to overcome this shortfall, Mason (2005) introduced the concept of the economic support ratio. The economic support ratio is computed as the ratio between the effective number of producers (calculated from the age-specific profile of labor income) and the effective number of consumers (calculated from the age-specific profile of consumption). Variations in the labor market, such as income received for part-time, full-time or self-employed workers, among population in different age groups are taken into

consideration. The growth rate of the economic support ratio is called the first demographic dividend. Ogawa et al. (2009) demonstrate the period of demographic dividend for selected Asian countries, using different approaches. The results show strikingly different lengths of the dividend period, comparing the demographic dependency ratio with the economic support ratio.

The magnitude and length of the demographic dividend is determined by the economic lifecycle. The economic lifecycle influences how the age structure that shapes the human lifecycle affects consumption, production and reallocations of economic resources. The human lifecycle begins and ends with periods of dependency when consumption exceeds labor earnings. This shortage of labor income, or lifecycle deficit, makes the young and the elderly depend on resources reallocated from the working or lifecycle surplus ages, as shown in Figure 5.9. If the economy has a large share of population concentrated at the lifecycle surplus ages, there will be excess resources available to save, invest and generate output, leading to a larger effect of the first demographic dividend. The method used to estimate these age profiles follows the National Transfer Accounts (see examples in Mason et al. 2009 and www.ntaccounts.org).

Figure 5.9 shows a comparison of the economic lifecycles in Thailand and Japan, using the per capita age profiles of consumption and labor income, normalized by average labor income at ages 30-49. The age profiles of labor income show important difference in the labor market between Thailand and Japan. Income increases with age, and it increases more steeply in Thailand than in Japan. The Japanese labor market is quite a seniority-based system. Labor income reaches its peak at around ages 40-45 in Thailand, whereas in Japan the peak is about at age 50. Then, for both countries, labor income declines steeply around the retirement ages at 60-65. The difference in the consumption age profiles is more prominent. Consumption by children increases with age for both Thailand and Japan. The increase in consumption is steeper in Japan, mainly due to higher investment in education by both the public and the family. In addition, consumption by the elderly in Japan increases much more steeply than in Thailand, mainly due to high consumption for health care and long-term care insurance in Japan. See Appendix B for the method of estimating demographic dividends.

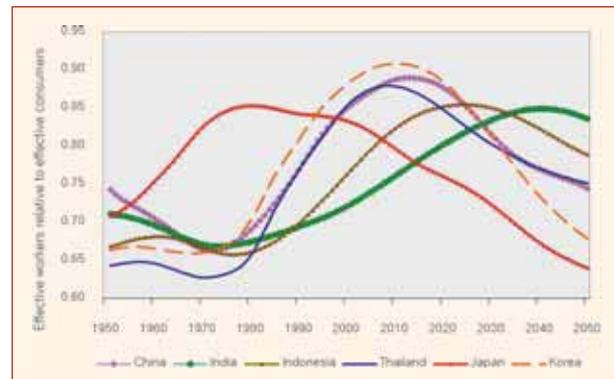
FIGURE 5.9 ECONOMIC LIFECYCLES OF THAILAND (2004) AND JAPAN (2004)



Source: Chawla (2008) for Thailand and Ogawa, Mason, et al. (2009) for Japan

The calculation of the economic support ratio is straightforward, using the age-specific profiles of consumption and labor income weighed by population age structure. The economic support ratio may rise or fall, depending on changes in age structure during the period of the demographic transition. Given constant productivity, income per effective number of consumers may increase when the economic support ratio is rising. On the other hand, when the economic support ratio is falling, income per effective number of consumers may decline. Results for the economic support ratio for selected countries in Asia are shown in Figure 5.10. It is noted that demographic transition in Japan occurred prior to any other Asian countries, resulting in an early rise and fall of the economic support ratio compared to others. The economic support ratio for Thailand was much lower than for other countries before 1980, but then it rose steeply due to a rapid increase in the share of working age adults. The economic support ratio for Thailand reached its peak in 2009 and it is expected to decline in 2010. In contrast, countries with slower demographic transition, such as Indonesia and India, could enjoy an increase in the economic support ratio for the next few decades.

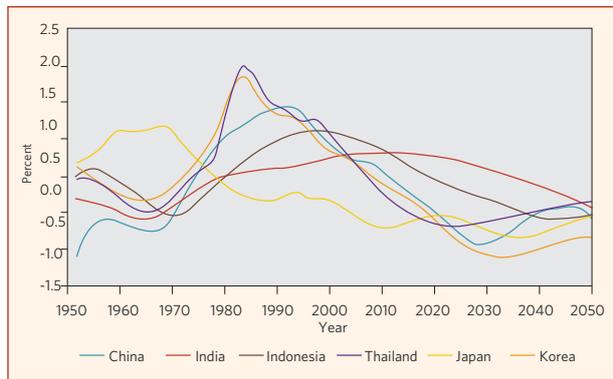
FIGURE 5.10 THE ECONOMIC SUPPORT RATIO FOR SELECTED ASIAN COUNTRIES



Source: Authors' calculation based on the economic lifecycle of Thailand

The growth rate of the economic support ratio measures the first demographic dividend. Owing to demographic transition, the first demographic dividend is transitory. A continual decline in fertility and mortality rates leads to population aging. The share of the labor force gradually declines, whereas the share of the elderly increases. The first demographic dividend will decline and eventually will turn negative when population growth is greater than the growth rate of the labor force. Examples of the first demographic dividend of selected Asian countries are shown in Figure 5.11. The first demographic dividend for Thailand was negative until the early 1970s before it turned positive, rose steeply and reached the peak in the mid-1980s. The first demographic dividend gradually declined as the economic support ratio increased at a decreasing rate. Thailand enjoyed the positive effect of demographic transition on economic growth until 2010 when the first demographic dividend for Thailand is expected to end. Demographic changes will no longer yield a positive gain to the economy. Population aging will eventually result in negative economic growth in Thailand if other factors remain constant.

FIGURE 5.11 THE FIRST DEMOGRAPHIC DIVIDEND FOR SELECTED ASIAN COUNTRIES



Source: Growth of the economic support ratio of each country

The span of the first dividend period varies from one country to another, depending on unemployment rates, labor force participation rates and other factors that influence economic lifecycles. In addition, human capital investment plays a crucial role in determining the productivity of the labor force, influencing total production of the economy. The results show that, holding other factors constant, changes in population age structure could lead to an increase in per capita income in these countries. The magnitude and length of the first dividend period depends on how rapid demographic change is in each country. Japan experienced demographic transition prior to any other Asian counterparts; therefore Japan gained the first demographic dividend even before 1950 and it lasted until 1980. Other countries did not receive benefits from the first demographic dividend until the mid to late 1970s. Some countries, such as China, South Korea and Thailand, experienced rapid demographic changes with sharp decline in total fertility rate (TFR), resulting in a large positive gain in the first demographic dividend. Population change in China, South Korea and Thailand brought about an increase in per capita income by about 1-2 percent a year during the mid-1980s. On the other hand, India and the Philippines have slow demographic change, leading to a small effect of the first dividend.

Demographic transition in these countries shows that when the smaller cohorts of children reach the working ages, the share of working age population declines and the share of the elderly increases. The economic support ratio falls, ending the period of the first demographic dividend. This raises

concerns that the favorable effect of population changes on economic growth is coming towards the end. However, economic growth in Thailand as well as other countries could be sustained despite population aging through physical capital and human capital accumulation.

The Second Demographic Dividend

Physical capital accumulation could generate sustainable economic growth, called the second demographic dividend. Unlike the first demographic dividend, the second demographic dividend is not transitory. Physical capital accumulation could lead to a permanent increase in capital deepening—a higher level of capital per unit of labor allowing individual consumption to rise.

The second demographic dividend is more complicated to estimate than the first demographic dividend. The second demographic dividend is influenced by how population aging affects the demand for wealth. Based on Mason (2005), there are two ways in which demographic transition affects demand for lifecycle wealth. First, there is a compositional effect, caused by an increase in the share of individuals who have nearly or fully completed their productive years. These individuals must have accumulated wealth in order to finance consumption in excess of labor income for many of their remaining years. Second, there is a behavioral effect, caused by an increase in life expectancy and the accompanying increase in the duration of retirement, leading to an increase in the demand for wealth.

Individuals may rely on different forms of wealth. One possibility is that retirees rely on transfers from public pension and other public welfare programs or from familial transfers from their working adult children. In such cases, individuals may rely on transfer wealth to support consumption during their retirement years. A second possibility is that individuals may rely on capital accumulated during their working years in order to support consumption during the retirement period. Both forms of wealth can be used to support the lifecycle deficit at older ages.

From the individual's point of view, transfers and assets can be used interchangeably to finance

consumption. However, from the macroeconomic point of view, only accumulation of assets leads to a higher capital-labor ratio, which enhances productivity and generates growth. Transfers do not lead to a higher level of output and cannot be used to generate economic growth, because net transfers at a point in time are summed to zero; transfers received by one age group are transfers given by another age group. Therefore, only capital may increase productivity of labor and affect economic growth. The effect of capital accumulation as an engine of growth is the source of the second demographic dividend.

Wealth can be accumulated over a lifetime in order to finance future consumption in excess of future labor income. The relevant demography is captured by the projections of the equivalent numbers of consumers and producers for each cohort. Each cohort's lifecycle wealth increases as the future person-years of consumption rises relative to the future person-years of production, both appropriately discounted. In reality, demand for life-cycle wealth is mainly concentrated among older working adults who are approaching their peak earnings and have completed their child-rearing responsibilities. See Annex A for methods to estimate the 2nd Demographic Dividend.

In order to simulate the second demographic dividend, some assumptions are necessary. First, the growth rates of consumption and labor income are exogenously determined at 1.5 percent per year and the interest rate is at 3 per cent. Second, individuals begin to accumulate wealth at age 50. Third, transfer policy is constant and the growth

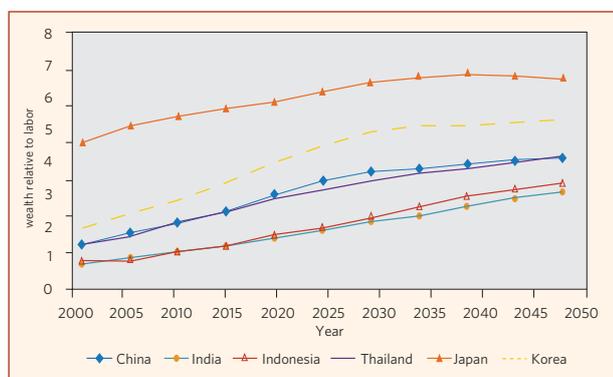
rates of the capital and life cycle wealth are equal. Fourth, the elasticity of labor income with respect to capital is 0.5, which draws from the assumption that elasticity of output with respect to capital equals one third. Therefore, the second demographic dividend is calculated as half of the growth rate of the ratio of wealth to total labor income.¹

The current trend toward population aging is unprecedented and an improvement in health care could significantly prolong life expectancy. This, together with the difficulty of raising fertility toward replacement level, makes population aging likely to be irreversible. Thus, it is important to create a prudent policy that promotes saving rather than rely on public transfers to support old-age consumption. Such policy could enable the economy to accumulate wealth relative to labor income or capital deepening, which is not as transitory as the first demographic dividend.

As shown in Figure 5.12, wealth to labor income ratio is higher in countries with a larger share of the elderly. Japan has the highest wealth to labor income ratio as Japan has experienced aging before any other Asian countries. Wealth relative to labor income in Thailand increases continually, following a similar trend to that in China. On the other hand, countries with a smaller share of the elderly, such as India and Indonesia, have the lowest wealth to labor income ratio.

The second demographic dividend can be simulated, as shown in Figure 5.13. The results show that economic growth can be attained for several more decades despite population aging. Thailand as well as other countries could benefit from population aging if their working age population accumulates capital to prepare for retirement consumption. Results also show that the magnitude of the second dividend is higher than the first dividend for all the countries.

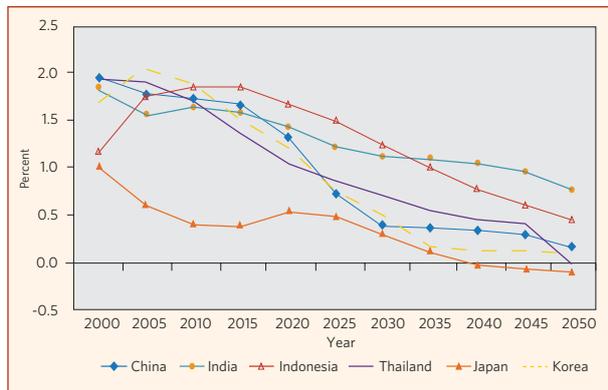
FIGURE 5.12 WEALTH TO LABOR INCOME RATIO FOR SELECTED ASIAN COUNTRIES



Source: Authors' calculation based on the economic lifecycle of Thailand

¹ It should be noted that under the golden rule, the ratio of consumption to labor income is assumed to be 1, and the rate of productivity growth and the rate of growth of equivalent consumption, g_y and g_c , expected to be constant and equal to each other.

FIGURE 5.13 THE SECOND DEMOGRAPHIC DIVIDEND FOR SELECTED ASIAN COUNTRIES



Source: Growth rate of wealth to labor income ratio of each country

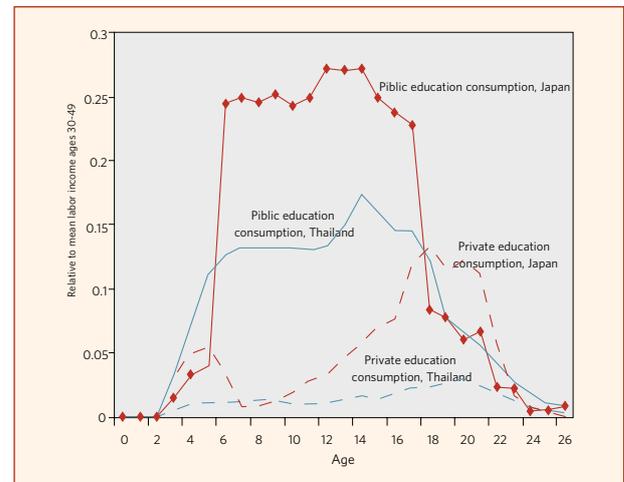
The lesson to be learned from the second dividend in Thailand as well as other Asian countries is that these countries still have time to maximize the full benefit of the second dividend. The reason is that population aging is not as prominent in Thailand as in Japan or other aging countries where capital accumulation is limited due to the smaller share of working age population. It is therefore important to produce a savings plan for the current working age population in Thailand so that they can prepare themselves for the retirement age.

At the end of the second demographic dividend period, even though demographic changes have no favorable effect on economic growth, the level of wealth to labor ratio is greater than at the beginning. An increase in wealth could be used to finance more consumption for each individual. In other words, individuals can attain a higher level of consumption in the future because capital accumulated throughout the dividend period leads to capital deepening or a higher level of productivity for workers.

Intergenerational Transfer of Human Capital

Human capital accumulation could increase productivity of workers, which could accelerate economic growth. The question is whether declining fertility could lead to an increase in intergenerational transfers of human capital to each child, which could raise productivity of the future labor force. The interactions between fertility

FIGURE 5.14 PUBLIC AND PRIVATE INTERGENERATIONAL TRANSFERS OF EDUCATION

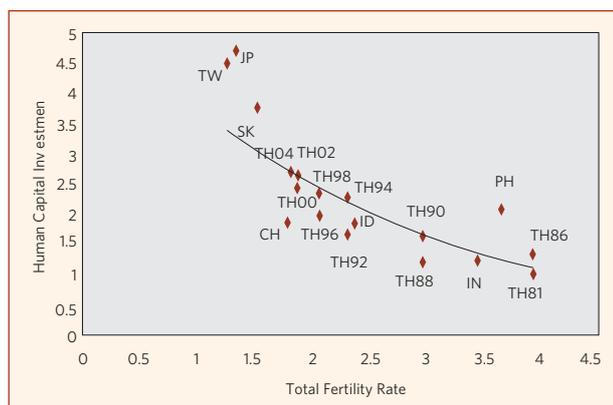


Source: Data used in Ogawa, Mason, et al. (2009)

and human capital investment or the quantity-quality trade off are introduced by Becker and Lewis (1973). If there is no change in the amount of total education spending, lower fertility leads to higher human capital investment per child. In such case, the economy may extend the period of the first demographic dividend due to a higher productivity level of workers, which enables the future workforce to generate more output.

Intergenerational transfers of education in Thailand are large and important. Children receive transfers from other age groups through the family and the public sector. Examples of familial transfers of education are tuition fees, text books and special lessons. Examples of public transfers of education are salaries, administration costs and other public education consumption in the government budget. The age pattern of human capital investment can be estimated, using the methodology of the National Transfer Accounts. Age-specific data on public and private education spending per child for selected countries are shown in Figure 5.14. In Thailand, public education transfers are much greater than private education transfers for all age groups.

FIGURE 5.15 QUALITY AND QUANTITY TRADE-OFF FOR SELECTED ASIAN COUNTRIES



Source: Based on authors' calculation, using results from the National Transfer Account Project

For each country, per capita public and private education spending for ages younger than 26 can be combined to measure synthetic cohort estimates of human capital transfers of education to children. Human capital investment relative to average labor income (E) for each country can be estimated in the natural log form. Figure 5.15 shows the relationship between total fertility rate (TFR) and human capital investment. Average TFRs for the most recent five-year interval before the period of human capital investment data (UN population data) are used.²

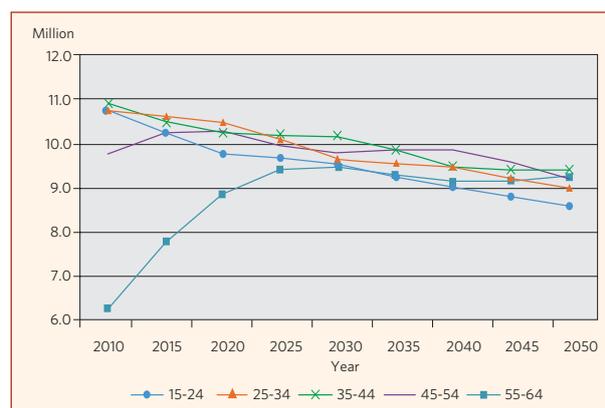
A decline in TFR could lead to a higher human capital investment per child, which improves productivity of the future workforce and accelerates economic growth.

Concluding Remarks and Challenges

The future does not look very bright, but nor does it appear impossible to cope with. Without any policy change, Thailand will continue to have smaller numbers of children and working age population. Longer life expectancy increases the proportion of old age dependency. By the middle of this century, Thailand will have 63 percent of its population in the working ages, about 9 million population in each age group of 15-24, 25-34, 35-44, 45-54,

² The regression can be shown as:
 $\ln(E) = 1.34 - 0.72 \cdot \ln(\text{TFR})$; $R^2 = 0.77$ (16.81) (-7.62)
 where the values in parentheses are t-statistics. An elasticity of -0.72 shows that if TFR is lower by 1 percent, the share of labor income spent on human capital investment will increase by 0.72 percent. The coefficient is statistically different from one. The regression result means that the increase in human capital investment in Asia is less than the proportional reduction in TFR in the region. See details of this study in Lee and Mason (2010) and Ogawa, Mason et al. (2009).

FIGURE 5.16 FUTURE WORKING AGE POPULATION



Sources: Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2008 Revision, <http://esa.un.org/unpp>.

and 55-64 (Figure 5.16). Thailand will not be able to benefit from the first demographic dividend since it has ended in 2010. More hope will attach to the second dividend or an import of work force from neighboring countries or both.

Thailand can actually benefit from population aging if people accumulate capital. What the government should do is to establish a savings plan for the current working age population so that they can prepare themselves for retirement age. As a result, individuals can attain a higher level of consumption in the future because capital accumulated throughout the dividend period leads to capital deepening or a higher level of productivity for workers. Encouraging the work force to save will also serve the social protection functions. Older people are vulnerable to poverty since their income could be lower than their consumption. Without any economic support, they could fall into poverty. Figure 5.17 shows that the poverty incidence³ among the older population is higher than among the working age groups.

A retirement pension may not only be able to reduce the likelihood of being poor for an old person, but may also improve well-being of other household members. Duflo (2003) showed that households do not function as unitary entities. A retirement pension for elder women can improve weight and height of girls in the same household in developing countries. Intra-household transfers still also exists

³ This is the headcount ratio of population who has consumption below poverty line.

in developed countries like Japan. A survey in Japan in 2007 showed that the proportion of respondents in their 40s who had received financial assistance from their parents over the previous 12 months was approximately 50 percent higher than that of those who had provided financial assistance to their parents. These results suggest that Japanese elderly are still playing a vital role in providing financial support for their offspring when the latter encounter economic difficulties (Ogawa et al., 2010).

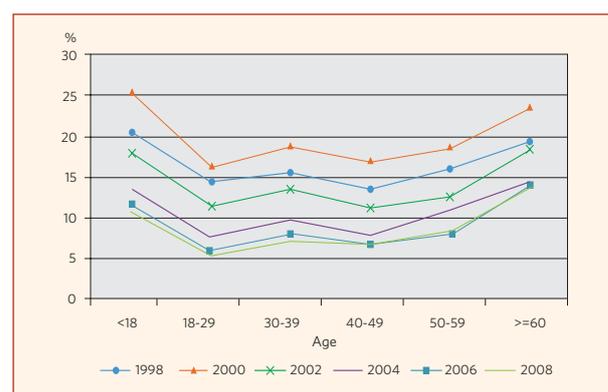
The high demand for savings for retirement is shown in the recent survey conducted by the National Statistical Office of Thailand. Social welfare questions were attached to the Socio-Economic Survey in April 2010. The survey covers 3,680 households from every province. The question on saving for retirement is: If the government asks you to save 100 Baht per month and the government will contribute another 50 Baht to your saving account, which will provide you a pension of 700 Baht per month starting from the age of 60, do you want to save? The result is shown in Table 5.4. About 80 percent of population wants to save for their retirement. But, only half of the population is certain about their capability of monthly saving. In all regions, the proportion of those who do not want to save is rather small. People in Bangkok who are richer than those in other region show more willingness to do their own saving than participate in the government saving plan.

TABLE 5.4 SAVING FOR RETIREMENT SURVEY

	Bangkok	Central	North	Northeast	South	Total
Want to save						
and capable of saving	55	49	43	47	51	48
but not sure of regular saving	14	22	24	27	20	23
but may not have money for saving	10	12	14	13	18	13
Do not want to save						
because I can manage my own saving.	7	4	5	2	1	3
because I do not need saving.	3	3	2	2	1	2
because I do not trust the government.	1	3	2	2	1	2
Don't know, not sure	11	8	11	8	8	9

Source: National Statistical Office, Demand for Social Welfare Survey 2010.

FIGURE 5.17 POVERTY INCIDENCE BY AGE GROUP



Source: TDRI

Without any changes to demographic policy, Thailand may choose to promote migration from neighboring countries to cope with its aging population. Thailand will need 6 million migrant workers in the next 10 years, to meet the excess demand and to continue its economic growth path (Potipiti, 2010). With a large pool of migrant workers, appropriate social policies must be conducted seriously. Migrant workers should be treated like Thai workers. Their children should be treated like Thai children. Therefore, social expenditure on education, medical care and other social insurance will increase. The public will have to weight this social cost with the cost of improving human capital and accumulating physical capital and choosing the growth path under the high labour productivity regime.



Urbanization and Migration Impact

Thailand has emerged as a middle income country in the past twenty-five years, and urban growth has proceeded rapidly. This growth is the result of both long-standing migration patterns and new population distribution trends. About one-third of the population now lives in urban areas. At the same time, international migration, both into and out of the country, has become an important economic and social force. This chapter explores trends and differentials in internal and international migration since the economic crisis of the mid-1990s. It also examines the trends in urbanization and urban settlement patterns, and the impact of these trends on sociodemographic differences and income disparity between urban and rural dwellers. An overview of the environmental consequences of urbanization and migration in Thailand is also presented. Finally, the implications of these trends for policy and planning are discussed with suggestions for strategic interventions as Thailand enters its next planning cycle.

Internal Migration

Long-term Thai migration patterns

Migration is not a new phenomenon in Thailand, nor does it result mainly from the industrialization and economic growth of the past twenty-five years. Rural people have migrated to supplement farm income since the 19th century, usually during the dry season when rice farming production is dormant. In the years before World War II, migration patterns were dominated by rural-rural migration streams to frontier areas for new cultivation of forested land. The abundance of unoccupied land and the ease of taking de facto ownership through cultivation and occupancy led to high mobility as the population increased (Sussangkorn, 1990; Phélinas, 2001).

At the same time, during the first half of the 20th century the high level of agricultural productivity discouraged movement to urban areas. The large numbers of Chinese immigrants to Bangkok meant that rice farming provided a relatively better livelihood than unskilled labor opportunities in the capital. When quotas on Chinese immigration began in 1947, wages for unskilled labor increased and lured rural migrants to Bangkok. This was especially true after 1950 when the population growth rate increased and rice productivity dropped. Seasonal migration was also common in the 1950s, for both men and women, driven partly by improvements in road transport (Ouyyanont, 1998, 2003; Phélinas, 2001).

Chamrathirong (2007) describes how the population explosion in Thailand of the 1950s and 1960s raised interest in studying internal migration, particularly rural-urban flows. An analysis of the 1960, 1970 and 1980 censuses revealed changing migration patterns during this period. By 1975-80, rural-rural five-year moves decreased and interregional and urban moves increased, including urban-urban moves. While the 1965-70 period saw in-flows to Bangkok, the North and the South, by 1975-80 only the Central region and Bangkok were gaining population through migration (Goldstein & Goldstein, 1986).

Several small-scale surveys were conducted during the 1970s and 1980s to examine migration patterns in more depth. Lightfoot et al. (1983) found high rates of short-term, circular moves in a survey of six villages in the Northeast. Bangkok was a primary destination, accounting for about 60% of moves, and while many of the short-term moves were driven by seasonal factors, 79% of the short-term migrants were away for more than one season. Other studies found that longer-term migrants were more selective than short-term migrants,

and that rural development projects tended to facilitate out-migration rather than discourage it (Chamratrithong, 2007).

The National Migration Survey (NMS), conducted in 1992, used month-by-month life history calendars to examine short-term and long-term migration in detail, as well as its interaction with other individual life events and household characteristics. The NMS found that short-term migration had been underestimated by other surveys and the census. If migration is defined as a movement of one month or more, the NMS found that 22.0% of the population had moved in the past five years compared with 8.0% in the 1990 census (Chamratrithong et al., 1995). Of these, 35.9% were repeat migrants (having moved two or more times) with 18.8% (about half of the repeat movers) migrating for seasonal employment. Households in the Northeastern sub-sample of the NMS were re-visited two years later for the NMS2 survey (Richter et al. 1996). Fully one in four (25%) of those interviewed for the 1992 survey had migrated in the succeeding two years, with 9% being seasonal migrants.

Two other important studies have fostered investigations of migration dynamics in Thailand and throughout the world. The Nang Rong study visited households in one district of Buriram province in 1984, 1994 and 2000. Migrants to four destinations (Bangkok, the Eastern Seaboard, Korat and Buriram city) between 1984 and 1994 were followed up in 1995. Following the 1994-95 study spatial data was added to the database. In 2000, an environmental component was added to the study, including spatial data (Entwisle et al., 1999; Rindfuss et al., 2003; Walsh et al., 2005). The Nang Rong studies have contributed to more in-depth understanding about the relationship between land use, population pressure and migration. Households with smaller land holdings were found to diversify their income sources through temporary migration, and out-migration from the household resulted in less land under cultivation (Rattanawarang, 2009; Van Wey, 2008). Subsequently, land became a less important factor in determining migration in villages with high out-migration rates (Garip & Curran, 2009).

The most recent significant study on migration is the Kanchanaburi Demographic Surveillance Survey (DSS), a longitudinal study of 100 urban and rural

communities in Kanchanaburi province. The study includes individual and household demographic, socio-economic, environment and health data linked to a community and GIS database. Data collection has been conducted since 2000 till now (2010), with several special topics on migration and its impact on household and family members, particularly children and the elderly. During 2007-2010, migrants who migrated to Bangkok and the capital city (amphoe muang) of Kanchanaburi province were contacted for a follow-up survey. This survey focuses on the migrants' employment status, social and health behavior, and includes both Thai and non-Thai migrants (IPSR, 2002). Findings to date include that residents of upland areas migrate at younger ages than those in the lowland rural areas, and that land pressure is a factor (Lam et al., 2007; Soe, 2005).

The 1990s economic crisis

While these studies greatly contributed to the understanding of migration dynamics in Thailand by the 1990s, the impact of the economic shocks of mid-1997—when the stock market and asset markets collapsed and the baht was devalued—was uncertain. If migrants in the construction, manufacturing and other sectors lost their jobs—both within Thailand and overseas—would they return to their rural hometowns? And if so, did rural areas have the capacity to absorb and sustain them?

The impact of the crisis on employment is difficult to estimate, since many workers who lost jobs moved out of the formal labor market into the informal economy. For this reason unemployment figures do not reflect the percentage who become underemployed or who are no longer reflected in official statistics. Most sources say that unemployment doubled during the crisis (cited in Skeldon (2004), p.58). The economic sectors most affected were construction (which was sharply affected by the loss of capital) and manufacturing; as money tightened, trade and commerce also contracted (Chalamwong, 2000). There is evidence that the service sector absorbed about 19% of employment losses in other sectors (Knowles et al., 1999). After decades of decline, poverty rates increased in countries where the economy had been booming. In Thailand for example poverty fell from 32.6% in 1988 to 11.4% in 1996, but increased to 12.9% in 1998 (NESDB, 1999).

Increases in poverty reflect in part the inability of the informal economy and the agricultural sector to absorb displaced workers. While most economies in the region recovered by 1999, Thailand was slower to recover and did not return to previous growth levels until 2001.

Internal migration flows greatly increased during the 1997-99 economic crisis, with a reversal of the prevailing pattern of rural-urban migration as migrants losing jobs in urban and peri-urban areas returned home. In Thailand, where manufacturing and construction were particularly hard-hit, it was estimated that two-thirds of the unemployed were rural migrants; return migration to rural areas increased four-fold as 75% of these returned home (Chalamwong, 2000).

Recent trends in internal migration

In this section we present trends in internal migration patterns from the financial crisis to the present. While census data is somewhat limited in its ability to examine the complexities of migration

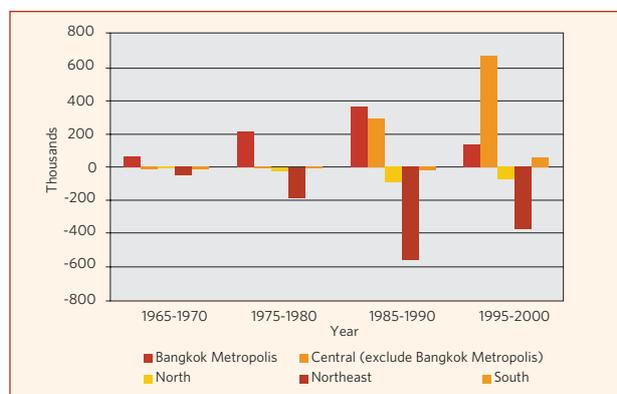
patterns, it is useful in providing a consistent series of measures over a long period of time. The census gives information on "lifetime" migrants (those living in a different province than that of their birth) and five-year migrants (those who have moved in the past five years).

As seen in Table 6.1, lifetime migration increased in the 1965-70 period, remained at the same rate from 1975-1990, and increased again 1995-2000. Five-year migration showed roughly the same pattern, except for the 1975-80 period when there was a decline from about 6% to about 4%. The 1995-2000 period showed the highest level of 5-year migration, at 6.3%.

Census data is also useful for giving a national overview of regional flows. As seen in Figure 6.1, outflows from the Northeast and in-flows to Bangkok increased steadily from the 1955-60 period to the 1985-90 period. In the final period of the 20th century however, in-flows to the central region outside of Bangkok outstripped that to Bangkok itself, and the size of the population stream to Bangkok declined. As will be discussed in more detail below, this is mainly due to the growth of urban areas in Bangkok's periphery, where employment opportunities expanded.

For a more detailed examination of migration since the 1990s economic crisis, we use the Migration Survey conducted by the National Statistical Office on a regular basis since 1997 (NSO, 1990). While the survey has been conducted annually since 2004, it was not conducted from 1998-2001 or in 2003. The survey uses a national sample; the questionnaire is identical to NSO's Labor Force survey with a migration module added. While the survey has changed the definition for some migration categories over the years, measurement of migration in the past year has remained constant and is used here.

FIGURE 6.1 REGIONAL NET GAIN/LOSS FROM 5-YEAR MIGRATION FLOWS, 1965-2000.



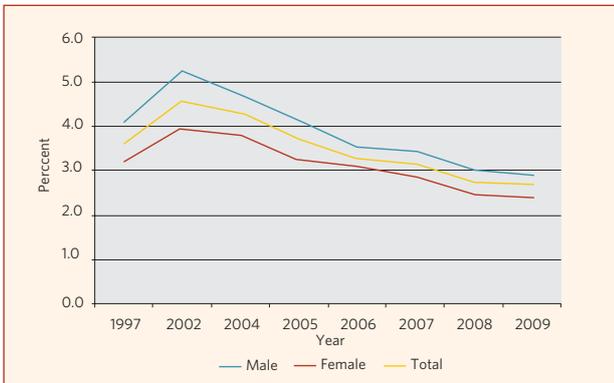
Source: National Statistical Office, 2003.

TABLE 6.1 CENSUS DATA ON THE PERCENT OF THE POPULATION WHO ARE LIFETIME MIGRANTS (LIVING IN A DIFFERENT PROVINCE THAN THAT OF THEIR BIRTH) AND WHO ARE FIVE-YEAR MIGRANTS (HAVING MOVED IN THE PAST FIVE YEARS)

	1960	1970	1980	1990	2000
Lifetime migrants	10.8	13.1	14.1	13.9	16.8
Five-year migrants	3.6	5.9	4.1	5.1	6.3

Source: National Statistical Office, 2003.

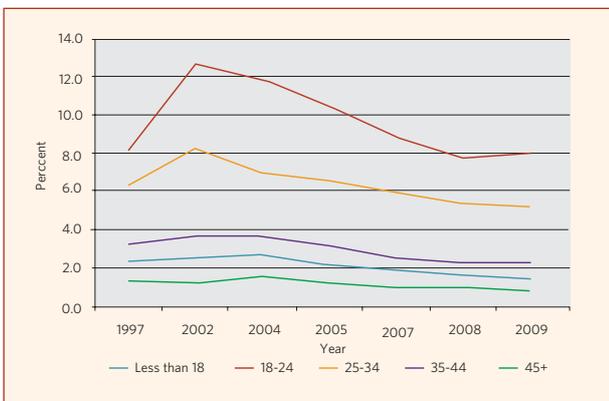
FIGURE 6.2 PERCENT OF THE POPULATION WHO ARE ONE-YEAR MIGRANTS¹ (TOTAL AND BY SEX), 1997-2009.



Note: The survey was not conducted every year prior to 2004 so the scale of the graphs using this data between 1997-2002 is distorted. Sources: National Statistical Office, Migration Survey, 1997, 2002 and 2004-2009.

Figure 6.2 shows migration rates for the total population, males and females for 1997-2009. The survey in 1997 was conducted in the rainy season, several months after the fall of the baht in July. Previous analysis of the impact of the 1990s financial crisis on migration maintains that migration rates should be high during this period—reflecting the fact that many rural-origin migrants returned home due to the decline of job opportunities in Bangkok and other destinations. However, the proportion migrating in 1997 is lower than that in 2002, when the economy was rebounding (3.6% vs. 4.6%). This issue is discussed in more depth below.

FIGURE 6.3 PERCENT OF THE POPULATION WHO ARE ONE-YEAR MIGRANTS BY AGE GROUP, 1997-2009.



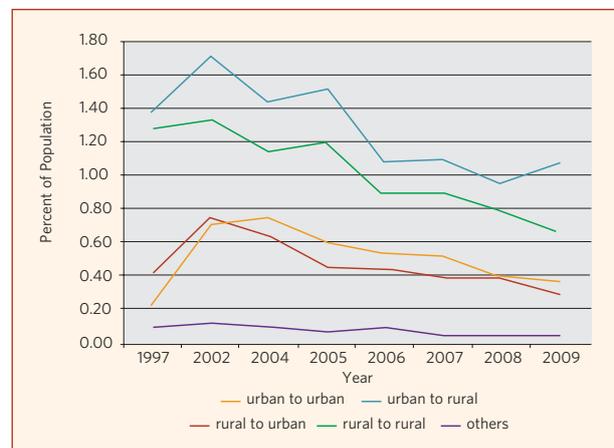
Sources: National Statistical Office, Migration Survey, 1997, 2002 and 2004-2009.

1 One-year migrants are living in a different subdistrict than they did one year ago (NSO, n.d.).

Since 2002, there has been a steady decline in migration rates. Males migrate at a higher rate than females, but the gap has narrowed in recent years. Looking at differentials by age (Figure 6.3), the young working age groups (age 18-24 and 25-34) have much higher migration rates than other groups. In 2002, fully 12.7% of those aged 18-24 migrated in the past year, as did 8.2% of 25-34-year-olds; other age groups migrated at a rate of less than 4%. Moreover, while migration rates of those less than age 18 or older than 35 remained fairly constant during this time period, young working adults had both a sharp increase in migration from 1997-2002 and a steeper decline from 2002-2009. While the differential between 18-24-year-olds and 25-34-year-olds was reduced in this time period, the 18-24-year-olds were the only group to show an increase in migration rates in 2009.

The migration rates by migration stream during this period are shown in Figure 6.4. Because migration streams are highly seasonal, it is important to note that the survey was conducted just after the rainy season during most rounds. This timing would capture most seasonal migrants in their rural home communities as they return for the rice harvest. The exception was in 2009, when the survey was conducted during the dry season in order to measure whether migration increased due to the economic crisis in 2008. As expected, the urban-rural and rural-rural streams are the largest during the rainy season, as seasonal and short-term migrants return home. In the 1997 survey the urban-urban and rural-urban streams are at their lowest point, likely

FIGURE 6.4 PERCENT OF THE POPULATION WHO ARE ONE-YEAR MIGRANTS BY MIGRATION STREAM, 1997-2009



Sources: National Statistical Office, Migration Survey, 1997, 2002 and 2004-2009.

TABLE 6.2 PERCENTAGE OF ONE-YEAR MIGRANTS WHO SAID THEIR MOST RECENT MOVE WAS TO RETURN HOME BY DESTINATION, 2008-2009

Year	Urban	Rural	Total
2008	42.1	66.4	58.9
2009	44.9	73.7	65.7

Sources: National Statistical Office, Migration Survey, 2008 and 2009.

reflecting the lack of urban opportunities during the 1990s financial crisis. Correspondingly, rural-rural migration is at its highest rate in 1997. While urban-rural migration is the largest migration stream, as expected, the fact that the rates increased further in 2002 and remained higher throughout the early 2000s calls into question previous findings that the 1990s crisis caused massive return migration to rural areas. However, the lack of specificity of the timing of the move and length of the migration makes it difficult to make firm conclusions about this response, as opportunities during the 2002-2004 period could have increased seasonal short-term migration over the rates during the crisis. Also, the relative importance of the urban-rural migration stream increased during the dry season in 2009.

Further detail on the nature of these moves is shown in Table 6.2, as 2009 saw an increase over the previous year in the percentage of migrants who said that they were returning home.¹ Boonyamanond and Punpuing (2010) contend that this provides evidence that at least some of this return migration was in response to the economic crisis in 2008.

Urbanization patterns

As mentioned above, most of the research on migration in the 1960s to 1980s was driven by concerns about rural-urban migration, especially to Bangkok. Bangkok's primacy among urban centers in Thailand has been well established since its foundation in the 18th century; by 1981, Bangkok's population was 50 times that of the second largest city. Bangkok's growth increased further when the country rapidly industrialized; by 2000, Bangkok had half of the country's urban population and produced 35.2% of its GDP. The dominance of the capital in providing job opportunities is seen by the

¹ This question was added to the survey in 2008 so it is not possible to look at the response in previous years.

FIGURE 6.5 AVERAGE ANNUAL POPULATION GROWTH RATE OF THAILAND BY URBAN STATUS

Figure 6.5a Rural and urban areas, Bangkok and peripheral provinces, 1960-2010

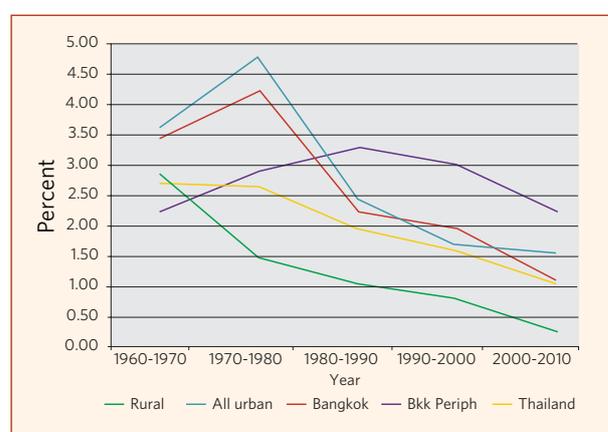
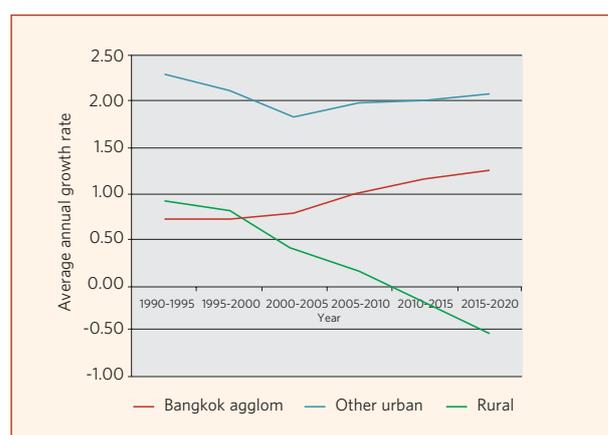


Figure 6.5b Rural, Bangkok agglomeration and other urban areas, 1995-2020



Sources: (Figure 5a) (Urban, rural) United Nations, World Urbanization Prospects Database, 2007; (All other) 1960-2000: Population and Housing Census, NSO; 2000-2010 Population projections, NESDB; (Figure 5b) United Nations, World Urbanization Prospects Database, 2007

fact that rural-urban migration has not historically followed a stepwise pattern in Thailand; many seasonal and long-term migrants moved directly to Bangkok without ever migrating to a smaller urban center. Bangkok is also a financial hub for the Mekong sub-region (Chamrathirong et al., 1995, 1999; Chubb, 1998; Glassman & Sneddon, 2003; Ouyannont, 1998).

In response to this rapid growth, the Thai government implemented decentralization policies in the Third (1972-76) and Fourth (1977-81) national plans. These included incentives to promote the Eastern Seaboard as a manufacturing hub and to encourage the growth of regional urban centers through industrialization. Efforts to diminish Bangkok's dominance during this period were not successful however, and by the late 1980s the Thai government focused on reducing the negative aspects of development. By that time Bangkok's peripheral areas were growing faster than the city itself. Many have argued that the absence of planning has led to urban problems such as congestion and pollution in the regional centers without alleviating them in Bangkok (CODI, 2006; Glassman & Sneddon, 2003; Guest & Jones, 1996; Punpuing, 1999).

Globally, urban growth rates are unprecedentedly high; and contrary to common belief the small and medium urban centers are growing more rapidly than mega-cities (UNFPA, 2007). As seen in Figure 6.5a, while Bangkok's growth rate was higher than that of the nation in the 1960s and 1970s, the gap has narrowed in recent years. Bangkok's growth rate

peaked in the 1970s at nearly 5%; by the 1980s the peripheral provinces were growing at a faster rate. At the same time, the growth rate for other urban areas is higher than the Bangkok agglomerated area (including peripheral provinces) throughout the 1990s and 2000s (Figure 6.5b), and Bangkok's proportionate share of the urban population has declined (Figure 6.6). According to Ministry of Interior estimates, Nakhon Ratchisima (in the Northeast) and Hat Yai (in Songkha province- in the South) are the most populated cities outside of the Bangkok agglomerated area; Chiang Mai, which was second to Bangkok throughout most of Thai history, now ranks behind them.

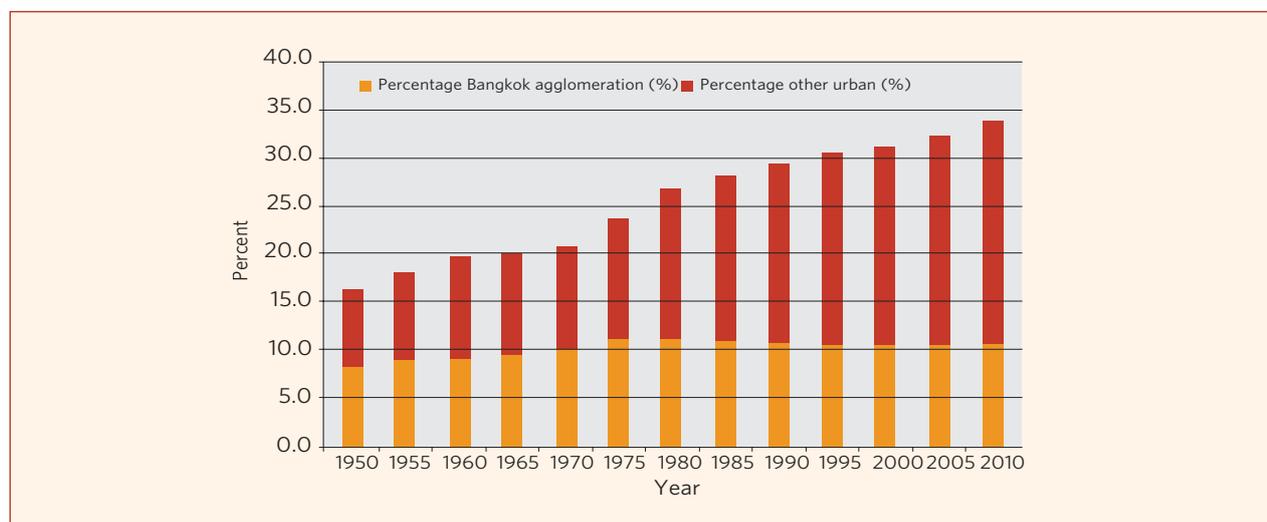
International Migration

In recent years, increasing differentials in the country's economic development level and demographic situation with other countries in the region have led to escalating international migration. The phenomenon is dominated by the movement of semi/unskilled workers from the weaker to stronger economy countries. For example, unskilled workers from the lesser economies in Southeast Asia move to Thailand, and semi- skilled Thai workers migrate to the stronger economies in East and Southeast Asia, the Middle East and other parts of the world.

Out-migration from Thailand

Most Thai out-migrants counted by official statistics are males (85%) and the majority of these are contract workers in low-skilled jobs. Looking

FIGURE 6.6 PERCENT OF POPULATION RESIDING IN BANGKOK AND OTHER URBAN AREAS, 1950-2010

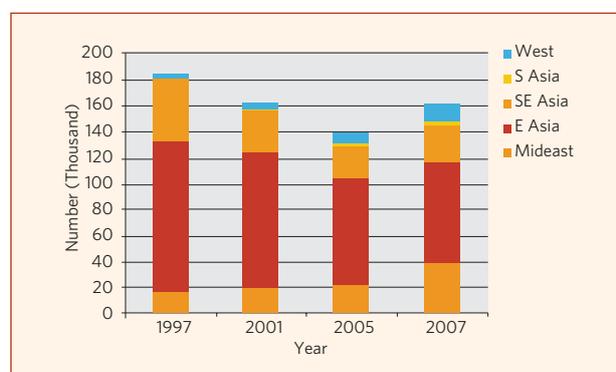


Source: United Nations, World Urbanization Prospects Database, 2007

at trends in the official number of out-migrants in Figure 6.7, there is a slight but steady decline in the 10-year period, from about 180 to 160 thousand, but with a slight increase in 2006-2007. Estimating the number of Thai migrants who returned from international destinations as a result of the 1990s financial crisis is difficult, since so many migrants are undocumented. The crisis occurred at a time where labor flows to the key destination countries in the region—Japan, South Korea, Taiwan, Hong Kong, Singapore, and Malaysia—were high and increasing (Skeldon, 1999). However, with the onset of the crisis several countries attempted to restrict migrant numbers by instituting policies to expel foreign workers. Despite these policies, during the crisis the number of foreign workers in the informal economy remained at stable numbers or even increased. Skeldon (2004) concludes that policies to expel foreign workers had no net dramatic effect on migration during this time period.

The destinations of Thai out-migrants also shifted during the period (Figure 6.7); the steady decline is seen to be a result of a reduced number in East Asia and in Southeast Asia, but the number in the Middle East nearly doubled from 2005-2007. The number in the West also increased steadily. In terms of specific countries in the Middle East, there is a large and fairly constant number in Israel of approximately 9-12,000. The increase in the Middle East in 2007 is almost entirely due to the UAE (Dubai) and the large construction projects there during that period; approximately 10,000 Thais were working there in 2007. A break-down of migrants to East Asia by country shows that the decline in that region is mainly due to a reduced

FIGURE 6.7 DESTINATION OF THAIS RESIDING OVERSEAS, 1997-2007 (OFFICIAL COUNT)



Sources: Huguet & Punpuing (2005); Sciortino & Punpuing (2009)

number in Taiwan (from over 100,000 to about 50,000). In SE Asia, other notable decreases were seen in Malaysia (from 9,000 to 3,000) and Brunei (from 18,000 to 4,000) (Huguet & Punpuing, 2005; Sciortino & Punpuing, 2009).

While it is difficult to estimate the number of irregular Thai migrants to other countries, it is likely that their numbers are larger than those of “official” migrants (see Table 6.3). The fluid borders with neighboring countries contribute to this. This is especially true for Malaysia; the cultural similarities with southern Thais mean that the numbers of short-term migrants to Malaysia are high. In other countries with a large number of migrants, such as Taiwan, contract workers may overstay their visas or break their contracts when they find other work. Women in less formal types of jobs, such as domestic work and agricultural labor, are also likely to have illegal status (Hugo, 2005; Martin, 2009; Sciortino & Punpuing; Skeldon, 1999).

TABLE 6.3 OFFICIAL COUNT OF THAIS RESIDING OVERSEAS, 1996-2007

Year	Thais residing overseas (' 1000)
1996	185.4
1997	183.7
1998	175.4
1999	159.6
2000	177.7
2001	165.0
2002	160.8
2003	147.8
2004	148.6
2005	139.7
2006	160.8
2007	161.9

Sources: Huguet & Punpuing (2005); Sciortino & Punpuing (2009)

Immigration to Thailand

Historically, Thailand has been a destination for migrants from other countries. The largest group was the traders and low-skilled workers from China,

who arrived in Thailand mainly during 18th and 19th centuries, and have now been settled in Thailand for generations. The 1909 census reported that 162,505 Chinese migrants were settled in the capital city-Bangkok (APMRN, n.d.). Particularly during the 19th century, other nationalities that mainly came to Thailand as traders, skilled workers or commercial networkers include those from India, Japan, United Kingdom, United States, and other European and Asian countries. A large number of Indians and Malays also assimilated into Thai society (Sciortino & Punpuing, 2009).

The second most visible migrant group in Thailand are those seeking refugee status. At the end of World War II, a group of migrants from Vietnam arrived, who escaped from internal conflict and deficiency in the country. It is estimated that about half of 68,800 migrants in 1959 were settled, particularly in the Northeastern region. Moreover, during the Vietnam war, a new wave of Vietnamese arrived in Thailand, but most of them were resettled in third countries (mainly in the United States). The exact number of migrants in recent years is not known, but the official figures during 1998 to 2004 showed that 24,914 Vietnamese ethnic migrants registered for 'alien status', which requires an application for 'Thai nationality' for the second and third generations (Sciortino & Punpuing, 2009, p. 81).

In the period after the Vietnam war (1975 and following), about 320,000 Laotians also escaped to Thailand, of which a majority was resettled in a third country or returned home. About 15,500 ethnic Hmong, who are former camp residents or the children who born in Thailand remained in the country, however they were sent back home in early 2010.

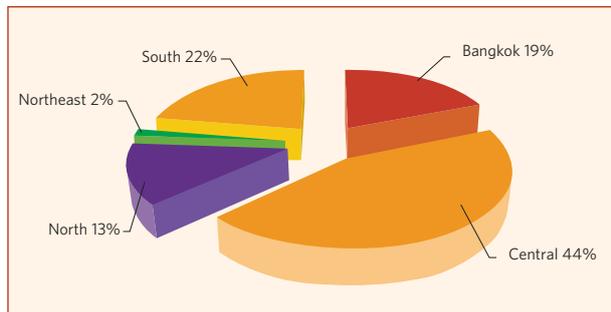
A group from Cambodia was forced to move to Thailand by various events in the country including the Khmer Rouge's victory in 1975, the fighting of the Vietnamese army against the Khmer Rouge in 1979, the Vietnamese offensive along the Thai border in 1984/85, the collapse of Cambodia's coalition government in 1997 and the Khmer Rouge's demise in 1998. The first refugee camp for Cambodians was opened in 1979, and the last closed in 1999. About 235,000 Cambodians have been settled in third countries, and 370,000 were deported back to Cambodia (Robinson, cited in Huguet & Punpuing, 2005).

Thailand is also the host of a large number of people who escaped armed conflicts between ethnic minority opposition groups and the central government in Myanmar. Now, there are nine camps located near the Thai-Myanmar border with a population as of December 2007 of 130,435 according to UNHCR (cited in Sciortino & Punpuing, 2009, p.83). Thailand has been an important receiving country for migrants since the early 1990s, when the influx of low skilled migrants from the Greater Mekong Subregion (GMS) countries- China (Yunnan), Vietnam, Lao PDR, Cambodia and, especially, Myanmar—began to outnumber Thai outflows (Tsay, 2002; Sciortino & Punpuing, 2009). The impact of the 1997-99 crisis on international migration is difficult to estimate, as it affected different countries and different sectors in different ways. Using statistics compiled from official sources, Skeldon (2004) showed that the number of international migrants in Thailand were stable or even continued to increase during this period.

The total number of foreigners working and living in Thailand was estimated at 2.8 million at the end of 2007 (Sciortino & Punpuing, 2009). Efforts are being made in the 2010 census to enumerate more of these workers than in 2000, where only about 70,000 workers from Myanmar, Laos and Cambodia were counted (Archavanitkul et al., 2009). By the end of 2009, an estimated 1,314,382 undocumented migrants², of which 82% were from Myanmar, 8% from Lao PDR and almost 10% from Cambodia, were resident in Thailand. This more than doubles the total number of migrants in the country, as it is in addition to the 1,093,237 documented migrants cited in Chapter 2. As most of the non-agricultural employment is located in urban areas, a higher proportion of the international migrants are concentrated in urban areas than is the case for the Thai population as a whole. As seen in Figure 6.8, about 1 in 5 (or 252,768) of the cross-border migrants from Myanmar, Lao PDR and Cambodia were working and living in Bangkok, while about 44%, 22%, 13% and 2% concentrated in provinces of the central, south, north and northeast regions respectively (Ministry of Labour, 2010). As discussed further below, for the most part cross-border migrants work at unskilled and low-paying jobs, which nonetheless pay them more than they could earn in their own countries.

² Undocumented migrants refer to those who enter Thailand without any immigration documents such as a border pass or visa.

FIGURE 6.8 UNDOCUMENTED MIGRANTS' DESTINATION, 2009



Source: Ministry of Labor, Report of Labor Situations, 2010

There are other types of international migrants who move for work or settlement reasons. There has been an increasing demand for experts with high managerial, technological, engineering or industrial skills. Most of these come from developed countries such as United Kingdom, United States and Japan. By the end of 2009, there were 210,745 foreigners who held Thai work permits, usually coming under a work contract or under the Thai government special scheme for foreign investment. Besides these contract workers, other foreign immigrants include students, those who live in Thailand because of marriage and those who settle there after retirement (see, e.g., Toyota 2006). Some tourists also overstay their visas or become permanent residents (Huguet & Punpuing, 2005).

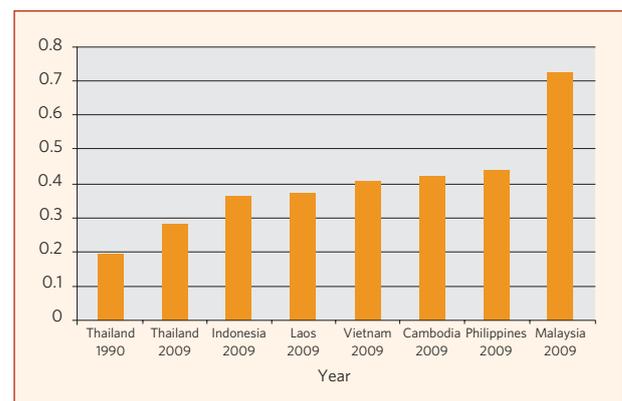
Impact of Migration and Urbanization

Concerns about migration and urbanization often focus on uneven development. If the lack of opportunity—especially for those with education and skills—leads to out-migration from rural areas, the result is increasing inequality between rural and urban areas. This inequality may be manifested by a drain from rural areas of the working-age and educated population, and by increased levels of dependency. Both of these patterns lead to greater inequality of income between urban and rural areas and between migrants and non-migrants.

Compared to other countries in the region, Thailand continues to have a high proportion of the workforce employed in agriculture. As seen in Figure 6.9, while the ratio of GDP from agriculture to employment in agriculture has risen in the past two decades, it remains the lowest in the region. This has been attributed to various reasons including the high level of land ownership, the frequency of seasonal and other short-term migration, and the rapidity of economic growth (Guest & Jones, 1996; Sussangkarn & Chalamwong, 1996). Some contend that the high proportion who continue to be employed in agriculture, combined with the primacy of Bangkok and the government's prioritization of rapid development and capital accumulation over sustainability, exacerbate rural-urban differences (Glassman & Sneddon, 2003).

Resources such as health care services tend to be concentrated in urban areas and especially Bangkok. Continued urbanization may further concentrate these resources. Migrants may also have limited access to these services for other reasons. The environmental impact of urbanization has global repercussions that affect livelihood in rural areas as well. This section examines how the migration and urbanization trends described above have had an impact on inequality and the environment.

FIGURE 6.9 RATIO OF PERCENTAGE OF GDP EARNED FROM AGRICULTURE TO PERCENTAGE OF THE WORK FORCE EMPLOYED IN AGRICULTURE FOR THAILAND AND OTHER SOUTHEAST ASIAN COUNTRIES



	Thailand		Indonesia	Laos	Vietnam	Cambodia	Philippines	Malaysia
	1990 ¹	2009						
Percent GDP from agriculture	12.4	11.6	15.3	29.9	21.3	29.0 ³	14.8	9.4
Percent employed in agriculture	63.5	42.4 ²	42.1 ⁴	80.0	51.8	67.9	34.0	13.0 ⁴

Sources: Except where noted, CIA World Factbook, 2009.

1. Sussangkarn and Chalamwong, 1996, p. 101.

2. 2008 data.

3. 2007 data.

4. 2005 data.

TABLE 6.4 AGE DISTRIBUTION FOR RURAL AND URBAN AREAS BY SEX, 1997 AND 2007(%)

Age	1997				2007			
	Urban		Rural		Urban		Rural	
	M	F	M	F	M	F	M	F
<15	26.9	25.6	31.0	30.2	24.8	22.5	27.8	26.2
15-59	64.6	64.6	60.0	59.3	65.5	66.0	61.4	61.1
60+	8.4	9.8	9.0	10.5	9.7	11.6	10.7	12.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Sources: National Statistical Office, Labor Force Survey, 1997 and 2007.

Sociodemographic differentials

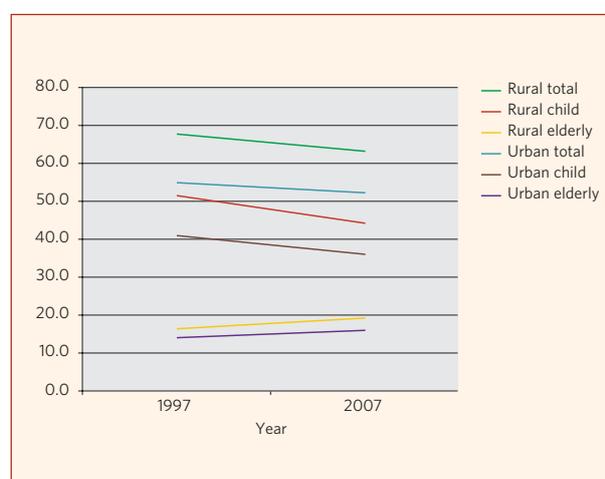
The sharp reduction in fertility in Thailand since the mid-1970s has resulted in a dramatic increase in the proportion of the population in the older age groups (Knodel et al., 2007). Table 6.4 shows differences in age structure between rural and urban areas over the ten-year period from 1997 to 2007. In both time periods there is a higher proportion of children in rural areas, but the difference does not increase over time. In both 1997 and 2007, the proportion of elderly people is only slightly higher in rural over urban areas.

These patterns are reflected in the dependency ratios for the two time periods (Figure 6.10). The total dependency ratio is higher in rural areas than in urban areas, and both decline at about the same rate between 1997 and 2007. The pattern is different for children and the elderly however. While the dependency ratio for the elderly increases over the 10-year period, the increase is very slight and there is little difference in the level of dependency between rural and urban areas. For children, there is a decrease in dependency, and rural areas have a much higher ratio than urban areas.

In sum however, there is no change in the difference between rural and urban areas in age structure or dependency ratios. In other words, the discrepancy between rural and urban areas in the economically active population has stayed about the same—and both rural and urban areas are more affected by the

overall aging of the population than by migration or urbanization patterns. Moreover, research has shown that the vast majority of migrant children maintain social and economic ties with their rural parents (Knodel et al., 2007). The large number of cross-border migrants of working age in Thailand may also have an effect on the age-sex distribution of the population, though the actual numbers are hard to estimate (see Chapter 2). Most migrants are young adults, aged 19-29 years, and they are predominantly male. While exact numbers are not known, children of migrants who are born in Thailand and migrants less than age 18 who migrate on their own to work may also contribute to a younger age structure (Sciortino and Punpung, 2007).

FIGURE 6.10 TOTAL DEPENDENCY RATIOS, CHILD DEPENDENCY RATIOS AND ELDERLY DEPENDENCY RATIOS FOR RURAL AND URBAN AREAS, 1997 AND 2007



Sources: National Statistical Office, Labor Force Survey, 1997 and 2007.

Another source of concern is the inequity between rural and urban areas caused by the “brain drain”, when more educated and skilled workers migrate to urban areas because they are unable to find appropriate jobs in rural areas. In Thailand, the modal educational attainment is the compulsory level of schooling, which was raised from Grade 6 (primary graduation) to Grade 9 (lower secondary graduation) in 1999. For this reason, educational attainment is closely associated with age cohort.³ Looking at rural-urban differences for each sex and year in Figure 6.11, the gap in secondary school attainment narrows considerably from 1997 to 2007. There is little gain in higher education in that time period however, and the percentage with some higher education in urban areas remains about three times that of their rural counterparts. Females in rural areas made the greatest gains in higher education in this period, from 6.2 to 8.4%; but in general the gender gap in education remained constant.

Occupational segregation

Though more attention is given to the situation of cross-border migrants, occupational segregation affects internal migrants as well. Table 6.5 shows national data for 1-year migrants and non-migrants, and it is clear that migrants continue to specialize at certain jobs. Migrants concentrated in manufacturing (16% of men and 14% of women); for men construction is an important category (8%) and women have a high proportion working in services (15%). For other categories such as sales and government work, the percentage of migrants employed is similar to that of non-migrants. However, fewer one-year migrants work in agriculture than non-migrants, particularly for women.

TABLE 6.5 OCCUPATION BY INDUSTRY FOR INTERNAL MIGRANTS AND NON-MIGRANTS BY GENDER, 2007(%)

Current industry	Migrant			Non-migrant		
	Male	Female	Total	Male	Female	Total
Agriculture/ fishery	42.2	36.3	39.9	47.9	48.7	48.2
Non-Agriculture	57.8	63.7	60.1	51.9	51.2	51.6
Production	15.9	14.5	15.4	8.8	8.2	8.5
Construction	11.8	2.7	8.3	7.8	1.8	5.0
Sales	13.7	16.4	14.8	14.5	15.3	14.9
Service	10.5	15.1	12.3	10.4	12.5	11.4
Financial/ real estate/ business	2.2	2.5	2.3	2.9	3.1	3.0
Government/ admin/ clerks	3.6	9.9	6.0	7.3	9.1	8.2
Domestic	0.1	2.5	1.0	0.2	1.2	0.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: National Statistical Office, Migration Survey, 2007.

³ Because educational attainment is closely associated with age, the percentage distributions in the figure are standardized by age. The figure thus shows what the educational attainment would be in 2007 if the age distribution in 1997 remained constant.

TABLE 6.6 UNDOCUMENTED MIGRANTS FROM MYANMAR, LAO PDR AND CAMBODIA WHO RECEIVED A WORK PERMIT BY SECTOR, DECEMBER 2009(%)

	All migrants	Myanmar	Lao PDR	Cambodia
All industries (Number)	1,314,382	1,078,767	110,854	124,761
Percent by sector:				
Agriculture	16.9	16.6	16.3	19.3
Fish processing/fisheries	14.7	15.7	2.7	16.7
Construction	16.7	16.2	11.4	26.1
Services	18.2	19.8	11.8	10.1
Domestic Helpers	9.9	9.5	19.2	5.3
Others	23.6	22.2	38.6	22.5
Total	100.0	100.0	100.0	100.0

Source: Ministry of Labor, Report of Labor Situations, 2010.

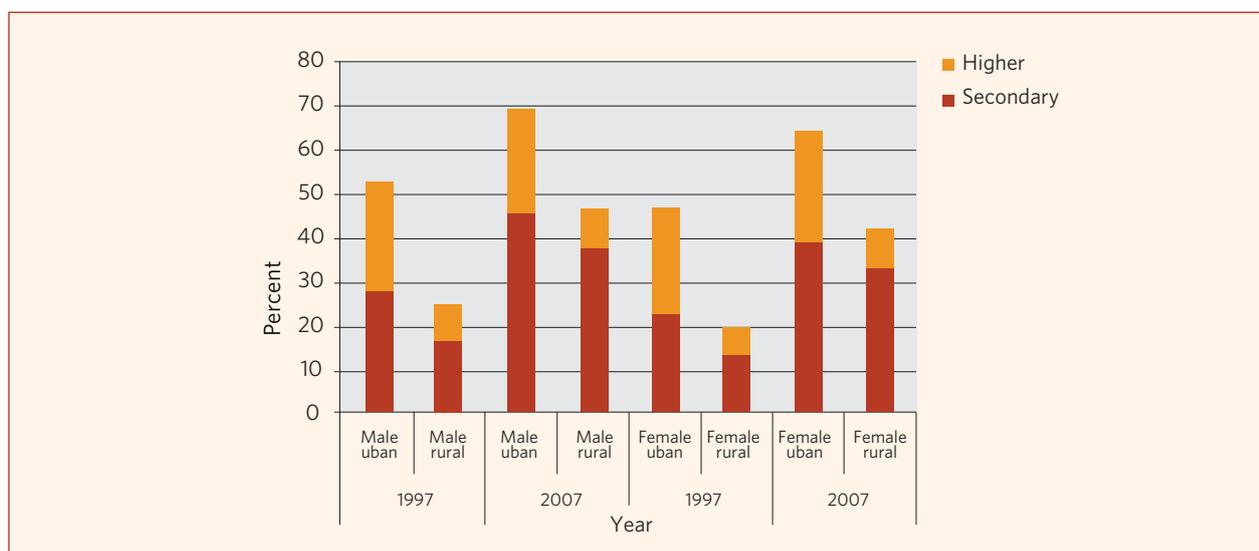
Table 6.6 shows that cross-border migrant workers are concentrated in agriculture and fisheries jobs (about 32%) followed by construction and services (about 18% each), domestic servants (10%), and a large “others” group (24%). The largest proportion of migrant workers from Myanmar are in agriculture and fisheries, followed by the service sector, while domestic servants are the largest sector for migrants from Lao PDR. The construction sector is particularly important for migrants from Cambodia (MOL, 2010). Thailand’s fisheries/seafood processing sector is dominated by migrants. Many migrant workers supply labor for large-scale agricultural production (mainly rubber) in the South, and for animal husbandry and crop production in the Northeast (Sciortino and Punpuing, 2009).

Income disparity

Though a great deal of concern has been raised about inequality in Thailand in recent years, the United Nations ranks Thailand’s Gini coefficient in the mid-range for countries in the region. In 2010 Thailand had a Gini coefficient of 42.5, compared with Vietnam at 37.8, the Philippines at 44.0 and Malaysia at 51.6 (United Nations, 2010). Figure 6.12 shows differences in average household income by urban status in recent years.⁴

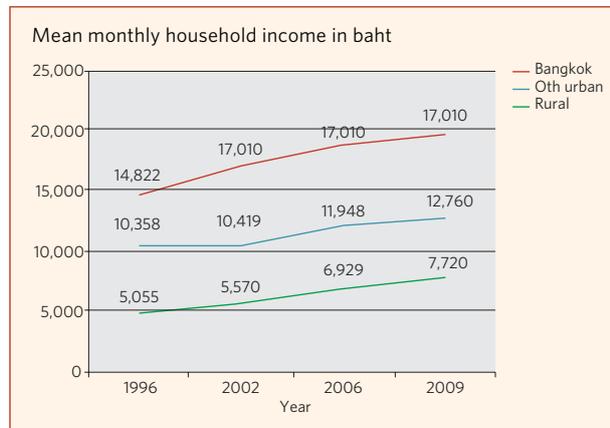
⁴ Household income is adjusted for inflation and by the OECD modified equivalence scale, which gives a more accurate measure for comparative purposes than per capita income. The OECD equivalence scale assigns a weight of 1.0 for the head of household, 0.5 for each additional adult and 0.3 for each child, whereas per capita income measures simply divide household income by the number of people in the household (OECD, n.d.).

FIGURE 6.11 EDUCATIONAL ATTAINMENT BY SEX FOR RURAL AND URBAN AREAS, 1997 AND 2007 (AGE STANDARDIZED)



Sources: National Statistical Office, Labor Force Survey, 1997 and 2007.

FIGURE 6.12 MEAN MONTHLY HOUSEHOLD INCOME ADJUSTED BY EQUIVALENCE SCALES FOR BANGKOK, OTHER URBAN AND RURAL HOUSEHOLDS, 1996-2009 (IN 2007 BAHT)¹

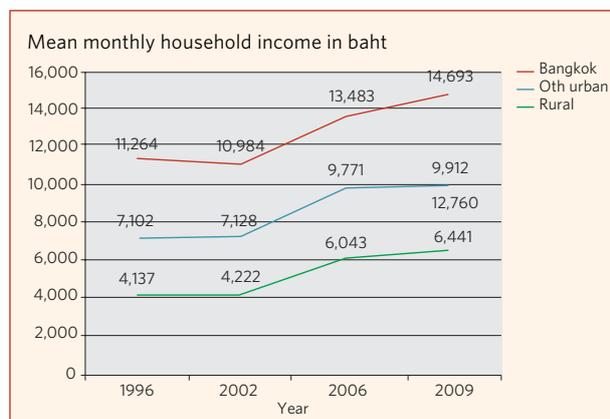


Sources: National Statistical Office, Household Socio-economic Survey, 1996, 2002, 2006 and 2009.

The gap between rural households and those in Bangkok and other urban areas is persistent and has narrowed only slightly in recent years, while the gap between other urban areas and Bangkok has widened. Rural households had 39% of the income of Bangkok households, with households in other urban areas at 65% of Bangkok income.

Data on expenditures from household economic surveys tends to be more accurate than that of income, which is often unreported or difficult to calculate. While expenditures are also much lower in rural areas than in Bangkok (Figure 6.13), the gap has increased in recent years. This finding indicates that inequality between rural and urban areas may be increasing.

FIGURE 6.13 MEAN MONTHLY HOUSEHOLD EXPENDITURES ADJUSTED BY EQUIVALENCE SCALES FOR BANGKOK, OTHER URBAN AND RURAL HOUSEHOLDS, 1996-2009 (IN 2007 BAHT)¹



Sources: National Statistical Office, Household Socio-economic Survey, 1996, 2002, 2006 and 2009.

Poverty head count ratios are another way at looking at relative well-being. As seen in Figure 6.14, while Thailand has successfully lowered poverty rates in the past 10-15 years, the gap between rural and urban areas and Bangkok is still large. Fully 10% of rural households were classified as living in poverty in 2009, while in Bangkok the percentage was less than 1%.

Impact of Migration and Urbanization on the Environment

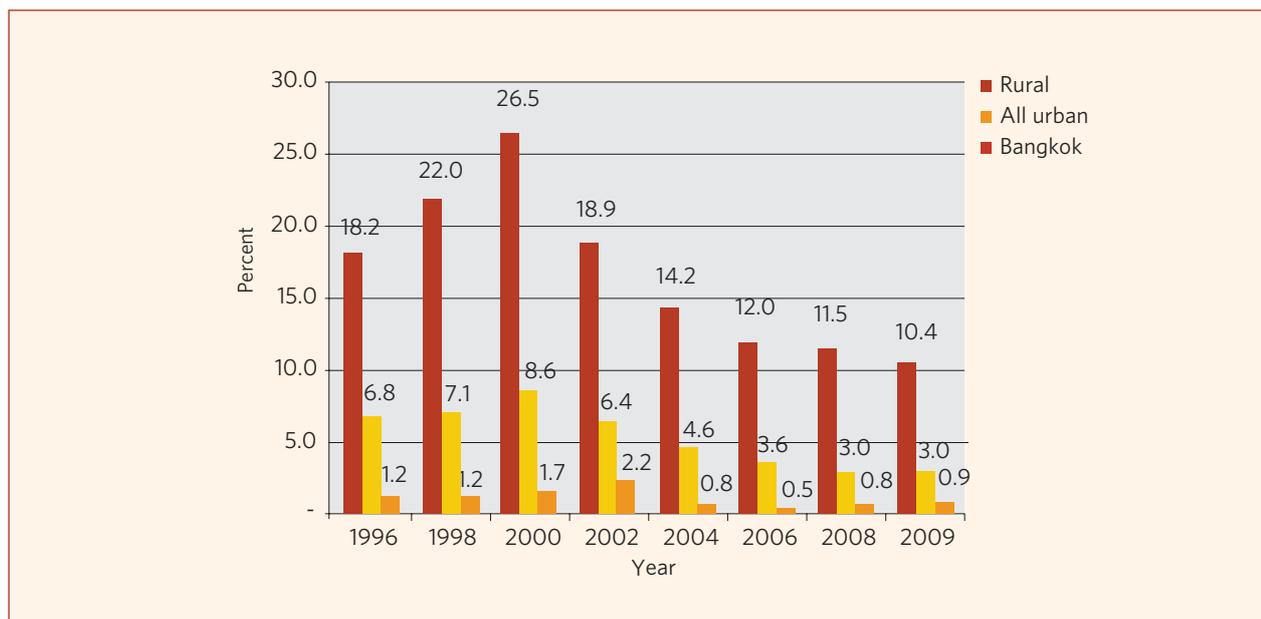
Two long-term settlement patterns have had an acute effect on Thailand's environment. The first is the migration to and appropriation of previously uncultivated land, which was the most common reason for rural-rural migration before the 1970s. Migration has been found to be closely related to land cover in the Northeast (Entwisle et al., 1998; Walsh et al., 1999). The second dominant settlement pattern with environmental consequences is urbanization, and specifically when urban growth incorporates previously productive land (Punpuing, 1999).

Environmental change can be both a cause and an effect of migration. Land productivity decline has been one of the major factors driving the migration of subsistence farmers to slums of major cities. Climate change can cause desertification, changes in water availability including both drought and flooding, and other natural disasters (Gleditsch et al., 2007; Richter et al., 2009). Environmental refugees are driven to migrate by these factors, which may be catastrophic and/or occur gradually over a long period of time. The resulting migration may be seen as voluntary (when income declines in relation to opportunities elsewhere) or involuntary (when land becomes uninhabitable due to environmental accidents or national disasters, or is expropriated for environmental reasons) (Hunter, 2004; Vine, 2005)

On the other hand, migrants can have an impact on the environment in both the origin and destination communities. In destination communities, relative poverty among migrants and the lack of ties to the community work against migrants' motivation to preserve resources (Cassels, 2006). In-migration to frontier areas affects land-use and land-cover change (LUCC) through deforestation (de Sherbinin

¹ Inflation rates from Bank of Thailand accessed at <http://www2.bot.or.th/statistics/ReportPage.aspx?reportID=409&language=eng>

FIGURE 6.14 POVERTY HEAD COUNT RATIO, 1996-2009



Sources: National Statistical Office, Household Socio-economic Survey, 1996, 2002, 2006 and 2009. Calculated by the National Economic and Social Development Board, Thailand

Note: Proportion of the poor is calculated by dividing population with consumption expenditures lower than poverty line by total population

et al., 2007). It is estimated that half of the forest cover in the Northeast was lost between 1973 and 1982 (Suhrke, 1993). Agricultural intensification and the drought cycle can be directly tied to migration flows to Bangkok during this period.

Commercial logging has also been a major factor in deforestation in Thailand. The lack of new land and the instability of the water supply have also led to a large number of landless people, who may migrate for daily labor or industrial jobs (Yoddumnern-Attig et al., 2004). Besides an increase in landlessness, the Nang Rong longitudinal study also found a decrease in the size of land holdings from 1984-1994, and that both were associated with migration (Rattanawarang & Punpuing, 2003).

Other recent studies have examined the impact of urbanization, and particularly Bangkok, on specific environmental factors and quality of life. Chamrathirong et al. (1999) relate the high density and high levels of consumption in Bangkok to air and water pollution and to hazardous waste. Air pollution grew rapidly in the early 1990s; about 60-70% of this is due to increased vehicular traffic and the rest to domestic and industrial use, including the shift to more modern fossil fuels. Increased land prices in central Bangkok contributed to the expansion to areas in peripheral provinces,

increasing the need for workers to commute and thus contributing to air pollution. It also pushed slum dwellers and the original residents of the area surrounding Bangkok to more densely populated and polluted areas. However, an increasing number of migrants go to these peripheral areas as well, since they have become industrial centers (Storey, 2005). No differences were found in gasoline consumption between migrants and non-migrants however. Pungsomlee and Ross (1992) examined the link between modernization and urbanization, and how the benefits of modernization go mainly to elite groups, with the problems affecting low income people thus increasing inequality. Storey (2005) points out that formal institutions tend to prioritize economic growth over addressing environmental problems in Thailand; for this reason, the government has been slow to move on environmental measures.

Discussion and Conclusions

Thailand's high rates of internal migration are a long-term pattern, driven by factors such as the seasonal cycle of rice cultivation, population pressure and industrialization. Longer-term migration is also common, and urban growth has

accompanied industrialization and the expansion of other nonagricultural sectors such as construction and services. But evidence also indicates that migration is a common response to economic shocks. Both the economic crisis of the 1990s and the more recent downturn in 2008 appear to have resulted in higher rates of return migration to rural areas. The fact that migrants are concentrated in production and labor jobs makes them particularly vulnerable to contractions in manufacturing and construction during economic hard times. As the proportion working in agriculture declines, it is likely that the ability of rural households to absorb these return migrants will also diminish. Hence the economic equilibrium that households achieve through migration—with remittances raising household income for those without land holdings or other assets—is in question.

At the same time, census and survey data from the past 15 years show that rates of internal migration are steadily declining. Further analysis shows that this decline is chiefly attributable to fewer moves among the younger working age groups. While seasonal and short-term moves are likely to be underestimated in this data, it would appear that these cohorts are making fewer moves than they did in the past. These same cohorts also are the first to benefit from compulsory secondary education, and thus may be finding more permanent jobs than the older age groups.

The balance of international migration, much of it in the form of undocumented migration, is adding to Thailand's population. The 2.8 million foreigners working and living in Thailand, mentioned above, are certainly not matched in numbers by Thais working and living abroad. Though a proportion of the foreigners working in Thailand are highly skilled, the majority are not, and international migration on balance can be seen as "de-skilling" Thailand's labour force.

To some extent, cross-border migrants are seen as taking the place of Thai workers in low-skilled jobs in the agricultural sector and in other "3D" jobs. A recent study investigates whether immigration, by supplying replacement labor, could alleviate losses to the workforce due to aging. The study uses various modeling techniques to investigate the issue. It estimates that one migrant worker is equivalent to 0.58 Thai workers in terms of productivity. Modeling also reveals that immigration cannot fully alleviate losses to GDP from population aging, due to the lower productivity of immigrant labor and consequent dilution of capital (Potipiti, 2010).

Urbanization patterns in Thailand also present a changing landscape. Bangkok's growth has slowed, but largely due to expansion to the more rapidly growing peripheral provinces forming Bangkok's mega-urban region. At the same time, other urban centers have higher growth rates, particularly in the South and Northeast. While decentralization of manufacturing and other jobs has positive implications, this growth has largely taken place without any regional or national planning strategies.

Moreover, analysis of socioeconomic characteristics shows that for the most part urban-rural differentials are declining only slightly. While the gap in secondary education between rural and urban residents has narrowed, little change has been seen in higher education. At the same time, there remains a sharp gap in income, expenditures and the poverty rate between rural and urban areas, implying continued inequality.

Demographic trends will continue to drive the forces affecting migration. This is particularly the case for population aging in Thailand, resulting in a lower proportion economically active and a higher dependency ratio. Dependency is often tied to those outside the household, and thus economic changes and urbanization are particularly critical. Thailand's strategic planning should include consideration of these dynamic demographic forces that both drive and respond to economic change.



Policy Implications of Thailand's Population Trends

This report has documented the trends in Thailand's population evolution and analyzed some implications and policy issues. This chapter will pull together the different threads of the argument and focus on the policy implications of Thailand's demographic trends. As noted in Chapter 1, Thailand has some unique features, and this is likely to mean that policies adopted in other countries of the region or other countries of the world with somewhat similar characteristics cannot be adopted unchanged in Thailand. Unique features may require unique policies. However, at the same time, lessons can undoubtedly be learned from other countries.

Population-responsive and population-influencing policies

The main emphasis throughout this report has been on understanding the demographic changes that have been taking place in Thailand, as well as likely trends in demographic variables into the future, and their implications for all aspects of human life and wellbeing in Thailand. Policies that take into account the implications of such demographic trends and attempt to strengthen the positive outcomes of these changes and to counter any deleterious consequences can be categorized as "population-responsive" policies. It can be argued that almost everything is affected by demographic trends, and viewed in this light, there is a danger that a study designed to address policy issues resulting from demographic trends will turn into some kind of general development plan. This is to be avoided. It is not appropriate to seek out every aspect of development that can arguably be related to demographic trends. Rather, we need to focus

on key issues in which demographic trends play a central, or at least an important role.

Policies that seek to modify the projected demographic changes in the interests of avoiding outcomes that are judged to be unfortunate can be categorized as "population-influencing". Over a long period in Thailand, the main plank of population policy – the aim of reducing fertility rates judged to be too high – was a "population-influencing" policy. As noted in Chapter 1, this aim was dropped in the Eighth Five Year Plan. The last two Five-year Plans (the Ninth and Tenth Plans, covering the periods 2002-2006 and 2007-2011 respectively) have specifically mentioned the need to maintain fertility at around replacement level. But the context has now changed. When these Plans were prepared, fertility was already below replacement, but not dramatically so. We know now that fertility has reached really low levels. Thus the situation has been evolving, and the key issue for Thailand at the current time is whether to introduce pro-natalist measures in the interest of avoiding excessively rapid ageing, decline in the size of the workforce and eventual population decline.

EVOLUTION OF THAILAND'S POPULATION POLICIES

Population policies in Thailand during the period since World War 2 can be grouped into 3 distinct periods: the period of pro-natalist policy (up to the 1st National Economic and Social Development Plan (NESDP), the period of anti-natalist policy (1st – 9th NESDP), and the period from the 10th NESDP to the present. The Thai government has supported quite distinct policies during each of these periods.

World War 2 to 1st National Plan: Pro-natalist policy

The first time that Thailand can be said to have had a population policy was in the period of Field Marshall Plaek Pibulsongkram's government. Plaek Pibulsongkram was Thailand's Prime Minister in the periods 1938 to 1944 and 1948 to 1957. His nationalist policy included the belief that it was necessary to have a large population to build a strong nation. Accordingly, he supported a healthy women policy on the conviction that only healthy women could give birth to healthy newborns. The following actions supported this policy (Podjanalawan, 2009):

- A midwifery school was established in the Vachira Hospital to improve maternal and child care in 1939. Women aged 19 to 30 who had graduated from the highest level of primary school (Pratom 4) could apply for a 1-year course with scholarship.
- In 1942, the Ministry of Public Health (MOPH) was established, integrating medical and public health services formerly conducted by many ministries. Maternal and child health was covered by one section of the MOPH.
- The Government intervened in marriage by announcing "a culture of husband and wife." They emphasized the importance of family for the strength of the nation. Wanting to make marriage affordable for the grooms, they asked women to limit the size of their bride price requested when arranging a wedding.
- A marriage promotion organization was established in the MOPH. Men and women were advised to have medical check-ups before marrying.
- Government took the role of match maker. The office of marriage information was established.
- A new law "tax to single individual" was enacted in 1944. Besides the income tax, single males age 25 and above had to pay additional tax, 10% of their income.
- The government recommended people to marry a healthy man or woman. People with genetic disease were discouraged from marrying. The government tried to enact a law that forced a couple to have a medical check-up before receiving a license to marry.
- The government provided more incentives to newly-wed couples, such as
 - they could get a loan, 50% above the level of their saving deposit.
 - their first child could get free education if the government arranged their wedding ceremony.
 - they could see free movies at Saha-cinema and its subsidiary theaters for 30 days after the date of their marriage registration.
 - pregnant women could get discount for public transport.
- Contraception was prohibited. Only prescription by a physician was allowed.
- Government recommended a suitable age of marriage: 20-30 for males and 18-25 for females. The marriage guideline was distributed in 1943.

The impact of the policy is hard to judge. Thailand's population increased from 21 million to 28 million in the 10 years between 1950 and 1960, with an average growth rate of 3.4 per cent per annum. This was the most rapid growth in Thailand's history. A major factor was the sharp decline in mortality rates over this period, but the pro-natalist policies may well have played a role.

The 1st – 9th National plans: Control population growth

During this period, the Thai government reversed its policy from pro-natalist to anti-natalist. The large cohorts born during the pro-natalist period entered the fertile age group and were ready to reproduce. This led to very high population growth during the 1st (1961-1966) and 2nd (1967-1971) NESDP—around 3%, causing high social spending. In 1963, the government started discussing the problem caused by high population growth (Robinson and Rachapetayakom, 1993; Rosenfield and Min, 2007: 223-7). The population policy was officially announced in 1970. The Planned Parenthood Association of Thailand (PPAT), was established under the patronage of H.R.H. the Princess Mother. It was the first non-profit organization aimed to promote family planning aggressively.

The government targeted population growth at 2.5% by the end of the 3rd NESDP (1972-1976). In 1976, the population growth was 2.7% (Table 7.1). The government continued to target declines in rate of population growth in the NESDPs for more than two decades.

Although the achievement did not quite reach the target in any of these plans, this non-achievement should definitely not be deemed a failure. The non-achievement resulted, not from poor performance, but from the setting of somewhat unrealistic targets. What happened over the period covered by the 3rd to 6th five-year plans was one of the most rapid declines in fertility in the history of the world – a decline from a TFR of 5.5 in 1970 to 2.2

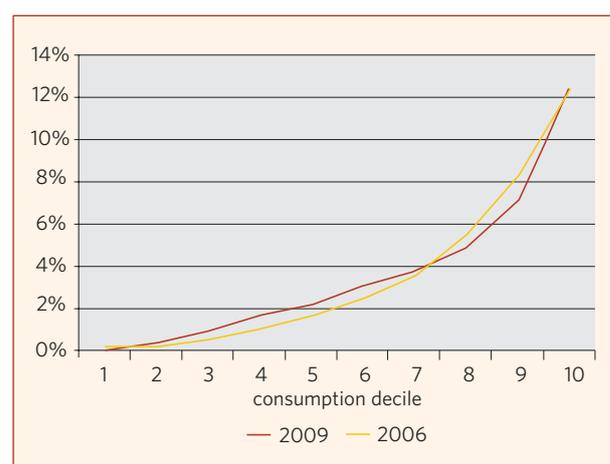
TABLE 7.1 TARGETED AND ACHIEVED POPULATION GROWTH RATE

NESDP	Target (%)	Achieved (%)
3 rd (1972-1976)	2.5	2.7
4 th (1977-1981)	2.1	2.2
5 th (1982-1986)	1.5	1.7
6 th (1987-1991)	1.3	1.4
7 th (1992-1996)	1.2	1.2

in just 20 years. The reason the population growth targets were not quite reached was that they were over-ambitious, and overlooked the effect of population momentum in holding back the declines in population growth rates even when fertility decline is very sharp. For example, it was extremely ambitious to think that the population growth rate could be reduced from 2.7 per cent per annum to 1.5 per cent per annum in just ten years (1976 to 1986), given the increase in the proportion of the population in the reproductive-age groups that would inevitably result from sharp fertility decline.

In the 1970s, private and public sectors worked together in family planning. Everyone knew about the motto “Having many children leads to poverty”, which was widely posted. The Ministry of Public Health ensured that family planning services were widely available and it took quite radical steps to ensure that women needing contraceptive protection were able to obtain it, including allowing midwife insertion of IUDs (Rosenfield et al., 1982). In 1979, Mechai Viravaidya, who was nicknamed Mr. Condom, emphasized that having many children did not only lead to poverty but also adversely affected the health of father, mother, and newborn (Veravaidya, 1979). Mechai’s private sector activities were an effective complement to the efforts of the Ministry of Public Health.

FIGURE 7.1 PERCENTAGE OF HOUSEHOLDS HAVING MEMBERS ATTENDING POST-SECONDARY EDUCATION



Source: National Statistical Office, Socio-Economic Survey (2006 and 2009).

We cannot measure precisely which factors among trends in socio-economic development, declining mortality and the effect of family planning programs have a stronger effect on the reduction of population growth. In the case of Thailand, it seems clear that these factors were all working together to reduce population growth rates.

By the time of the 7th plan, for Thailand as a whole, the number of children per family was steadily decreasing, and the aim of reducing fertility was targeted more to controlling population growth in some regions, such as northeast Thailand and the mountainous areas, where the birth rate remained relatively high, causing imbalances in allocation of resources to education and health.

As mentioned in Chapter 1, the 8th (1997-2001) and 9th (2002-2006) NESDP set no targets for reducing the population growth rate, but aimed at promoting an appropriate family size among Thai people, not too small and not too large. The 9th Plan did mention that this would ensure that fertility would be maintained around the replacement rate. In some regions, the fertility rate was considered too low, but no policies were proposed to counter this. Population growth at the end of 2005 was around 1.2% per annum.

National Plan 10th – present: Issues of Aging Population

The 10th plan expresses concern about aging population, both in Thailand and in developed countries, and notes that aging population in developed countries might cause a tremendous labour movement from developing to developed countries where job opportunities are better. Such movements could cause more labour shortage in Thailand. However, present policies at the ministry level are responsive policies, basically to cope with changing population structure. No attention is paid to raising the birth rate, but there is some emphasis on controlling the deaths of newborns and mothers. Policies are shown in Table 7.2.

The key concerns of the next development plan are economic growth, expenditures on healthcare and social welfare, low global economic growth and high public debt. One important challenge for the next development plan is the declining growth of labour force from 0.98% per annum in 2005-2009 to 0.45% per annum in 2010-2014. The labour force will begin to decline in 2018, but its share in the total population will begin to decline almost immediately.

TABLE 7.2 POPULATION-RESPONSIVE SOCIAL AND ECONOMIC DEVELOPMENT POLICY IN THE 10TH PLAN

Institution	Responsive policy
Ministry of Finance	Encourage people to save for retirement
Ministry of Labour	No long-term policy on migrant workers. Plan to promote part-time or temporary employment among elderly. Plan to improve labor productivity. Study retirement age extension.
Ministry of Public Health	Promote family planning Improve maternal and child care. Monitor reproductive health and fertility indices. Prepare long term care for elderly.
Local government	Cooperate with private sector to build community child care center. Extend social assistance for elderly. Promote social activities among elderly. Encourage people, public, and private sectors to participate in social welfare administration.
Ministry of Social Development and Human Security	Improve awareness of aging society. Protect social rights of elderly.

Note: These policies are not only responsive to population trends, but also to other social and economic changes in Thailand.

TABLE 7.3 FERTILITY ASSUMPTIONS (TFR) UNDERLYING THE UNITED NATIONS POPULATION PROJECTIONS

	2005-2010	2010-15	2015-20	2020-25	2025-30
High Projection	1.81	2.10	2.25	2.35	2.35
Medium projection	1.81	1.85	1.85	1.85	1.85
Low projection	1.81	1.60	1.45	1.35	1.35

Source: UN World Population Prospects, 2008

TABLE 7.4 EFFECT OF ALTERNATIVE FERTILITY ASSUMPTIONS ON MEDIUM-TERM GROWTH AND STRUCTURAL CHANGE IN THAILAND'S POPULATION

	2010	2015	2020	2025	2030
% aged 0-14					
<i>High projection</i>	21.5	21.4	21.9	22.4	22.1
<i>Medium projection</i>	21.5	20.7	20.1	19.3	18.5
<i>Low projection</i>	21.5	20.0	18.2	16.0	14.7
% aged 15-64					
<i>High projection</i>	70.8	69.9	67.7	65.2	63.4
<i>Medium projection</i>	70.8	69.8	69.3	67.8	66.2
<i>Low projection</i>	70.8	71.1	70.7	70.5	69.1

Source: UN World Population Prospects, 2008

RESPONDING TO CURRENT AND PROJECTED DEMOGRAPHIC TRENDS

Population growth and age structure

Population growth in Thailand is now very slow, and is projected to cease altogether within another decade or two. Foreseeable changes in fertility and mortality will make little differences to the age structure trends projected in the United Nations population projections. The fertility trends assumed in the different United Nations projections are shown in Table 7.3. As shown in Table 7.4, if the fertility trends of the high or low projection are followed, rather than those of the medium projection, the effect on age structure will be limited over the coming decade 2010-2020 (for example, % aged

0-14 would vary only between 18.2% and 21.9% and the percent in the working ages would vary only between 67.7% and 70.7%). Over the decade after that, the effects of different fertility assumptions on age structure would become greater, but because of offsetting effects of increased aged population and decreased child population, the variation in the share of the population in the working ages (between 63.4% and 69.1%) would not be very large.

When the fertility assumptions underlying the UN's projections for Thailand are examined (see Table 7.5) the high projection appears highly unlikely to be followed. And in view of the most recent estimates of Thailand's fertility reported in Chapter 2, the low projection appears more likely to be followed than the medium projection, given the evidence that TFR is already well below the figure assumed by the medium projection for the 2005-2010 period, which in the medium projection is projected to

continue unchanged over the next two decades. Therefore, in comparing the future growth of population, we will ignore the UN's high projection. When we compare the growth of population according to the medium and low projections, we see that in both projections, numbers in the labour force age groups will begin to decline in the early 2020s. However, in both cases, the younger segment of the labour force ages—those aged 15-29 – was already beginning to decline before 2010 (see Chapter 1, Table 1.5).

Ageing and its implications

Demographic trends as well as socio-economic factors have an important effect on the living arrangement of older persons, such as a decline in co-residence with an adult child among persons aged 60 and older. The declining co-residence is expected to continue as we expect that future elderly will be better educated, and likely in better health. Many of them will be covered by some form of retirement benefit. Any form of private or public institutions that can assist the elderly to live independently and safely should be fostered.

Children have been an important safety net for aging parents. Chapter 3 shows that filial material support has only modestly declined. Financial support does not require physical proximity and the size of monetary contribution increases—and could continue to increase in future—with the better employment opportunities of adult children. However, planning needs to take into account the possibility that in the future, filial material support may diminish due to the reduction in family size of the future elderly, and the clear evidence that the proportion of elderly who are childless will increase. It is important that the expansion of the retirement pension among insured workers under the Social Security system and savers under the upcoming National Saving Scheme is designed to counterbalance this likely loss of support.¹ In the meantime, it is important that the modest safety net provided by the Bt.500 government welfare allowance for all elderly persons be continued. Bearing in mind that the proportion of elderly in the population will continue to increase, each

working individual should prepare enough saving to supplement the government welfare allowance as it is hard for the government to increase such allowance.

Material well-being of the elderly could be promoted through improving the health of older persons to allow them to work longer. This needs to be linked with an extension of the retirement age from 60 to 65 or a new employment arrangement for elderly to work part-time. According to the 2007 Surveys of Older Persons in Thailand, about 70 percent of persons aged 60 and above are not in the labour force. The main reason (stated by 79 percent) is that those elderly think that they are too old to work. If job opportunities are open to them, some proportion of these elderly may want to work. Only 7 percent of out-of-labour-force elderly are unemployable due to sickness or disability.

As noted in Chapter 3, the government should encourage those who will later be entering the elderly age groups to make specific plans for their old age as early as possible through both formal and informal educational channels. It should also promote realistic expectations regarding how much financial support can be expected from the various measures and programs that it is establishing. Given limited national financial resources and rapid growth in the number of older persons, a substantial degree of self-dependency and positive life style practices need to be encouraged. At the same time, the government should recognize its responsibility to provide assistance with respect to the needs that individuals, their families, and communities cannot adequately meet by themselves. Given limited government resources, efforts will likely need to be targeted to those groups of elderly with greater need, such as the poor, the oldest old, or the disabled rather than to all elderly equally.

Long term care for severe disability or serious chronic illness presents the greatest challenge in the face of smaller family size, the greater dispersion of adult children, and increased proportion of elderly with no children. Government could be involved by promoting both family and non-family means. In terms of family means, government could promote 'elder care leave policies'. This should be done cautiously to avoid abuse. It must be made clear who will bear the cost and how to manage abuse. In terms of non-family means, government

¹ The National Saving Scheme is a new cabinet-approved scheme, aiming to encourage the working-age population to save for their retirement. Government promises to make a contribution if members of the fund save until they reach their retirement age.

TABLE 7.5 FUTURE GROWTH OF THAILAND'S POPULATION ACCORDING TO UN MEDIUM AND LOW PROJECTIONS

MEDIUM PROJECTION	2010	2015	2020	2025	2030	2035	2040
Population							
Aged 0-14	14,629	14,485	14,321	14,027	13,651	13,327	13,078
Aged 15-64	48,259	49,311	49,528	49,207	48,602	47,847	47,103
Aged 65+	5,251	6,143	7,594	9,394	11,209	12,736	13,823
Total	68,139	69,939	71,443	72,628	73,462	73,910	74,004
% growth over previous 5 years							
Aged 0-14	-3.3	-1.0	-1.1	-2.1	-2.7	-2.4	-1.9
Aged 15-64	4.6	2.2	0.4	-0.4	-1.2	-1.6	-1.6
Aged 65+	12.1	17.0	23.6	23.7	19.3	13.6	8.5
Total	3.3	2.6	2.2	1.7	1.1	0.6	0.1
LOW PROJECTION							
Population							
Aged 0-14	14,629	13,834	12,661	11,140	10,203	9,634	9,227
Aged 15-64	48,259	49,311	49,528	49,207	47,956	46,197	44,237
Aged 65+	5,251	6,143	7,594	9,494	11,209	12,736	13,823
Total	68,139	69,288	69,782	69,741	69,369	68,568	67,287
% growth over previous 5 years							
Aged 0-14	-3.3	-5.4	-8.5	-12.0	-8.4	-5.6	-4.2
Aged 15-64	4.6	2.2	0.4	-0.6	-2.5	-3.7	-4.2
Aged 65+	12.1	17.0	23.6	23.7	19.3	13.6	8.5
Total	3.3	1.7	0.7	-0.1	-0.5	-1.2	-1.9

Source: UN World Population Prospects, 2008

could promote and regulate private agencies that offer full-time help with eldercare. The demand for eldercare will increase with the number of elderly who have fewer or no children or who have never been married. Government intervention in monitoring and regulating is needed to protect elderly who have saved in their working period to spend in their last life span.

The Thai government is clearly aware of the challenge posed by long term care arrangements

in the context of reduced availability of family assistance, and is actively experimenting with pilot programs to promote community based home care assistance through either paid or non-paid volunteers. This could prove to be an effective strategy to help meet the need for assistance with instrumental activities such as meal preparation, shopping and cleaning that are typically required only on a part time basis, but is unlikely to meet the need of those who suffer serious chronic illnesses, are bedridden or severely disabled. For

this group, expensive government assistance will be needed, and this highlights the need to keep the group as small in number as possible through preventive health, active ageing measures, health interventions that target treatable problems that underlie disability, and promoting assistive aids as well as modifications of physical environment that facilitate mobility.

Planning for health services

As emphasized in Chapter 4, a health systems perspective on the demographic and health transition points inevitably to the increasing share of the health care needs of the elderly in the overall health budget. It is in the first year and in the last years of a person's life that medical costs are highest. Given the steady decline in the proportion of infants, and the steady rise in the proportion of the elderly in Thailand's population, this rise in the share of elder care in the health budget is inevitable. Whether this will prove to be really burdensome to the government budget will depend partly on policies adopted.

The main losses of disability adjusted life years (DALY) among elderly men and women are the same: cancer, cardiovascular diseases and chronic respiratory diseases. Disorders of the sensory organs such as vision and hearing loss and neurological disorders such as dementia were also important among the elderly, reflecting the frequent development of degenerative conditions during the ageing process. Among the pre-elderly group, cancer and cardiovascular diseases were also the most important categories, but unintentional injuries, HIV/AIDS and mental disorders were more important in the DALY profile than for the elderly.

Chapter 4 stressed the need to keep the pre-elderly cohort healthy, minimizing exposure to key risk factors such as tobacco, excessive alcohol consumption, unsafe sex, high blood pressure and high body mass index among pre-elderly men and women. Tackling these issues requires a range of approaches, from legislation and effective law enforcement through to health promotion campaigns and better urban design conducive to an active lifestyle. More effective collaboration between government and civil society can assist in these efforts.

For the health care needs of the elderly, a clear strategy is needed. Public health interventions need to be oriented to reduction of primary risk exposures such as use of tobacco and excessive alcohol, improving diet and promoting physical activities. Skill in home healthcare provision needs to be developed in conjunction with effective interface between home, community and institutional based care for the elderly.

Thailand has always suffered from a shortage of health personnel in areas considered less attractive to work in, resulting in a ratio of doctors per 10,000 population in Bangkok that is 10 times higher than in the northeastern region. Planning for the health workforce is complicated by the rapid growth in the private hospital share in the healthcare market, resulting from rapid economic growth and government promotion of medical tourism, which drew doctors and nurses from rural public facilities to private facilities. The ratio of doctors who moved out from MOPH public facilities to new entrants increased from 22 per cent in 2001 to 80 per cent in 2008, and although an increase in financial incentives implemented in 2009 reduced this ratio to 63 per cent in 2009, continuing attention needs to be paid to measures to ensure a better balance between supply of medical personnel and needs for their services in different regions of the country.

Marriage trends in Thailand have greatly altered the composition of the population needing access to reproductive health services, including contraception. It was never appropriate to ignore the reproductive health needs of the unmarried reproductive-age population. But the urgency of modifying policies and programs to effectively serve the needs of this section of the population is highlighted by the steady rise in the share of this group in the reproductive-age population, as a result of delayed marriage. Sensitivities surrounding the provision of services to the unmarried need to be tackled head-on in the interests of the wellbeing of this section of the population, not least because of the continuing danger posed by the HIV/AIDS epidemic.

Planning for improving human capital

The shares of children aged 0-14 and working population aged 15-59 to total population in

Thailand reached their peaks at different times: children were 45 percent in 1965 (down to 21 per cent in 2010) and the working age proportion reached its maximum share of 71 percent in 2010. Chapter 5 has shown that the first demographic dividend, defined as the growth rate of the ratio between the effective number of producers and the effective number of consumers, has ended in 2010, and the age structure will gradually become less favourable to economic growth. Policies such as improving human capital and increasing capital accumulation are needed in the medium and long terms.

Human capital accumulation has a major role to play in increasing labour productivity and economic growth. What seems to be a major obstacle is the quality of education. Thailand has increased its spending on education, but lagged behind neighboring countries, e. g. Singapore, Malaysia and Indonesia, in terms of educational indicators. The quality of primary and secondary education differs widely between rural and urban areas and between well developed and less developed provinces. Thai teachers, particularly in remote areas, do not have good knowledge in languages, mathematics and science. All these issues should be remedied to improve the quality of the future workforce. The smaller workforce in the future needs to be upgraded into a high productivity workforce. This has implications for the education budget. Declining numbers of school-age children do not mean that the education budget can be cut; investment needed to raise the quality of education will require considerably higher expenditure per pupil.

Another obstacle to improving human capital is access to higher education. The education law improves access to secondary education. Households in all income levels have equal access to lower secondary education (albeit of different quality). However, opportunities to enter higher education are highly unequal as shown in Figure 7.1. (See page 117). Student grants for the poor and student loans for middle income households should be extended. This is expected to improve not only Thai human capital, but also income distribution.

Increasing physical capital accumulation is another policy option to attain economic growth in the future. Physical capital accumulation can lead to

permanent increase in capital deepening, and thus a higher capital per unit of labour. Consumption could be maintained even in the aging society. Therefore, government promotion of saving for retirement should be encouraged. Pensions under Pay-As-You-Go arrangements should be minimized.

Policies such as increasing the reliance on migrant workers to replace low skilled workers may be suitable only in the short term as they tend to have a negative effect on per capita income. Low skilled workers are more likely to work in the informal sector. In about 5-10 years, about 30 percent of these workers who are now aged over 50 will not be able to work as they will be 60 years old or more. If Thailand chooses to replace retiring low skilled workers with migrant workers, social expenditure will inevitably increase. This includes expenditure on education for migrants' children, healthcare, and other social concerns, e.g. discrimination, and law enforcement in the labour market. The trade-off of the cost and benefit of replacing low skilled Thai workers with migrant workers should be publicly evaluated.

Given that social expenditure will continue to increase in the future, the Thai government needs to improve its tax capacity. In the past 20 years, tax revenue has accounted for only 16-18 percent of GDP. About 55% of tax revenues are from indirect tax (value added tax, excise tax, import duties, and other sales tax) and another 45% are from direct tax. The personal income tax base is narrow, covering only one-fourth of the labour force. About 44% of individuals who file an income tax form have income below the taxable income level. The government could increase tax revenues by introducing property tax (on land and real estate), abolishing tax exemption for large firms that receive investment promotion from the Board of Investment, adjusting itemized deductions for personal income tax, and increasing marginal tax rates (Jitsuchon, 2010; Anuchitworawong, 2010; Chandoevmit, 2010).

Urbanization, migration and regional depopulation

Thailand's population distribution and growth needs to be carefully assessed. First of all, growth of population is slowing and only between one

TABLE 7.6 PERCENTAGE OF CHILDREN LIVING IN A HOUSEHOLD WITH THEIR PARENTS

Household has	2006	2007	2008	2009
Both father and mother	64.5%	63.0%	62.0%	61.9%
Father only	2.4%	2.3%	2.6%	3.1%
Mother only	13.7%	12.8%	13.6%	13.8%
Relatives, no parents	18.9%	21.7%	21.4%	21.0%
Non-relative, no parents	0.5%	0.3%	0.4%	0.3%
Total	100%	100%	100%	100%

Source: National Statistical Office, Socio-Economic Survey.

and a half million more (low projection) and 6 million more (medium projection) are expected to be added before population levels off. Given the currently relatively low levels of urbanization, the proportion urban can be expected to increase considerably. Planning to enhance the quality of life of this growing urban population is crucial.

Planning must take into account where the growing urban population will live. It is likely that the decline in the share of the Bangkok mega-urban region in the nation's urban population (observed over the 1990-2000 period – see Jones and Douglass 2008, Table 3.4) will continue. The implication is that smaller cities and towns will be growing rapidly. Planning for the physical, social and environmental wellbeing of these smaller cities and towns must be accorded high priority. At the same time, differential growth in the core and the fringes of the Bangkok metropolis will lead to complex planning issues.

It is likely that some regions will lose population, because rural depopulation will not be fully made up for by the growth of towns and cities in these regions. The consequences of such declines can be very traumatic for populations of these declining areas. For example, difficult decisions may need to be taken about closure of some schools, and busing of pupils to larger schools where a broader educational experience can be gained. Problems will be faced in maintaining infrastructure designed for a larger population.

The wellbeing of migrants also needs to be planned for, both domestic migrants such as those moving permanently or seasonally from rural areas, and international migrants from neighbouring countries – Myanmar, Lao PDR and Cambodia–most of whom also originate in rural areas.

Population changes and socio-economic factors may have an impact not only on co-residential patterns of the elderly, but also of children. Many working adults leave their hometown to work in the city or in remote provinces. These adults are mainly in the fertile age group. When they have their offspring, they find it difficult to combine work and child care. Many of their offspring end up living in a household where either father or mother is absent.

The Socio-Economic Surveys in 2006-2009 show consistently declining percentages of children living in a household in which both parents are present. In just 4 years, this percentage has fallen from 64.5% to 61.9%, but the percentage of children living in a household from which both parents are absent increased from 19.4% to 21.3% (Table 7.6). The surveys consistently show that children in the northeast have the lowest percentage (around 55%) and children in Bangkok have the highest (around 76%) that live in a household with both parents present. Migration is the main reason for such absence of both parents from the same household (Table 7.7). Separation is the second most important reason.

TABLE 7.7 REASONS THAT CHILDREN DO NOT LIVE WITH BOTH PARENTS IN THE SAME HOUSEHOLD IN 2009

Household with	Father and/or mother were death	Parents are separated	Father and/or mother works in other province	Father and/or mother work abroad	Children want to attend school	Other	Total
Father only	10%	64%	23%	1%	1%	2%	100%
Mother only	12%	36%	38%	10%	0%	4%	100%
Relative, no parents	6%	25%	61%	2%	2%	5%	100%
Non-relative, no parents	17%	28%	19%	9%	0%	27%	100%
Total	8%	32%	49%	5%	1%	5%	100%

Source: NSO, Socio-Economic Survey 2009

Children living in a household without parents are vulnerable.² It has been estimated that half of such children could have been with their parents in their working provinces if infrastructure such as childcare had been appropriately provided. Assistance to families to combine work and child raising is needed. At the same time, it must be recognized that it may not always be in the best interests of young children to move from rural areas where they are in grandparental care to an urban setting with migrant parents who may be in a disadvantaged situation compared with other urban dwellers.

POLICIES TO INFLUENCE DEMOGRAPHIC TRENDS

Mortality

It is universally agreed that countering illness and lowering mortality are desirable, and therefore the "population-influencing" policy of extending life is a non-controversial goal. From a policy point of view, all that remains to be decided (and this, of course, raises major issues) is the share of public resources that should be devoted to this aim, and to the further aim of extending healthy life, in competition

² The study by the Office of Welfare Promotion, Protection and Empowerment of Vulnerable Groups stated that these children are at risk of school drop out, aggressive behavior, drug addiction, under-age sexual relationship etc. [quoted by the Secretary-General of the Office of Education Council www.onec.go.th/cms/new_highlightview.php?ID=332]

with all the other desirable uses of public funds. We will not pursue that here; the policy issues of more effective utilization of resources for health in light of the projected changes in burden of disease etc. have already been dealt with above.

Fertility

Thailand's fertility rate is well below replacement level. It has been gradually declining, and shows no signs of leveling off. TFR is likely to fall below the level of 1.5 which many observers see as something of a "crisis point", for two reasons. First, fertility maintained for very long at this level or lower will lead to rapid ageing of the population and to a decline of each generation by about 30% compared to the preceding generation, leading eventually to a sharp contraction of population that is hard to reverse because of a negative "population momentum" – a built-in tendency for population to decline further, even if fertility increases, because of the increasingly smaller population in the reproductive-age groups. Secondly, once fertility falls below this level, there are few cases indeed when it has been raised again to replacement level. This is merely an empirical fact; there is no immutable logic to say that it cannot be done.

As noted in Chapter 1, most Asian countries have been very slow to reverse population policy once fertility falls below replacement level. Thailand is in exactly the same position as Japan, Singapore,

South Korea, and Taiwan before it. It has waited a decade and a half or more, after fertility sank below replacement level, to introduce specifically pro-natalist policies. We believe that now is the time for Thailand's government to take some specific actions to foster an increase in fertility.

If it is agreed that pro-natalist measures are appropriate at this stage, the issue is to find measures that will have a non-trivial impact, while avoiding deleterious effects. This is an important issue, because it is generally believed that policies in other East Asian countries do not appear to have had much effect.

The argument that not much can be done because policies in other East Asian countries have not had much effect needs careful assessment. We would argue that in fact, other East Asian countries have either not used the full armoury of possible policies (and this applies to all low-fertility Asian countries) and/or have introduced policies so recently that there has not been time to assess their impact. This certainly applies to South Korea and Taiwan. Therefore the possibility remains that well-reasoned and formulated policies can have an impact in raising fertility rates. The average desired family size in Thailand, along with other countries in the region, remains at two children. The fact that fertility is lower than this indicates that there are institutional or other obstacles to people's achieving their desired family sizes. Policy should be addressed to removing, as far as possible, these institutional obstacles.

Another important point needs to be made. Just as some anti-natalist policies in the past have been criticized for treating women as instruments of population policy rather than taking a holistic approach to population policy in the context of family policy, so too must pro-natalist policies be considered in the context of family policy designed to allow women and men the best possible choices about marrying, having children and combining work and child-rearing. The aim should be to formulate family policy that will widen the choices open to parents and potential parents, in ways that will foster higher fertility.

What specific aspects of Thailand's situation need to be borne in mind in considering family and fertility policy measures?

1. Importance of delayed marriage in the fertility decline. This has also been an important factor in the other low fertility countries of East Asia (Jones, 2007).
2. Whereas in other East Asian countries, one important element in the decline to ultra-low fertility was rising female labour force participation rates (LFPRs) and the dilemma women faced in trying to combine a career and child raising, LFPR in Thailand has always been high (see Table 7.8), and it has not changed much over the period when fertility rates in Thailand were falling. Thus, unlike the situation in other East Asian countries, the decline to sub-replacement fertility does not seem to have been related to increasing LFPRs. However, it **may** have been related to changing employment patterns among women—change in occupational structure, and a rising proportion of jobs requiring women to be away from the home. It is clear from Table 7.8 that the structure of employment for women in Thailand has changed drastically over the period since 1980. Agriculture's share has almost halved, the share of manufacturing has more than doubled and that of services has almost trebled. There has been a sharp rise in the proportion of women working in the formal sector. These trends are likely to have impacted on fertility decisions of Thai women and their partners.
3. In Thailand, unlike the other East Asian countries, relatively low levels of urbanization mean that raising fertility requires that not only urban women but also rural women raise their fertility levels. Policies in other East Asian countries, developed in an overwhelmingly urban context, may have limited relevance to this need. On the other hand, it should be noted that real levels of urbanization in Thailand are undoubtedly higher than the official statistics reveal. Over the period since 1980, when the share of agriculture in female employment almost halved, the proportion of population recorded as rural fell only from 73.2 per cent to 66.0 per cent. While urbanization and the movement out of agricultural employment are certainly not in a direct relationship, the very slight decline in % rural is surprising in this context.

The issue is therefore to find policy levers that will influence childbearing patterns in the particular

TABLE 7.8 THAILAND: CHANGING FEMALE LABOUR FORCE PARTICIPATION RATES (LFPR) AND EMPLOYMENT STRUCTURE, 1980-2010

	1980	1985	1990	1995	2000	2005	2010
Female LFPR							
Ages 40-64	84.4	82.1	84.4	81.1	77.9	78.9	78.3
Ages 20-39	80.4	76.0	78.5	73.6	72.8	75.0	76.3
All ages 20-64	83.0	80.0	82.3	78.1	75.7	77.1	77.3
% female employment in							
Agriculture	71.7	67.4	63.4	52.9	46.9	40.0	38.4
Manufacturing*	8.0	9.5	12.6	17.4	17.9	19.8	18.7
Trade	10.7	11.2	11.4	14.3	16.1	14.9	16.0
Services	9.5	11.9	12.6	15.4	19.0	25.2	26.9
% female employment in informal sector							
Agriculture	47.6	46.9	45.0	48.1	45.0	44.2	43.5
Non Agriculture	31.6	35.0	39.0	39.4	43.8	45.8	45.8
Total	34.7	37.7	40.2	40.7	44.0	45.6	45.5

*including construction, transportation, electricity, gas and water supply
Source: National Statistical Office, Labour force surveys

context of Thailand. As noted in the points above, the seemingly wide differences between the context in Thailand and the other low fertility countries of East Asia may not be as wide as they at first appear.

A hint as to policies that work might be sought by focusing on policies followed by Western countries that have managed to either raise fertility to near-replacement levels, or to maintain them at near-replacement levels (Neyer and Andersson, 2007; McDonald, 2002). Examples of the former are the Scandinavian countries and France; examples of the latter are the United States and Australia. This is a very diverse group of countries, and it is hard to find common elements in their policies that might have relevance for Thailand. For example, strong family welfare policies, long maternity leave, provision of childcare facilities and gender-balanced workplace policies have been important in Scandinavia; France has provided significant tax deductions and excellent and free

childcare facilities.³ In Australia, cash grants have also been involved, with the institution of a direct baby bonus payment to parents (A\$5,000).

As mentioned in Chapter 1, policies in Taiwan and South Korea are too recent to have had much impact on fertility, if they do indeed have an impact. As recently as October 26, 2010, the South Korean government announced a new five-year plan which goes well beyond the policies reviewed in Chapter 1. This plan for 75.8 trillion won represents a 79 per cent increase over the amount budgeted in the previous five-year plan (2005 to 2010). Paid maternity leave will be extended from the current three months up to one year, the fourth to twelfth month on 40 per cent of their monthly salary. Flexible working hours will be introduced for female employees with children, and companies

³ The French family minister, when asked to comment on why France has higher fertility than most European countries, answered "We spend the most money and we offer good childcare, it's as simple as that" (*New York Times*, Saturday November 6, 2010: "French difference lives: women lag in equality").

encouraged to set up day-care facilities on their premises. Pre-school education will be subsidized and a second child's education up to high school will be free (*Straits Times*, 9/11/2010: "Baby incentive fails to excite South Koreans").

For Thailand, it appears appropriate for the government to introduce a number of policy changes with a view to encouraging marriage and childbearing, in the context of general family policy. While these policies would need to be considered carefully for budgetary and other implications, and the experience of other countries with similar policies assessed before introducing them, the following set of policies would seem to be relevant:

Paid maternity leave

The new ILO convention stipulates that cash benefits during maternity leave be paid at the rate of at least two thirds of the woman's previous or insured earnings for a minimum period of 14 weeks. Currently, fewer than half the world's countries meet this standard (United Nations, 2010: 104). In Thailand, maternity leave is provided to employees for 90 days at 50% of previous earnings, from funds contributed by government, the employer and the employee. More generous maternity leave provisions should be planned for.

Paternity leave

This is a short period of leave taken by a father around the time of the birth of his child. The aim here is to assist men to play a more prominent part in parenting.

Flexible working hours

Flexible working hours are designed to assist parents to spend more time with family at times when this is needed, and to take childcare leave where necessary. In Thailand, flexible working hours are not a common feature of employment arrangements.

Eldercare

In Thailand's declining fertility situation, the growing elderly population will have fewer adult children to take care of them, as detailed in Chapter 3. Subsidies for frail parental nursing care, better community care for frail older persons and compassionate leave for eldercare may lessen the burden on working women and provide an environment more conducive to having children.

Improved subsidized childcare

Most countries aiming to raise birth rates include the expansion of subsidized childcare facilities as an important part of their package. Without access to such childcare, women tend to find it hard to return to full-time employment within a reasonable time period, thus affecting their job continuity and chance of promotion and career development. This deters them from having a child, or an additional child.

Tax incentives and/or baby bonus schemes

Singapore provides substantial baby bonus payments, in a scheme to which both government and parents contribute. Many countries allow tax deductions for children, sometimes quite substantial. The basic principle underlying such schemes is that the social contribution of those who produce and raise children justifies transfer payments to compensate them to some extent for the costs incurred in raising their children.

The desirable aim is to develop a package of policies that strengthens the coherence and wellbeing of the family as well as raising the fertility rate. This should be the goal of Thailand's family and fertility policies. At the same time, Thailand's reproductive health program should continue to receive support. Though raising the fertility rate is in the national interest, the wellbeing of those wishing to avoid unwanted births should remain an important goal, requiring provision of effective family planning advice and services. Moreover, pockets of high fertility remain, affecting the Hmong ethnic group, the Muslim population in the far South, and some groups of cross-border migrants. Reproductive

health programs targeted to their needs should continue to remain a priority.

In the 1960s, as planners in Thailand were contemplating adopting anti-natalist policies, a series of national population seminars was held, at which the issues were discussed in depth. The current situation, in which the adoption of pro-natalist policies needs to be contemplated, would seem to require a similar approach to studying the issues and mobilizing support for altered policies. Up to this point, there seems to have been very little discussion of this issue in Thai planning circles or among the general public.

Teenage pregnancy and unwanted pregnancy

As discussed in Chapter 2, sexual activity is increasing (and increasingly considered acceptable) among unmarried teenagers. There are substantial numbers of teenage pregnancies in Thailand, many of which are unwanted. Teenage pregnancies are of two kinds: those to young married teenagers, and those to unmarried teenagers. Most of those to unmarried teenagers can be considered unwanted, and many of those to young married teenagers are also unwanted, particularly in cases where the marriage was in response to an unexpected pregnancy.

Unwanted teenage pregnancy is a serious issue for Thailand, because of the greater risks to health of children and young mothers when very young women give birth, because there are issues about the quality of childrearing in the case of unwanted babies, and because of the high number of induced abortions performed on unmarried teenagers. The issue is also related to the increase in sexual activity among teenagers, and the risks of sexually related disease, including HIV. Possible policy interventions raise controversial issues, but the need for intervention cannot be ignored. The rising number of adolescent pregnancies requires attention to provision of appropriate sexuality education and counselling to teenagers with adequate attention to male responsibility, to enable them to deal effectively with their sexuality. Those unmarried teenagers (as well as those beyond the teenage years) who nevertheless choose to engage in sexual activity need access to effective

contraception. Consideration must also be given to access to safe abortion in accordance with the existing policies for those who do not wish to continue with an unplanned pregnancy. The practice of schools of expelling pregnant students should be discontinued, in the interests of giving teen mothers a better future.

Urbanization, migration and regional depopulation

Governments are frequently strongly disposed to influencing population distribution. Over a long period of time, in most Asian countries there was a generally negative attitude towards the growth of large cities, and frequently specific policies to restrict rural-urban migration and to encourage the growth of smaller cities and towns through incentives for location of industry, infrastructure development policies, etc. However, the arguments against the growth of large urban agglomerations did not always hold up to objective scrutiny. In a recent study, the World Bank (2009) has cautioned against efforts to maintain or increase populations in disadvantaged areas and to restrict the growth of large cities. The report argues that spatial concentration of economic activity rises with development, and that governments should not resist it by seeking to target investment and policy attention to the lagging areas of their countries. Instead they should adopt a neutral stance on the location of development activities, but make judicious investments in transport and communications which will enable disadvantaged areas to become connected to the centres of growth. "The challenge for government is to allow – even encourage – "unbalanced" economic growth, and yet to ensure inclusive development" (p. 20) through a "well-calibrated blend of institutions, infrastructure and interventions" (p. 6).

Montgomery (2009), in a review of the World Bank study, makes the point that the World Bank report may be overly optimistic about some of the benefits of spatial concentration. He argues that in poor countries, inadequate urban management and governance may prevent firms from reaping scale economies of metropolitan location when the public sector cannot provide them with adequate and reliable supplies of electricity and water, and when the urban transport system is ill-managed,

congested and chaotic. His point is well taken, but more in relation to the poorest countries than to East and Southeast Asian countries, including Thailand, that are experiencing rapid and sustained economic growth. It can be argued that the role of spatial concentrations of economic activity in fostering rapid national economic growth is well illustrated by countries such as South Korea, China, Malaysia, Thailand, and Indonesia. Bangkok's role as an engine of growth for the whole economy can be demonstrated.

From a policy perspective, Thailand's population distribution and growth needs to be carefully assessed. As noted earlier, the growth of Thailand's population is slowing and only between one and a half and five million more are expected to be added to the population before it levels off. Given relatively low levels of urbanization, the proportion urban can be expected to increase considerably, and the absolute size of the rural population will decline. It is tempting for government to intervene to influence where the growing urban population will live, and to seek to limit the decline of rural populations. However, explicit or implicit policies to control the growth of the Bangkok mega-urban region population should be avoided, and policies to foster the growth of smaller cities should be pursued only with care, and in a broader regional development context. The need is not to try to slow Bangkok's growth but rather to create conditions in which location of industry and other economic activities in Bangkok are not artificially fostered, but at the same time costly incentives for location in lagging regions are not relied on.

It is likely that some regions will lose population, because rural depopulation will not be fully made up for by the growth of towns and cities in these regions. Planning for population decline is important. Many other regions of the world have had to do this, notably Europe and East Asia, and the lessons from managing population decline in rural areas in these countries need to be carefully studied.

Thailand will continue to experience substantial seasonal, short-term and long-term migration, both internal and international. The very slow increase in Thailand's labour force, along with wide earnings differentials between Thailand and a number of its neighbouring countries, will almost guarantee

continuing international migration flows into Thailand, which could be further fuelled by political instability in any of these countries. Migrant workers provide much needed flexibility to the labour market. But policies must take account of the need to effectively deliver social services, especially education and health, to these mobile groups, and to reduce their mobility-related risks, including malnutrition, unsanitary living environment, poverty, illiteracy, vulnerability to sexual abuse and exploitation and occupational hazards (Sciortino and Punpuing, 2009). Administrative data systems need to be further refined to enable better recording of mobile populations and their needs, and better data on the roughly two million migrants from the Greater Mekong Sub-region who are living and working in Thailand (Ministry of Public Health of Thailand, 2010: 17-21).

Conclusions

Population trends in Thailand are evolving in ways that require new policy initiatives. There are many policy issues related both to adjusting to population trends and to nudging population trends in desired directions. Unlike some other Asian countries, Thailand's population size does not appear problematic in relation to its resource and environmental base. A slow increase or decrease from its current level should not raise major issues. Trends in age structure are leading to rapid ageing, but this can be accommodated if the right policy mix is found. What does need to be avoided, however, is a continued decline in fertility to ultra-low levels, which would raise more serious issues of longer-term population decline and very high proportions of elderly population.

The policy issues raised in this chapter require continuing attention. Good research is needed to guide policy. For example, research is needed on population scenarios that go beyond the three assumptions used in United Nations projections, incorporating a range of assumptions on migration. Part of the concern with future migration flows is to avoid a lowering of Thailand's human capital through a balance between inflow of lesser skilled and an outflow of the more skilled. The strength of research institutes within Thailand able to conduct policy relevant research into such matters needs to be enhanced.

Appendix A



Notes on projecting the educational level of the older population

The 2010 first-quarter Labour Force Survey conducted by The National Statistical Office contained two items concerning education that were recorded for all members of sampled households who were aged 15 or older. The first question provided information on whether or not the person was currently attending school and if so what grade. The second question asked for the highest grade of school completed. Among the 20-24 age group 19% were still attending school but this declines to only 3% of those in the age group 25-29 and 1% of those 30-34.

Note that by 2050, persons age 60 are age 20 in 2010. Thus in order to project the level of education of persons age 60 and above all the way to 2050, the completed education of persons aged 20 and over in 2010 needs to be determined. For the purpose of the projections, the completed educational attainment of persons aged 20 and over in 2010 among those who are no longer in

school is assumed to be the level indicated as the highest grade completed. For those who are still in school, the completed educational level is assumed to be the one that they are currently studying at. It is possible of course that some of these people will continue their education beyond the current level that they are studying. However, given that the highest category of educational attainment used for the projections is secondary education or beyond, attributing the current level as the highest completed level for those who were still in school will likely place them in the correct category even if they eventually continue beyond their current grade. The reason for this is that almost all who are currently still studying at age 20 or older will already be at the secondary level.

Note also for the purpose of the projections, no account is taken of differentials across educational levels with respect to mortality or migration into or out of the population. Thus the current level of attainment assessed as described above remains fixed for each cohort indefinitely into the future.

Appendix B

The 1st Demographic Dividend Estimation

Methods to estimate demographic dividends are comprehensively formalized in Mason (2005). Effective number of consumers (N) and effective number of producers (L) are defined as:

$$N(t) = \sum_a \alpha(a)P(a,t)$$

$$L(t) = \sum_a \gamma(a)P(a,t)$$

where α and γ are the age profiles of consumption and labor income, and $P(a,t)$ is the population. Using mathematic formation, output per effective consumer (Y/N) can be shown as the product between output per effective number of producers and the support ratio:

$$\frac{Y(t)}{N(t)} = \frac{Y(t)}{L(t)} \times \frac{L(t)}{N(t)}$$

In order to identify the period and length of the dividends, output per effective number of producers and the support ratio can be converted from levels to rates of growth by taking the natural log of both sides and taking the derivate with respect to time:

$$g\left(\frac{Y(t)}{N(t)}\right) = g\left(\frac{Y(t)}{L(t)}\right) + g\left(\frac{L(t)}{N(t)}\right)$$

The rate of growth in output per effective number of consumers is the sum of the rate of growth of productivity and the rate of growth of the support ratio. The first demographic dividend is defined as the rate of growth of the economic support ratio. The second demographic dividend, to be discussed below, functions though productivity growth by inducing the accumulation of capital.

The 2nd Demographic Dividend Estimation

Following Mason (2005), the wealth held by those aged 50 and over is used to measure the effect of demography on life-cycle wealth and the second demographic dividend. Demand for life-cycle wealth is computed as the difference between the present value of lifetime consumption and the present value of lifetime production for adults.

The present value of the future lifetime consumption of the cohort born in year $b = t-a$ or earlier is:

$$\bar{y}^l(t)PVL(< b, t) = \bar{y}^l(t) \sum_{x=0}^{a-t} e^{(g_y - r)x} L(\leq b, t+x),$$

where \bar{y}^l is the number of effective consumers born in year b or earlier who are alive in year $t+x$, g_c is the rate of growth of the per capita age profile of consumption, r is the interest rate, and L is consumption per effective consumer in year t .

Similar to consumption, if the per capita age profile of production is fixed and shifted upward at rate of g_y , the present value of the future lifetime production of the cohort born in year $b=t-a$ or earlier is:

$$W(\leq b, t) = \bar{c}(t)PVN(< b, t) - \bar{y}^l(t)PVL(< b, t).$$

where \bar{c} is the number of effective producers born in year b or earlier who are alive in year $t+x$, and c is production per effective producer in year t .

Consequently, without bequests, the lifetime budget constraint guarantees that wealth in year t of those born in year b or earlier equals

$$w(\leq b, t) = [\bar{c}(t) / \bar{y}^l(t)] PVC(\leq b, t) / L(t) - PVL(\leq b, t) / L(t),$$

With algebraic manipulation, the ratio of wealth to total labor income for those who were born in year b or earlier ($b=t-a$) is

$$\bar{c}(t) PVN(< b, t) = \bar{c}(t) \sum_{x=0}^{\omega-a} e^{(g_c-r)x} N(\leq b, t+x),$$

where $PVN(< b, t)$ is the present value of future lifetime consumption of all persons born in year b or earlier per effective producer in year t . $N(\leq b, t+x)$ is the present value of future lifetime production of all persons born in year b or earlier per effective producer in year t .

References

- Anuchitworawon, Chaiyasit, 2010, "Indirect Tax Incidence" in Economic reform for social justice, a research reported to Thailand Research Fund. (in Thai).
- Aphichat Chamrathirong, Pramote Prasartkul, Varachai Thongthai and Philip Guest. 1997. *National Contraceptive Prevalence Survey 1996*. Nakhonpathom: Institute for Population and Social Research, Mahidol University. (in Thai)
- Archavanitkul, K., Punpuing, S., Prohmno, A., and Bryant, J. 2009. "Lessons learned from pilot census in areas where there are concentration of migrants in Thailand". Paper presented at the Regional Workshop on Lessons Learned from Pilot Census in Areas Where There Are Concentration of Migrants in Thailand, Pattaya.
- Asia Pacific Migration Research Network (APMRN). n.d. "Migration issues in the Asia-Pacific". Accessed 12/09/2010 at <http://www.unesco.org/most/apmrnw14.htm>.
- Bangkok Post*. 2010. "National retirement scheme set for 2011 launch". Business section 13/04/2010. Bangkok: Bangkok Post.
- Becker G. and H.G. Lewis. 1973. "On the interaction between the quantity and quality of children". *Journal of Political Economy* 84(2): S279-S288.
- Bhassorn Limanonda. 1983. *Marriage Pattern in Thailand: Rural-Urban Differentials*, Paper No. 44. Bangkok: Institute of Population Studies, Chulalongkorn University.
- Bloom, David, David Canning & Guenther Fink. 2009. "The graying of the global population and its macroeconomic consequences". Working Paper 47, Program on Global Demography of Aging. Harvard School of public Health.
- Bongaarts, John. 1982. "The fertility-inhibiting effects of the intermediate fertility variables." *Studies in Family Planning* 13(6/7):179-189.
- Bongaarts, John. 1983. "The proximate determinants of natural marital fertility." Pp. 103-138 in *Determinants of Fertility in Developing Countries. Volume 1: Supply and Demand for Children*. edited by Rodolfo A. Bulatao and Ronald D. Lee. New York: Academic Press.
- Boonpratuang, Chet, Gavin W. Jones and Chanpen Taesrikul, 1996, "Dispelling some myths about urbanization in Thailand", *Journal of Demography* (Chulalongkorn University, 12(1): 21-36.
- Boonyamanond, S. and Punpuing, S. 2010. "The global financial crisis: impact on internal migration in Thailand". UNDP Discussion Paper.
- Booth, Anne, 2003, "Education and economic development in Southeast Asia: myths and realities", in Jomo K.S. (ed), *Southeast Asian Paper Tigers? From Miracle to Debacle and Beyond*, London: Routledge Curzon.
- Bureau of Policy and Strategy, Permanent Secretary Office, Ministry of Public Health. 2010. *Ministry of Public Health 's Strategic Plan (2009-2012)*. Bangkok: Sam Charoen Panich (in Thai).
- Chai Podhisita, AnchaleeVarangrat, Rossarin Gray, PatamaVapattanawong, and Sootthida Chuanvan. 2009. "Nuptiality Change in Thailand, 1960-2000: Implication for Future Fertility". *Songklanakarin Journal of Social Sciences and Humanities* 15(5):703-722. (in Thai)

- Chalamwong, Y. 2000. "Thailand: the economic contraction, the labour market and migration". Pp. 217-242 in *Labour Migration and the Recent Financial Crisis in Asia*. Organization for Economic Cooperation and Development (OECD).
- Chamrathirong, Apichat. 1980. *Nuptiality in Thailand: A Cross-sectional Analysis of the 1970 Census*, Paper of the East-West Population Institute; No. 69. Honolulu: East-West Center.
- Chamrathirong, A., Archavanitkul, K., Richter, K., Guest, P., Boonchalaksi, W., Piriathamwong, N. and Vong-Ek, P. 1995. *The National Migration Survey of Thailand*. Mahidol University. Institute for Population and Social Research; no. 188.
- Chamrathirong, A., Prasartkul, P., Punpuing, S., Boonchalaksi, W., and Santiphop, T. 1999. "The study of population-consumption-environment link: the case of air pollution in Bangkok". Institute for Population and Social Research No. 224.
- Chamrathirong, A. 2007. "Research on internal migration in Thailand: the state of knowledge". *Journal of Population and Social Research* 16(1):1-20.
- Chamrathirong, Apichat, Sirinan Kittisuksathit, Chai Podhisita, Pimonpan Isarabhakdi, and Malee Sabaiying. 2007. *National Sexual Behavior Survey of Thailand 2006*. Nakhonpathom: Institute for Population and Social Research, Mahidol University.
- Chandoevrit, Worawan, 2010, "Marginal cost of public funds and income tax reform" in Economic reform for social justice, a research reported to Thailand Research Fund. (in Thai).
- Charasdamrong, Prasong. 1992. "The Misery of Those Left Behind," *Bangkok Post*, 10 May 1992.
- Chawla, A. 2008. "Macroeconomic Aspects of Demographic Changes and Intergenerational Transfers in Thailand". Ph.D. dissertation submitted to the University of Hawaii at Manoa.
- Chayovan, Napaporn and others. 2003. "A report of a survey on economic crisis, demographic dynamics and family in Thailand". CPS Publication Number 289.
- Chen, Ya-Mei & Elaine Adams Thompson. 2010. "Understanding Factors That Influence Success of Home- and Community-Based Services in Keeping Older Adults in Community Settings". *Journal of Aging and Health*, 22 (3): 267-291.
- Chiangkul, Wittayakorn. 2009. "Thailand's education situation 2007/2008, the problem of Equality and Quality". Bangkok:V.T.C Communication. (in Thai).
- Chubb, E. 1998. "Bangkok: A primate city". *Geofactsheet* No. 53. Birmingham: Curriculum Press.
- Commission on Higher Education, Ministry of Education. 2007. "Framework of the second 15-year long range plan on higher education of Thailand (2008-2022)". (in Thai)
- Community Organization Development Institute (CODI). 2006. "Urban development towards sustainable cities and housing for the urban poor in Thailand". Accessed at http://www.codi.or.th/downloads/english/Paper/Urban_Poor_in_Thailand_062006.pdf 25-August-2010.
- Cowgill, D.O. (1972). "The role and status of the aged in Thailand". In D. O. Cowgill & L. D. Holmes (eds.), *Aging and Modernization*, pp. 91-101. New York: Appleton-Century-Crofts.
- Department of Health, Ministry of Public Health. 2010. *Four years action plan (2010-2013)* (in Thai).
- Department of Local Administration, Ministry of Interior. *Four years action plan (2009-2012)*. Bangkok: Department of Local Administration (in Thai).
- Department of International Economic Affairs, Ministry of Foreign Affairs, Kingdom of Thailand. 2010. "The study of Thailand competitiveness ability development". Available URL:<http://www.mfa.go.th/web/2993.php?id=3880#> (in Thai).

- Duflo, Esther. 2003. "Grandmothers and granddaughters: Old-age pension and intra-household allocation in South Africa". *World Bank Economic Review* 17(1): 1-25.
- Easterlin, Richard. 1975. "An economic framework for fertility analysis". *Studies in Family Planning* 6(3):54-63.
- East-West Center. 2002. *The Future of Population in Asia*. Honolulu: East-West Center.
- Entwisle, B., Walsh S.J., Rindfuss, R. R. and Chamrathirong, A. 1998. Land use/ land cover and population dynamics, Nang Rong, Thailand. Pp. 121-144 in *People and pixels: linking remote sensing and social science*. National Research Council.
- Ekpalakorn W. et al. 2010. The 4th National Health Examination Survey (2008-09). Nonthaburi: Health System Research Institute.
- Feng, Junxin and David D. Li. 2006. "Stages of urbanization: is China's urbanization poised to take off?" unpublished draft.
- Frejka, Tomas, Gavin W. Jones and Jean-Paul Sardon. 2010. "East Asian childbearing patterns and policy developments", *Population and Development Review*, 36(3): 579-606.
- Fujioka, Rika & Sopon Thangphet. 2009. *Decent work for older persons in Thailand*. (ILO Asia working paper series). Bangkok: ILO Regional Office for Asia and Pacific.
- Garip, Filiz, and Sara Curran. 2009. "Increasing migration, diverging communities: Changing character of migrant streams in rural Thailand". *Population Research and Policy Review*, 29:659-685.
- Glassman, J. and Sneddon, C. 2003, "Chiang Mai and Khon Kaen as growth poles: regional industrial development in Thailand and its implications for urban sustainability". *Annals of the American Academy AAPSS* 590:93-115.
- Gleditsch, N.P., Nordås, R. and Salehyan, I. 2007. "Climate Change and Conflict: The Migration Link". International Peace Academy: Coping with Crisis Working Paper Series.
- Gray, Rossarin, Chai Podhisita, PatamaVapattanawong and AnchaleeVarangrat. 2004. "Fertility decline among the Karen and the Hmong, hill tribe minorities in northern Thailand". Pp. 53-75 in *The 2004 Thai National Symposium on Population Studies*. Bangkok: Thai Population Association.
- Greenspan A. 1994. "After the demographic transition: policy responses to low fertility in four Asian countries". *Asia Pac Pop Policy*. Sep(30):1-4.
- Goldstein, Sidney and Alice Goldstein. 1986. "Migration in Thailand: a twenty-five year review", *Papers of the East-West Population Institute* No. 100, Honolulu, Hawaii.
- Goldstein, Joshua R., Tomas Sobotka and Aiva Jasilioniene. 2009. "The end of "lowest-low" fertility?" *Population and Development Review*, 35(4): 663-699.
- Gu, Baochang, 2009, "The arrival of low fertility in China", in Gavin Jones, Paulin Tay Straughan and Angelique Chan (eds), *Ultra-low Fertility in Pacific Asia: Trends, Causes and Policy Issues*, London: Routledge.
- Guest, Philip and Joeean Tan. 1994. *Transformation of Marriage Patterns in Thailand*. IPSR Publication No. 176. Bangkok: Institute for Population and Social Research, Mahidol University.
- Guest, Philip. 1995. "Declining of fertility in Thailand: determinants and consequences." Pp. 17-95 in *The Turning Point of Population Policy in Thailand*, edited by Kusol Soonthornthada. Bangkok: Thai Research Fund.
- Guest, P. and Jones, G. 1996. "Policy options when population growth slows: The case of Thailand". *Population Research and Policy Review* 15:109-130.
- Guest, Philip. 1998. "Assessing the consequences of internal migration: methodological issues and a case study on Thailand based on longitudinal

- household survey data". Pp. 275-218 in R. Bilborrow (ed.), *Migration, Urbanization and Development: New Directions and Issues*. Norwell MA: United Nations Population Fund and Kluwer Academic Publishers.
- Havanon, Napaporn, John Knodel & Werait Sittitrai. 1992. "The Impact of Family Size on Wealth Accumulation in Rural Thailand". *Population Studies* 46(1):37-51.
- Hermalin, Albert I., Mary B. Ofstedal & Rebecca Tesfai. 2007. "Future characteristics of the elderly in developing countries & their implications for policy". *Asian Population Studies* 3(1):5-36.
- Hollingsworth, David Anthony, 2007, *The Rise, the Fall, and the Recovery of Southeast Asia's Minidragons*, Lexington Books, Lanham Md.
- Hunter, Lori M., 2000, *Environmental Implications of Population Dynamics*, Santa Monica: RAND.
- Hunter, L.M. 2004. "Migration and Environmental Hazards". University of Colorado at Boulder: Institute of Behavioral Science Research Program on Environment and Behavior Working Paper EB2004-0002.
- Hugo, G. 2005. "Migration in the Asia-Pacific region". Global Commission on International Migration (GCIM). Accessed at <http://www.gcim.org/mm/File/Regional%20Study%202.pdf> 20-Jul-10.
- Huguet, J.W. and Punpuing, S. 2005. *International Migration in Thailand*. International Organization for Migration, Regional Office. Bangkok, Thailand.
- Institute for Population and Social Research (IPSR). 2002. Report of the baseline survey Round 1 (Kanchanaburi).
- Institute for Population and Social Research (IPSR). 2005. The 2005 Thai Health Report-Free Trade: A Double-Edged Sword for Thai People's Access to Drugs. IPSR Publication No. 298
- IPCC - Intergovernmental Panel on Climate Change, *Climate Change 2007. Impacts, Adaptation and Vulnerability*, Contribution of Working Group II to the Fourth Assessment Report of the IPCC. Cambridge: Cambridge University Press.
- International Institute for Management Development. 2009. *IMD World Competitiveness Yearbook 2009*.
- Lee, R. and A. Mason. 2010. "Fertility, human capital, and economic growth over the demographic transition" *European Journal of Population*. 26(2): 159-182.
- Lutz, W., A. Prskawetz, and W.C. Sanderson, Eds. 2002. *Population and Environment. Methods of Analysis*. Supplement to *Population and Development Review*, Vol. 28, 2002. New York: The Population Council.
- James, William E., Seiji Naya and Gerald M. Meier. 1987. *Asian Development: Economic Success and Policy Lessons*, Madison: University of Wisconsin Press.
- Jenchitr, Wataneee & Chalao Pongprayoon. 2003. "The national program for the prevention of blindness and eye health promotion and Thailand". *The Journal of Public Health Ophthalmology* 17(1): 6-19.
- Jitapunkul, Suttichai, Jiraporn Kespichayawattana, Napaporn Chayovan & Sasipat Yodpet. 2008. *Age Profile - Health System and Long-term Care in Thailand*. Bangkok: Ministry of Social Development and Human Security.
- Jitsuchon, Somchai. 2010. "Fiscal measures for economic and social justice: expanding tax base" in *Economic reform for social justice, A research reported to Thailand Research Fund*. (in Thai).
- Jones, Gavin W., 1990, "Population dynamics and educational and health planning", Paper No. 8, Training in Population, Human Resources and Development Planning, ILO, Geneva.
- Jones, Gavin W., 2004, "Urbanization trends in Asia: the conceptual and definitional challenges", in Tony Champion and Graeme Hugo (eds), *New*

Forms of Urbanization: Beyond the Urban-Rural Dichotomy, Aldershot: Ashgate.

Jones, Gavin W., 2005, "The "flight from marriage" in South-East and East Asia", *Journal of Comparative Family Studies*, 36(1): 93-119.

Jones, Gavin W. 2005. "Policy synthesis on demographic change and the demographic dividend in Asia: the utility of education in Thailand and Indonesia", in Kua Wongboonsin and Philip Guest (eds), *The Demographic Dividend: Policy Options for Asia*, Bangkok: College of Population Studies, Chulalongkorn University.

Jones, Gavin W. 2007. "Fertility decline in Asia: the role of marriage change", *Asia Pacific Population Journal*, 22(2): 13-32.

Jones, Gavin W. and Mike Douglass (eds). 2008. *Mega-Urban Regions in Pacific Asia: Urban Dynamics in a Global Era*, Singapore: NUS Press.

Jones, Gavin, Paulin Tay Straughan, and Angelique Chan. 2009. *Ultra-low Fertility in Pacific Asia: Trends, Causes and Policy Issues*, London: Routledge.

Jones, Gavin W. and Bina Gubhaju. 2009. "Factors influencing mean age at first and proportions never marrying in the low-fertility countries of East and Southeast Asia", *Asian Population Studies*, 5(3): 237-266.

Jylha, Marja. 2009. "What is self-rated health and why does it predict mortality? Towards a unified conceptual model". *Social Science & Medicine* 69:307-316.

Kamnuansilpa, Peerisit and Aphichat Chamratrithirong. 1985. *Contraceptive Use and Fertility in Thailand: Results from the 1984 Contraceptive Prevalence Survey*. Bangkok: NIDA and IPSR.

Katz, S., L. G. Branch, et al. 1983. "Active life expectancy". *N Engl J Med* 309(20): 1218-24.

Khoman, Sirilaksana. 1993. "Education policy", in Peter G. Warr (ed), *The Thai Economy in Transition*, Cambridge: Cambridge University Press.

Knodel, John, Aphichat Chamratrithirong, Napaporn Chayovan and Nibhon Debavalya. 1982. *Fertility in Thailand: Trends, Differentials, and Proximate Determinants*. Washington, D.C.: National Academy of Sciences.

Knodel, John, Aphichat Chamratrithirong and Nibhon Debavalya. 1987. *Thailand's Reproductive Revolution: Rapid Fertility Decline in a Third World Setting*. Madison: University of Wisconsin Press.

Knodel, John and Malinee Wongsith. 1989. "Monitoring the education gap in Thailand: trends and differentials in lower and upper secondary schooling", *Asian and Pacific Population Forum*, 3(4): 25-35.

Knodel, John. 1997. "The Closing of the Gender Gap in Schooling: The Case of Thailand," *Comparative Education* 33(1): 61-86.

Knodel, John & Chanpen Saengtienchai. 1999. "Studying Living Arrangements of the Elderly: Lessons From a Quasi Qualitative Case Study Approach in Thailand". *Journal of Cross-Cultural Gerontology* 14(3):197-220.

Knodel, John & Chanpen Saengtienchai. 2007. "Rural Parents with Urban Children: Social and Economic Implications of Migration on the Rural Elderly in Thailand". *Population, Space and Place* 13(3):193-210.

Knodel, John, Jiraporn Kespichayawattana, Suvinee Wiwatwanich and Chanpen Saengtienchai. 2007. *Migration and Inter-generational Solidarity: Evidence from Rural Thailand*. In UNFPA Country Technical Services Team for East and Southeast Asia, Papers in Population Ageing Series, Number 2. Bangkok: UNFPA.

Knodel, John & Napaporn Chayovan. 2008. *Population Ageing and the Well-Being of Older Persons in Thailand: Past trends, current situation and future challenges*. *Papers in Population Ageing* No. 5. Bangkok: UNFPA.

Knowles, J.C., Pernia, E.M. and Racelis, M. 1999. "Social consequences of the financial crisis in Asia".

- Asian Development Bank Economic Staff Paper No. 60.
- Kojima, Reetsu. 1995. "Urbanization in China", *The Developing Economies*, XXX111-2: 121-154.
- Lam, T.Q., Bryant, J.R., Chamrathirong, A. and Savangdee, Y. 2007. "Labor migration in Kanchanaburi Demographic Surveillance System: characteristics and determinants". *Journal of Population and Social Studies* 16:117-144.
- Leoprapai, Boonlert and VarachaiThongthai. 1989. *Contraceptive Practice of Thai Women 1987: Results of the Study on Determinants and Consequences of Contraceptive Use Patterns in Thailand*. Nakhonpathom: Institute for Population and Social Research, Mahidol University. IPSR Publication No.138.
- Lightfoot, P. and Fuller, T. 1983. "Circular rural-urban movement and development planning in Thailand". *Geoforum* 14(3):277-287.
- Lutz, W., A. Prskawetz, and W.C. Sanderson, Eds. 2002. *Population and Environment. Methods of Analysis*. Supplement to *Population and Development Review*, Vol. 28, 2002. New York: The Population Council.
- Martin, P. 2009. *Migration in the Asia-Pacific Region: Trends, factors, impacts*. UNDP: Human Development Research Paper 2009/32.
- Mason, A. 2005. "Demographic transition and demographic dividends in developed and developing countries". United Nations Expert Group Meeting on Social and Economic Implications of Changing Population Age Structures, Mexico City, August 31-September 2, 2005
- Mason, A., R. Lee, A.C Tung, M. Lai, and T. Miller. 2009. "Population aging and intergenerational transfers: introducing age into national accounts", in *Developments in the Economics of Aging*, edited by David Wise. (National Bureau of Economic Research: University of Chicago Press). pp. 89-122.
- McDonald, Peter. 2002. "Sustaining fertility through public policy: the range of options", *Population (English Edition)*, 57(3): 417-446.
- McMichael A.J., Woodruff R. & Hales S. 2006. "Climate change and human health: Present and future risks". *The Lancet*; 367: 859-69.
- McKinsey & Company. 2007. "How the world's best-performing school systems come out on top", September.
- Ministry of Labor. "Ministry of Labor's implementation plan in 2010 relating to elderly". http://www.mol.go.th/anonymouse/policy_vision_mission
- Ministry of Social Development and Human Security. 2010. *Services for Hill Tribes*. http://www.m-society.go.th/msoservice_detail.php?pageid=216 . (accessed 1st August 2010).
- Ministry of Commerce- Department of Export Promotion. 2008. "Statistics of foreign patients". (unpublished).
- Ministry of Education. 2008. "Synthesis report of conditions and factors affecting Thailand education quality". Bangkok:V.T.C Communication.(in Thai).
- Ministry of Public Health (MOPH). 1997. *National Health Examination Survey (1996-7)*. Nonthaburi, Ministry of Public Health.
- Ministry of Public Health (MOPH). 2004. *National Health Examination Survey (2003-4)*. Nonthaburi, Ministry of Public Health.
- Ministry of Public Health, Personnel Administration Division. 2008. Administrative Registration database.
- Ministry of Public Health, Personnel Administration Division. 2010. Administrative Registration database.
- Ministry of Public Health, with support from the United Nations Population Fund (UNFPA), 2010, *ICPD at 15 Report: Progress and Challenges in*

- Implementing the Programme of Action in Thailand*, Nonthaburi: Ministry of Public Health of Thailand.
- Montgomery, Mark R., review of *World Bank, World Development Report 2009*, in *Population and Development Review*, 35(1): 197-199.
- Myers, Charles and Chalongphob Sussangkarn. 1992. "Educational Options for the Future of Thailand", Bangkok: Thai Development Research Institute.
- National Statistical Office. n.d. *Analysis Report No.1: Migration*. Bangkok: National Statistical Office, Office of the Prime Minister.
- National Statistical Office. 1986. *Health and Welfare Survey*. Bangkok, National Statistical Office.
- National Statistical Office. 1993. *Report the Social Attitude Towards Children Survey 1993*. Bangkok: Statistical Data Bank and Information Dissemination, National Statistical Office. (in Thai)
- National Statistical Office. 1994. *Report of the 1994 Survey of Elderly in Thailand*. Bangkok, National Statistical Office.
- National Economic and Social Development Board of Thailand (NESDB). 1999. "Poverty and inequality during the economic crisis in Thailand". *Indicators of well-being and policy analysis, a newsletter of the NESDB* 3(1).
- National Economic and Social Development Board. 2009. "Thailand millennium development goals report 2009". Bangkok: NESDB. (in Thai)
- National Economic and Social Development Board. 2009. "Thailand's vision in 2027. A report from annual conference in 2009" (in Thai).
- National Statistical Office. 2002. *Disability Survey*. Bangkok, National Statistic Office.
- National Statistical Office. 2002. *Report of the 2002 Elderly in Thailand Survey*. Bangkok, National Statistical Office.
- National Statistical Office. 2003. *Health and Welfare Survey*. Bangkok, National Statistic Office.
- National Statistical Office. 2003. *Summary Report of Provincial Migration of Thai Population: Based on 2000 Population and Housing Census Data*. Bangkok: National Statistical Office, Office of the Prime Minister.
- National Statistical Office. 2006. *Report of 2006 Reproductive Health Survey*. Bangkok: Statistical Forecasting Bureau, National Statistical Office. (in Thai)
- National Statistical Office. 2007. *Report on the 2005-2006 Survey of Population Change*. Bangkok: Statistical Forecasting Bureau, National Statistical Office.
- National Statistical Office. 2007. *Health and Welfare Survey*. Bangkok, National Statistical Office.
- National Statistical Office. 2007. *Disability Survey*. Bangkok, National Statistic Office.
- National Statistical Office. 2007. *Report of the 2007 Older Person in Thailand*. Bangkok, National Statistic Office.
- National Statistical Office. 2010. *Report of 2009 Reproductive Health Survey*. Bangkok: Statistical Forecasting bureau, National Statistical Office. (in Thai)
- Neyer, Gerda and Gunnar Andersson, 2007, "Consequences of family policies on childbearing behaviour: effects or artifacts?" MPIDR Working Paper WP 2007-021, Max Planck Institute for Demographic Research, Rostock, Germany.
- Noree T. 2010. "Doctor income". (unpublished).
- Nursing Council. 2010. "Nursing Production Plan". (unpublished).
- Office of the Basic Education Commission. 2010. *Education Information*. http://doc.obec.go.th/doc/web_doc/#h4. (accessed 15th September 2010).

- Office of the Education Council, Ministry of Education. 2009. *Education statistics in Thailand academic year 2008*. Bangkok:Prikwan Graphic. (in Thai).
- Office of Foreign Workers Administration. 2010. *Monthly Statistics, March 2010*. <http://wp.doe.go.th/sites/default/files/statistic/7/sm03-53.pdf> . (accessed 1st August 2010).
- Office of the Permanent Secretary, Ministry of Education. 2008. "Geographical, economic, political and social data". Available URL:http://www.moe.go.th/data_stat/Download_Excel/BriefStat/2009-09-04_statistics2551.xls (in Thai).
- Office of Permanent Secretary, Ministry of Social Development and Human Security. "Four years Ministry's action plan (2008-2011)" (in Thai).
- Office of the Prime Minister, *National Elderly Plan Vol. 2 (2002-2021)*. Bangkok (in Thai).
- Ogawa, N., A. Chawla and R. Matsukura. 2009. "Some new insights into the demographic transition and changing age structures in the ESCAP region". *Asia-Pacific Population Journal* 24(1): 87-116.
- Ogawa, N., A. Mason, A. Chawla, R. Matsukura and A. Tung. 2009. "Declining fertility and the rising cost of children, What can NTA say about low fertility in Japan and other Asian countries?" *Asian Population Studies* 5(3): 289-307.
- Ogawa, N., A. Mason, A. Chawla, R. Matsukura. 2010. "Japan's unprecedented aging and changing intergenerational transfers", in *The Economic Consequences of Demographic Change in East Asia*, edited by Takatoshi Ito and Andrew Rose, NBER-EASE Volume 19, pp. 131-160, National Bureau of Economic Research, Inc.
- O'Neil, BC, Lutz, W, Mackellar, L 2005. *Population and Climate Change*. Cambridge University Press. Cambridge.
- Organisation for Economic Co-operation and Development (OECD). n.d. "What are equivalence scales?" OECD Project on Income Distribution and Poverty. Accessed at http://www.oecd.org/LongAbstract/0,3425,en_2649_33933_35411112_1_1_1_1,00.html
- Ouyyanont, P. 1998. "Bangkok as a magnet for rural labour: changing conditions, 1900-1970". *Southeast Asian Studies* 36(1):78-108.
- Pachanee C, Wibulpolprasert S. 2006. "Incoherent policies on universal coverage of health insurance and promotion of international trade in health services in Thailand". *Health Policy Plan*. 21:310-318.
- Pagaiya N. 2008. "Health workforce requirement for aged care". Available at : http://www.thainhf.org/document/media/media_677.pdf (July 16th, 2010).
- Pacharanarumol W, Tangcharoensathien V, Limwattananon S, Panichkriangkrai W, Patchanee K . 2010. "Why and how Thailand achieved Good Health at Low Cost?" Nonthaburi, Ministry of Public Health, International Health Policy Program. 20 August 2010
- Phananiramai, Mathana. 1997. "Population changes and economic developments in Thailand: their implication on women's status". *TDRI Quarterly Review*, Vol. 12(3):15-26.
- Phélinas, P.M. 2001. *Sustainability of rice production in Thailand*. Hauppauge, New York: Nova Science Publishers, Inc.
- Pimonpan Isarabhakdi and Sukanya Chongthawonsatid. 2004. "Fertility of migrants from Myanmar in Ranong Province". Pp 35-52 in *The 2004 Thai National Symposium on Population Studies*. Bangkok: Thai Population Association. (in Thai)Population Division of the Department of Economic and Social Affairs of the United Nations
- Podjanalawan, Pinyapun. 2009. The National Mother Day in 1937: Sex, Love and National Female Breeder. Prachathai On-line Newspaper. [www.artgazine.com/shoutouts /viewopic.php?t=9180](http://www.artgazine.com/shoutouts/viewopic.php?t=9180) (in Thai).

- Podhisita, Chai and Peter Xenos, 2008, *Survey Comparisons of the Sexual Risk Behavior of Young Adults in Thailand, Vietnam and the Philippines*, IPSR
- Pongpaichit, Pasuk and Chris Baker, 1998, *Thailand's Boom and Bust*, Chiang Mai: Silkworm Books.
- Porapakkham, Y., J. Pattaraarchachai, et al. 2008. "Prevalence, awareness, treatment and control of hypertension and diabetes mellitus among the elderly: the 2004 National Health Examination Survey III, Thailand." *Singapore Med J* 49(11): 868-73.
- Potipiti, T. 2010. "Unskilled migrant workers and Thai aging problems". Working paper prepared for the Thailand Research Fund.
- Potipiti, Tanapong. 2010. "The number of unskilled migrant workers from Myanmar, Lao, and Cambodia in the future and the demand for migrant workers in aging society". Thailand Research Fund. (in Thai)
- Prachuabmoh, Vipana and Preeya Mithranon, 2003, "Below replacement fertility in Thailand and its policy implications", *Journal of Population Research*, 20(1): 35-50.
- Prachuabmoh, Vipana, Napaporn Chayovan, Malinee Wongsit, Siriwan Siriboon, Busarin Bangkaew, and Chanette Milingtangul. 2008. *The Project on Setting-Up the System for Monitoring and Evaluation of the Second National Plan for Older Persons (2002-2021)*. Bangkok: Thanwa Printing.
- Prachuabmoh, Vipana 2009. "Preparation for Old Age and Social Participation of Present and Future Older Persons in Thailand: Gender Difference", Paper presented at the Conference on "Workshop on Gender and Ageing in Southeast Asia: Contexts, Concerns and Contradictions, February 10-11, 2009, organized by Asia Research Institute, National University of Singapore.
- Pramote Prasartkul and PatamaVapattanawong. 2005. "Population Situation of Thailand, B.E. 2548." Pp 14-31 in *2005 Population and Social: Population of Thailand on 2005*, edited by
- Pramote Prasartkul and PatamaVapattanawong. 2008. "Population Dimension and Families of the Two Generations." Pp 18-27 in *2008 Population and Social: Thai Families in the Social and Demographic Transitions*, edited by Chai Podhisita and SuchadaThaweewit. Nakhonpathom: Population and Social Printing. (in Thai)
- Punpuing, S. 1999. "Bangkok and its environment as the context of commuting". *Journal of Population and Social Studies* 7(2): 33-69.
- Rattanawarang, W. and Punpuing, S. 2003. "Migration and land size change: a case study in Nang Rong, Buriram, Thailand". *Journal of Population and Social Studies*, 11(2): 95-119.
- Rattanawarang, W. 2009. *Migration and land use change: a case study in Nang Rong, Buriram Province*. PhD Dissertation, Institute for Population and Social Research, Mahidol University.
- Richter, K., Guest, P., Boonchalaksi, W., Piriathamwong, N. and Ogena, N. 1996. *Migration and the Rural Family: Sources of Support and Strain in a Mobile Society*. Report of the Northeastern Follow-up to the National Migration Survey. Mahidol University. Institute for Population and Social Research.
- Richter, K., Benjamin A.E. and Punpuing, S. 2009. Population and Environment in Asia and the Pacific: Trends, Implications and Prospects for Sustainable Development. *Asia and Pacific Population Journal* 24(1):35-64.
- Rindfuss, R., Prasartkul, P., Walsh, S.J., Entwisle, B., Sawangdee, Y. and Vogler, J.B. 2003. "Household-parcel linkages in Nang Rong, Thailand: challenges of large samples". Pp. 131-172 in Fox, J., Rindfuss, R., Walsh, S.J. and Mishra, V. (eds.), *People and the Environment*. Kluwer Academic Publishers.
- Robinson, Warren C. and Yawalaksana Rachapaetayakom. 1993. "The role of government planning in Thailand's fertility decline", in Richard Leete and Iqbal Alam (eds), *The Revolution in Asian Fertility: Dimensions, Causes and Implications*, Oxford: Clarendon Press.

- Robinson, Warren C. and John A. Ross (eds). 2007. *The Global Family Planning Revolution: Three Decades of Population Policies and Programs*, Washington D.C.: The World Bank.
- Rosenfield, Allan, Anthony Bennett, Somsak Varakamin and Donald Lauro. 1982. "Thailand's family planning program: an Asian success story", *International Family Planning Perspectives*, 8(2): 43-51.
- Rosenfield, Allan G. and Caroline J. Min. 2007. "The emergence of Thailand's National Family Planning Program", in Warren C. Robinson and John A. Ross (eds), *The Global Family Planning Revolution: Three Decades of Population Policies and Programs*, Washington D.C.: The World Bank.
- Rumakom, Patchara, Pramote Prasartkul, Philip Guest, Vorachai Thongthat and Sureepong Punpuing. 2002. "Change to the epidemiological transition in Thailand due to HIV/AIDS: Implications for population and health policies". Paper presented at the 2002 IUSSP Regional Population Conference, Bangkok, 10-12 June 2002. <http://www.iussp.org/Bangkok2002/S07Rumakom.pdf>
- Sakunpanich T. et al. 2009. "Trend of cost and service in Thai health delivery systems". Preliminary report
- Sciortino, R. and Punpuing, S. 2009. *International Migration in Thailand 2009*. International Organization for Migration, Regional Office. Bangkok, Thailand.
- Schwab, Klaus (editor) 2009. *The global competitiveness report 2009-2010*. World Economic Forum.
- Siamwalla, Amar, Suthad Setboonsarng and Direk Patemasiriwat, 1993, "Agriculture", in Peter G. Warr (ed), *The Thai Economy in Transition*, Cambridge: Cambridge University Press.
- Siritrangsri, Pinsuda. 2008. "Research of the future: research on scenario of Thai education in the next 10-20 Years". Proposed to Office of the Education Council, Ministry of Education. Bangkok: Pimdee Printing.(in Thai).
- de Sherbinin, A., Carr, I.D., Cassels, S., and Jiang, L. 2007. "Population and Environment". *Annual Review of Environment and Resources*. 32:345-73.
- Skeldon, R. 1999. "Migration in Asia after the economic crisis: patterns and issues". *Asia and Pacific Population Journal* 14(3):3-24.
- Smith RD, Chanda R, Tangcharoensathien V. 2009. "Trade in health-related services". *The Lancet*; 373: 593-601.
- Soe, Khaing Khaing. 2005. *Factors affecting the timing of first migration: a case study of Kanchanaburi DSS areas*. PhD Dissertation, Institute for Population and Social Research, Mahidol University.
- Storey, D. 2005. Urban water pollution, communities and the State in Southeast Asia. Paper presented to the workshop on *Water in Mainland Southeast Asia*, Siem Reap, 30 November to 2 December 2005.
- Suhrke, A. 1993. "Pressure points: environmental degradation, migration and conflict". Cambridge Mass.: American Academy of Art and Science. Accessed at <http://www.cmi.no/publications/publication/?1374=pressure-points-environmental-degradation> 11-Jul-10.
- Sussangkarn, Chalongphob. 1988. "Production structures, labor markets and human capital investments: issues of balance for Thailand", *NUPRI Research Paper Series No. 46*, Nihon University Population Research Institute.
- Sussangkarn, C. 1990. "Labour market in an era of adjustment: a study of Thailand". Paper prepared for the workshop on "Labour market in an era of adjustment", Warwick University. Accessed at <http://www.ftadigest.com/reports/published/h40.pdf> 28-Aug-10.
- Sussangkarn, C. and Chalamwong, W. 1996. "Thailand: development strategies and their impacts on labor markets and migration". Pp. 91-126 in O'Connor, D. and Farsakh, L., *Development Strategy*,

- Employment and Migration: Country Experiences*. Organization for Economic Cooperation and Development (OECD).
- Tangcharoensathien V., Prakongsai P., Limwattananon S., Patcharanarumol W., and Jongudomsuk P. 2009. "From targeting to Universality : lessons from the health system in Thailand" P. 310-322 in Peter Townsend, editor. *Building Decent Societies: Rethinking the Role of Social Security in Development*, Houndmills, Basingstoke, Hampshire : Palgrave Macmillan.
- Tantivess, S. and G. Walt. 2008. "The role of state and non-state actors in the policy process: the contribution of policy networks to the scale-up of antiretroviral therapy in Thailand." *Health Policy Plan* 23(5): 328-38.
- Taub, Eric. 2010. "The Technology for Monitoring Elderly". *New York Times* (July 28, 2010)
- Thai Health Research Institute. 1992. *National Health Examination Survey (1991-2)*. Nonthaburi, Health System Research Institute.
- The Thai Working Group on Burden of Disease. 2008. "Burden of Disease and Injury in Thailand". Nonthaburi: International Health Policy Program, Ministry of Public Health.
- The Thai Working Group on National Health Account. 2010. "National Health Expenditure 1994 to 2008". Nonthaburi, International Health Policy Program, Ministry of Public Health http://ihppthaigov.net/index.php?option=com_content&task=view&id=117&Itemid=124 [access 18 April 2010]
- Thailand Development Research Institute. 2009. "Strategy for country's development in service sector". A research project submitted to the Office of the National Social and Economic Development Board. (in Thai).
- The Office for National Standards and Quality Assessment (ONESQA). 2008. *Annual Report 2008*, October 1, 2007 - September 30, 2008). (in Thai).
- Tey Nai Peng, 2007, "Trends in delayed and non-marriage in Peninsular Malaysia", *Asian Population Studies*, 3930: 243-261
- Toyota, Mika. 2006. "Ageing and transnational householding : Japanese retirees in Southeast Asia", *International Development Planning Review*, 28(4): 515-531
- Tsay, C. 2002. Labour migration and regional changes in East Asia: outflows of Thai workers to Taiwan. Paper presented at the IUSSP Conference on "Southeast Asia's Population in a Changing Asian Context", Bangkok, Thailand.
- United Nations (UN). 1956. *The Ageing of Populations & Its Economic & Social Implications*. New York, United Nations.
- United Nations (UN). 2002. *Report of the Second World Assembly on Ageing: Madrid, 8-12 April 2002*. United Nations: New York.
- United Nations (UN). 2009. *World Population Prospects, the 2008 Revision, Volume I: Comprehensive Tables*. New York.
- United Nations (UN). 2010. *Human Development Report*. Accessed at http://hdr.undp.org/en/media/HDR_2010_EN_Tables_reprint.pdf 21-December-2010.
- United Nations (UN). 2010. *The World's Women 2010*, New York: United Nations Department of Economic and Social Affairs.
- UNHCR. 2010. *2009 Global Trends: Refugees, Asylum-seekers, Returnees, Internally Displaced and Stateless Persons*. Geneva: Division of Programme Support and Management.
- United Nations Department of Economic and Social Affairs, Population Division. 2010. *World Urbanization Prospects: the 2009 Revision Database*. Accessed at <http://esa.un.org/wup2009/unup/> 14-Jul-10.
- United Nations Population Fund (UNFPA). 2005. *Reproductive Health of Women in Thailand*:

- Progress and Challenges Towards Attainment of International Development Goals*. UNFPA Country Technical Services Team for East and South-East Asia, Bangkok, Thailand.
- United Nations Population Fund (UNFPA). 2007. *State of the World's Population 2007: Unleashing the Potential of Urban Growth*. New York: UNFPA.
- United Nations Population Fund (UNFPA). 2009. *State of World Population 2009. Facing a Changing World: Women, Population and Climate*, New York: UNFPA.
- United Nations Population Fund (UNFPA). 2010. "ICPD at 15 Report: Progress and Challenges in Implementing the Programme of Action in Thailand". UNFPA and Department of Health, Ministry of Public Health.
- Van Landingham M, Hirschman C. 2001. "Population pressure and fertility in pre-transition Thailand". *Population Studies (Camb)*; 55:233-48.
- Varachai Thongthai. 2001. "Age at first birth: an important determinant of low fertility." Pp 177-190 in *The 2001 Thai National Symposium on Population Studies*. Bangkok: Thai Population Association. (in Thai)
- VanWey, L.K. 2008. "Land ownership as a determinant of temporary migration in Nang Rong, Thailand". *European Journal of Population* 19: 121-145.
- Vine, D. 2005. "The Other Migrants: Cause and Prevention in Involuntary Displacement and the Question of "Environmental Refugees"". Pp. 141-153 in *International Migration and the Millennium Development Goals: Selected Papers Of The UNFPA Expert Group Meeting Marrakech, Morocco 11-12 May 2005*.
- Viravaidya, Mechai. 1979. "Caution! frequent child bearing or too many children". *Journal of Rural Doctor*, 7 (November): 19. (in Thai).
- Walsh, S.J., Evans, T.P., Welsh, W.F., Entwisle, B. and Rindfuss, R. 1999. "Scale-dependent relationships between population and environment in Northeastern Thailand". *Photogrammetric Engineering & Remote Sensing*, 65:97-105.
- Walsh S.J., Rindfuss, R. R. , Prasartkul, P., Entwisle, B., and Chamrathirong, A. 2005. "Population Change and Land Use Dynamics". Pp. 135-159 in Entwisle, B. and Stern, P.C. *Population, Land Use, and Environment: Research Directions*. National Academy of Sciences.
- Warakamin, Suwanna, Nongluk Boonthai and Viroj Tangcharoensathien. 2004. "Induced abortion in Thailand: Current situation in public hospitals and legal perspectives." *Reproductive Health Matters* 12(Supplement 24):147-156.
- Watcharaseranee, Nahathai, Pitcha Pinchantra and Somkid Piyaman. 2006. "The incidence and complications of teenage pregnancy at Chonburi hospital." *Journal of the Medical Association of Thailand* 89(Supplement 4):S118-S123.
- Wichai Aekplakorn (editor). 2010. *National Health Examination Survey IV, 2008-2009*. Nonthaburi: National Health Examination Survey Office. (in Thai)
- Wibulpolprasert S, Pengpaiboon P. 2003. "Integrated strategies to tackle the inequitable distribution of doctors in Thailand: four decades of experience". *Human Resources for Health*; 1:12.
- Wibulpolprasert S Ed. 2008. *Thailand Health Profile 2001-2004*. Bangkok, Thailand: Bangkok: Express Transportation Organization.
- World Health Organisation (WHO). 1999. *The World Health Report 1999: Making a Difference*. Geneva, World Health Organisation.
- World Health Organisation (WHO). 2006. *The World Health Report 2006. Working Together for Health*. Geneva: World Health Organization.
- World Bank. 2009. *World Development Report 2009: Reshaping Economic Geography*, Washington, D.C.: World Bank.

Yawarat Porapakkham and Porapan Punyaratabandhu (editors). 2006. *National Health Examination Survey III, 2003-2004*. Nonthaburi: Health System Research Institute and Bureau of Policy and Strategy, Ministry of Public Health. (in Thai)

Yoddumnern-Attig, B., Attig, G.A., Santiphop, T., Rojnkeesstlen, K., and Vorasiriamorn, Y. 2004. "Population dynamics and community forestry in Thailand: Understanding and incorporating population issues into forestry development plans and programs". Institute for Population and Social Research, Mahidol University.

Zimmer, Zachary and John Knodel. 2010. "Return Migration and the Health of Older Aged Parents: Evidence from Rural Thailand". *Journal of Aging and Health* 21 (forthcoming in 2010).





Office of the National Economic
and Social Development Board



ISBN: 978-974-680-287-1

Printed on recycled paper
United Nations Population Fund