Topics in Labour & Human Resource Economics

Selected Topics in Development Economics

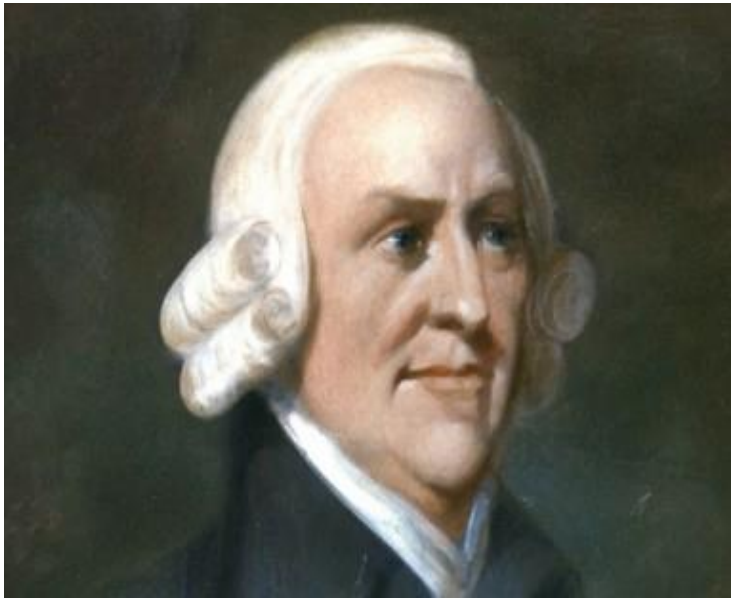
Faculty of Economics, Thammasat University

Friday 20th July 2018
09:00 – 12:00 hrs

Outline

1. **Labour and Demography**
2. Human Resource Development
3. Selected Topics: Ageing Society & Its Economic Impacts

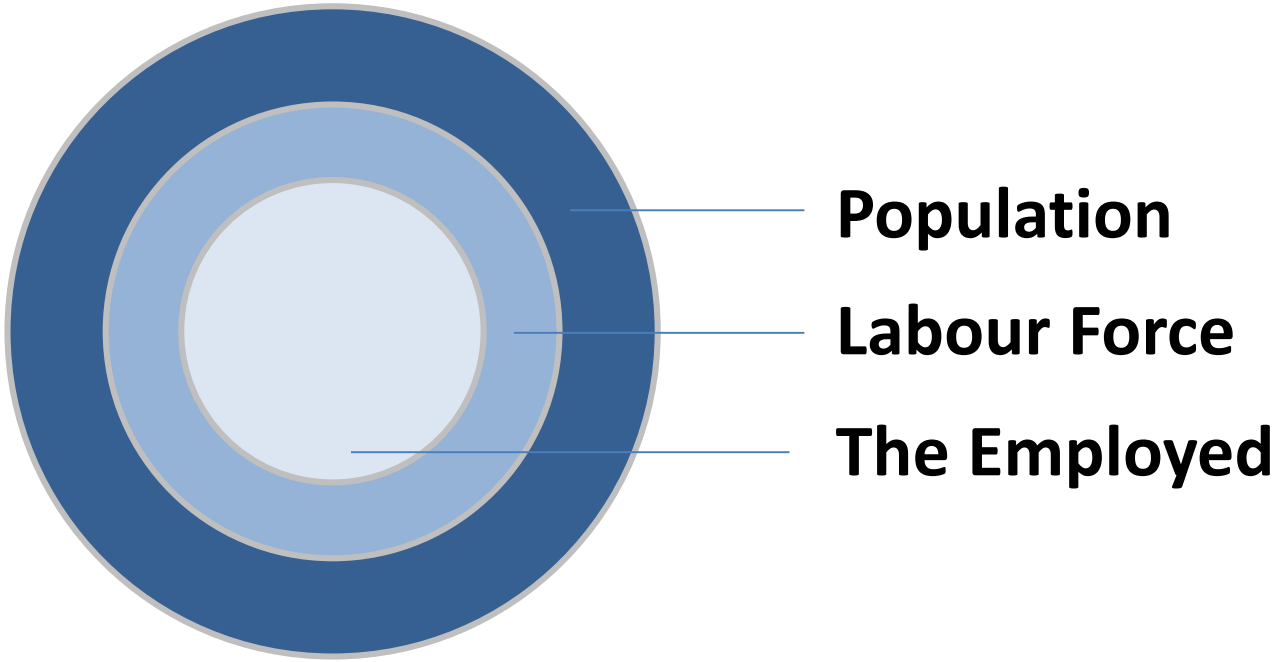
Importance of Labour and Human Resource



“The wealth of a nation depends upon (1) the productivity of labor; and (2) the proportion laborers who are usefully or productively employed.” – Adam Smith (Skinner, 1970, pp. 100-126)

The Situations of Demographic Changes

Population and Labour Force

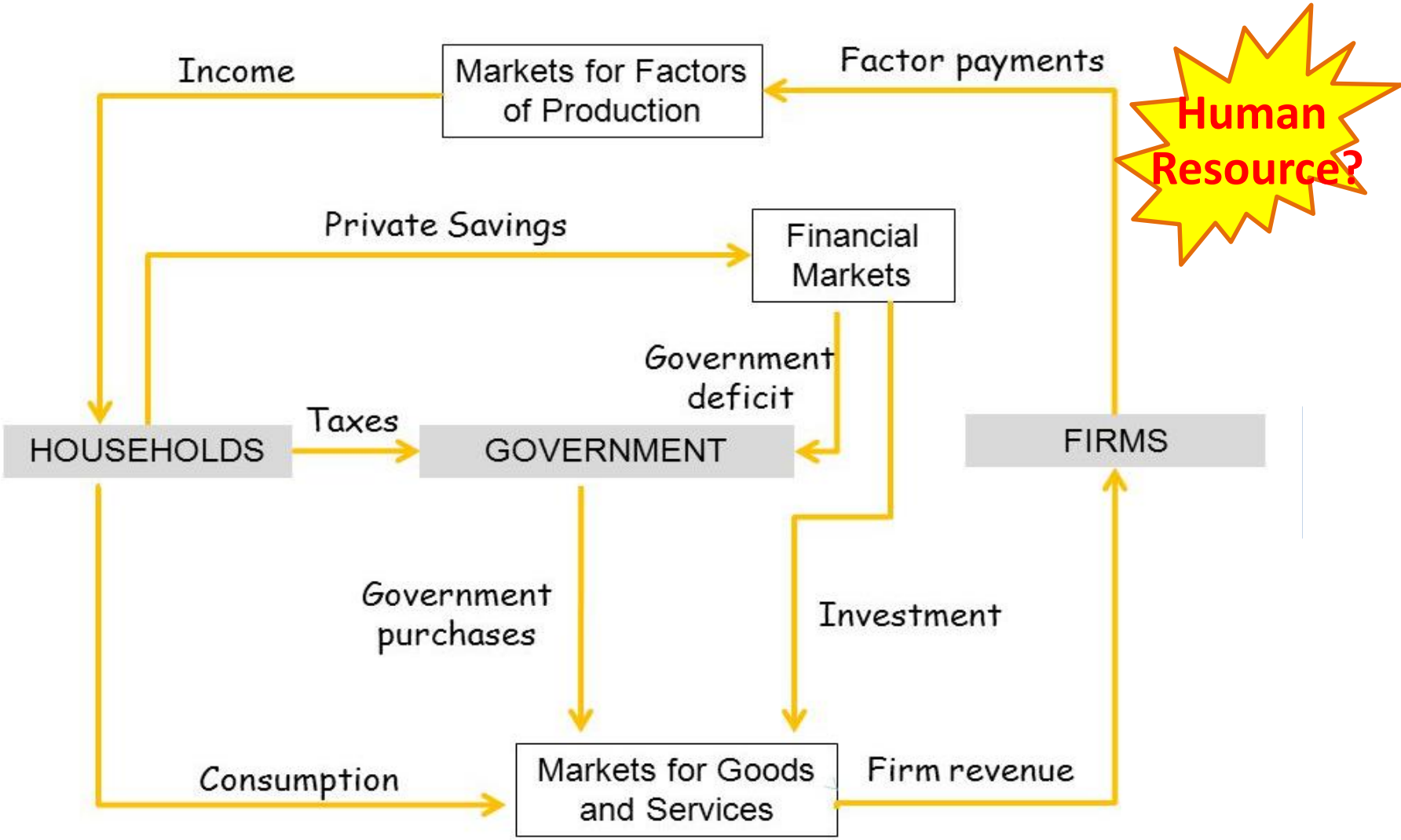


Labour force = the employed + the unemployed

Population = labour force + those outside labour force (i.e. children, inactive elderly)

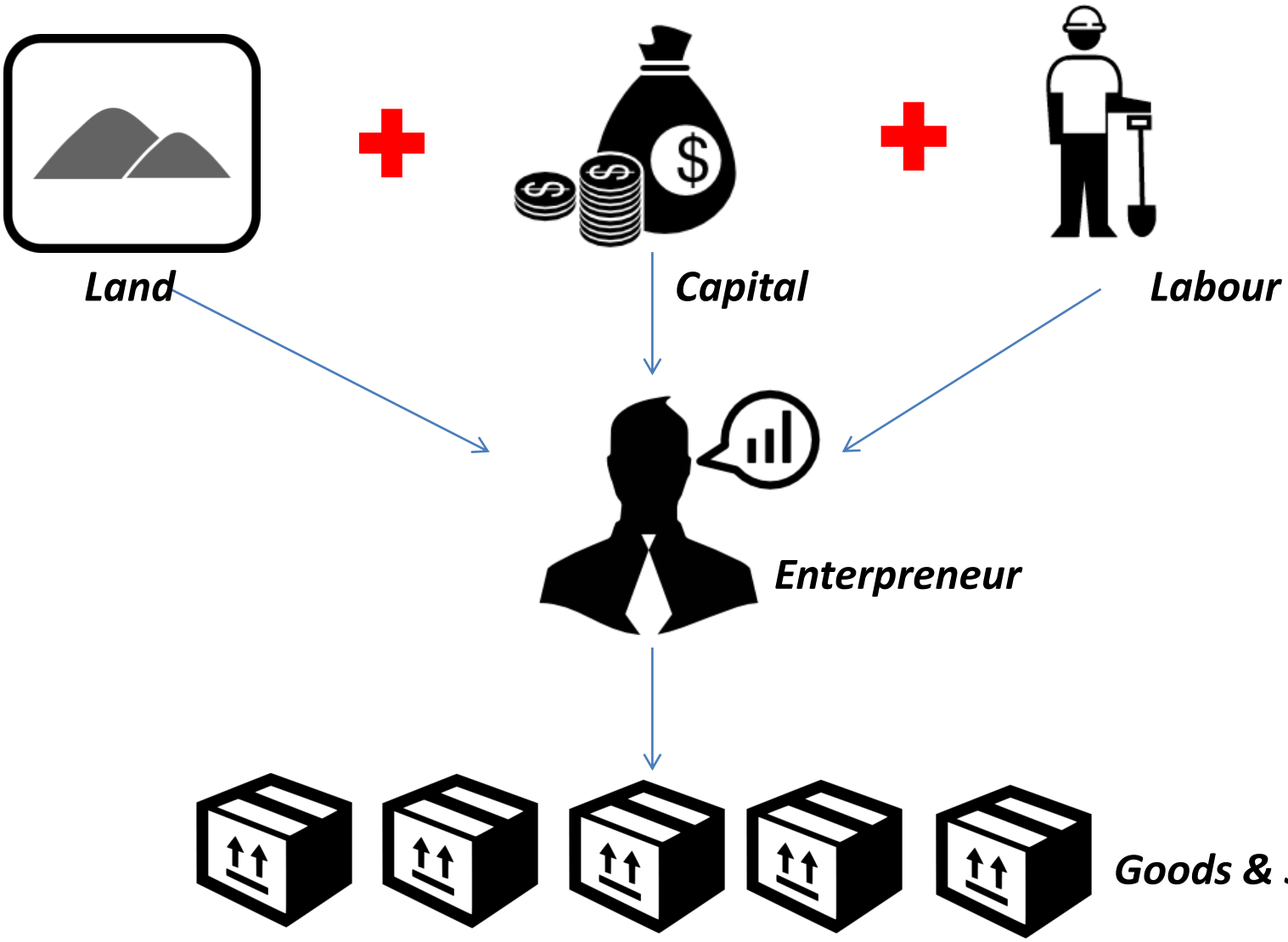
The Situations of Demographic Changes

Circular Flow of Income in Three-sector Economy



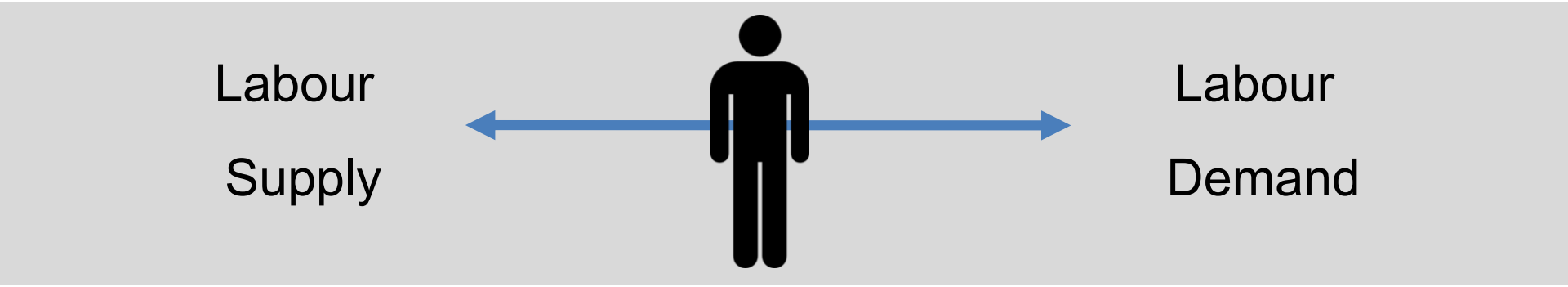
The Situations of Demographic Changes

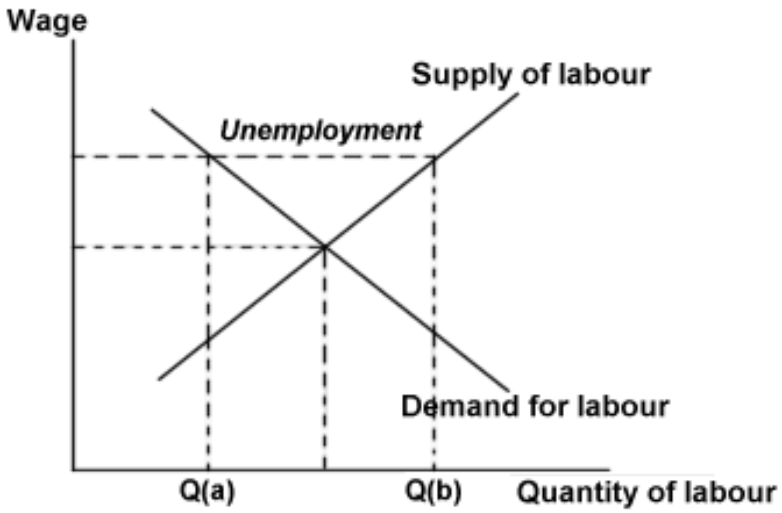
Human as a factor of production



The Situations of Demographic Changes

Human as a factor of production





- Negotiating Power
- Labour demand & supply
- EQUILIBRIUM
- Wages
- Labour productivity

The Situations of Demographic Changes

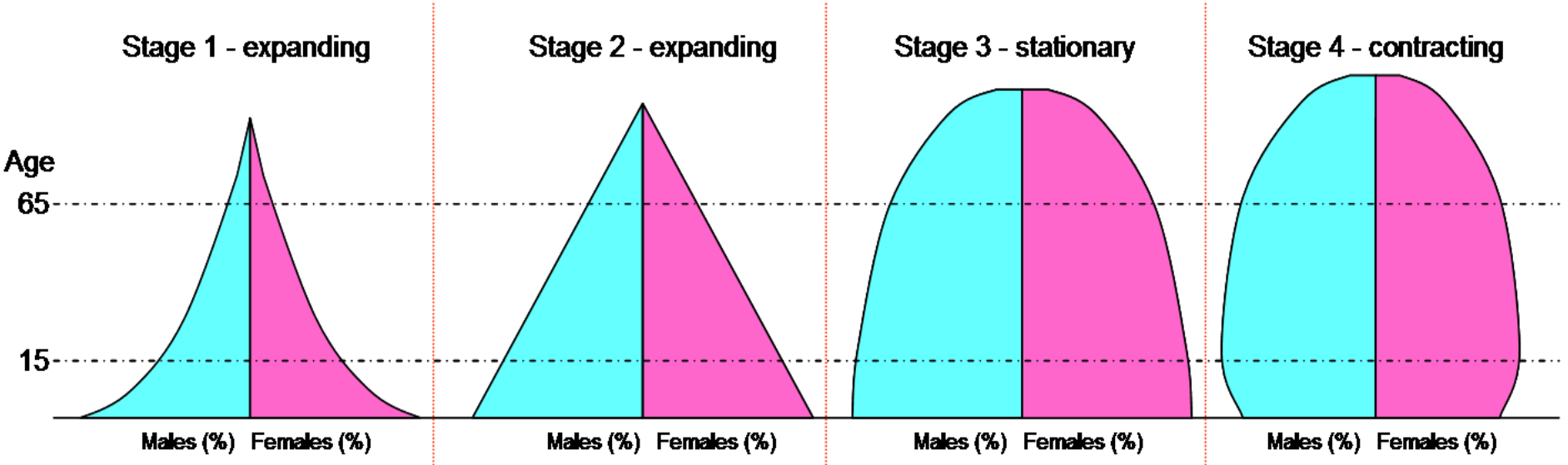
Economic Growth Theory

$$Y = f(K, L, R)$$

- Production Function: a function relating between physical capital (K) and labour (or human capital: K), also associating with residual (R).
- Robert M. Solow: R as a technological change (A).

The Situations of Demographic Changes

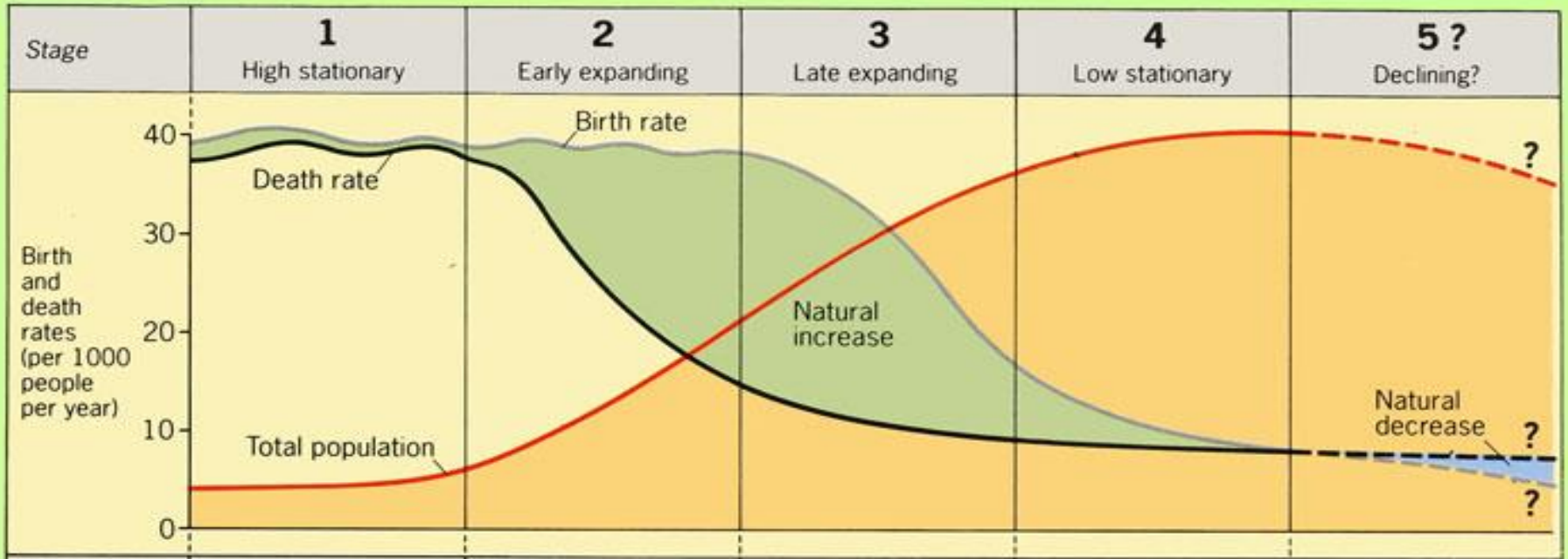
Demographic Transition Model - 4 stages of population pyramid



Stage 1 - expanding	Stage 2 - expanding	Stage 3 - stationary	Stage 4 - contracting
High birth rate; rapid fall in each upward age group due to high death rates; short life expectancy.	High birth rate; fall in death rate as more living in middle age; slightly longer life expectancy.	Declining birth rate; low death rate; more people living to old age.	Low birth rate; low death rate; higher dependency ratio; longer life expectancy

The Situations of Demographic Changes

Demographic Transition Model - from high to low stationary stage



Stage	1 High stationary	2 Early expanding	3 Late expanding	4 Low stationary	5 ? Declining?
Examples	A few remote groups	Egypt, Kenya, India	Brazil	USA, Japan France, UK	Germany
Birth rate	High	High	Falling	Low	Very low
Death rate	High	Falls rapidly	Falls more slowly	Low	Low
Natural increase	Stable or slow increase	Very rapid increase	Increase slows down	Stable or slow increase	Slow decrease
Reasons for changes in birth rate	Many children needed for farming. Many children die at an early age. Religious/social encouragement. No family planning.		Improved medical care and diet. Fewer children needed.	Family planning. Good health. Improving status of women. Later marriages.	
Reasons for changes in death rate	Disease, famine. Poor medical knowledge so many children die.	Improvements in medical care, water supply and sanitation. Fewer children die.		Good health care. Reliable food supply.	

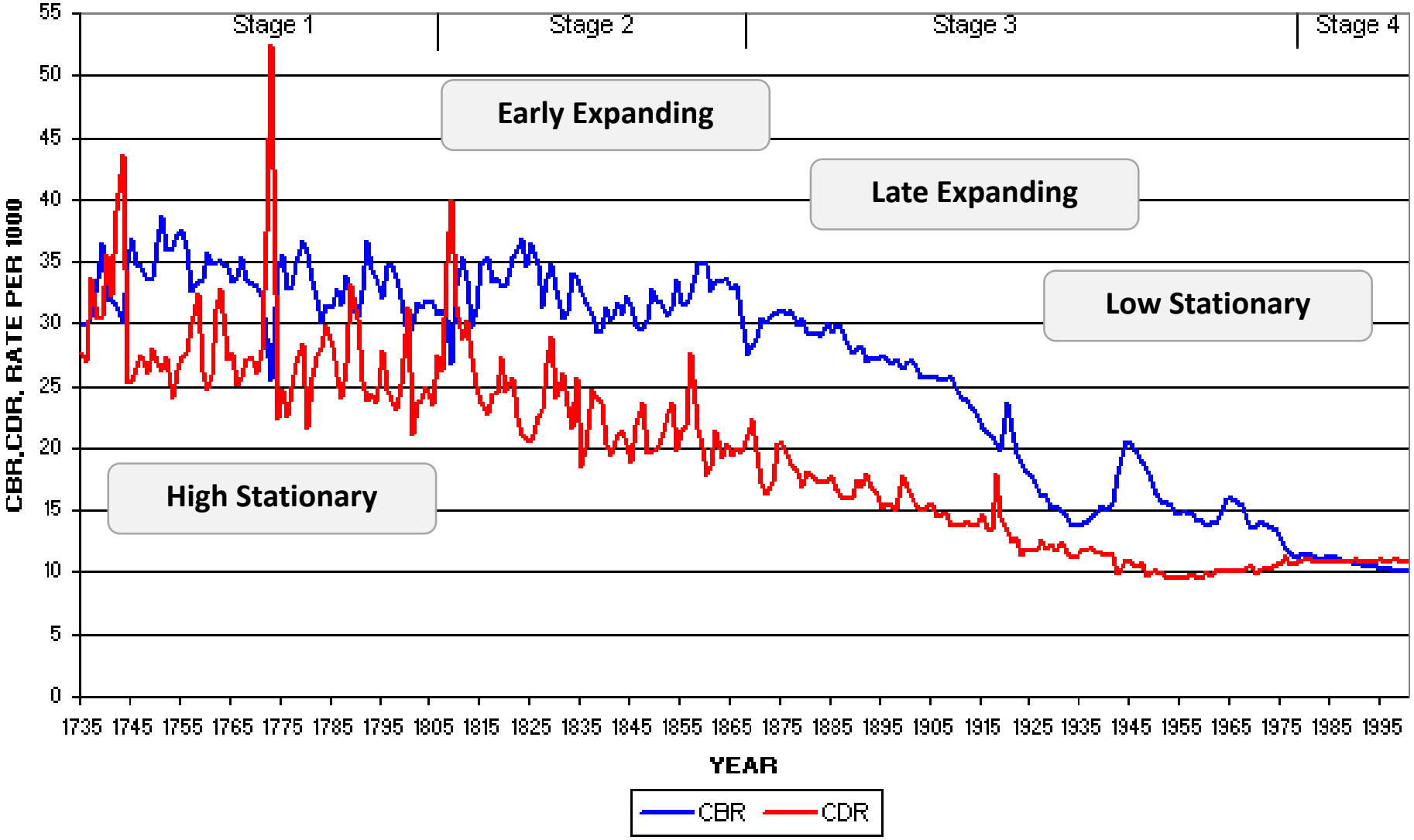
The Situations of Demographic Changes

Demographic Transition Model - from high to low stationary stage (con't)

Stage	Status	Description
1.	High Stationary	Population Growth is low, these are the Least Economically Developed Countries (LEDCs)
2.	Early Expanding	High Birth & Death Rates start to decline. Pop Growth Rate is High. This is in most of Developing Countries.
3.	Late Expanding	Slower Birth rates and continual slowdown in death rates. Population has proper family planning. Pop Growth Rate declines owing to rapid death rates like in Brazil & China PRC
4.	Low Stationary	Low Death Rates as medical care is advanced. Female labor force increase. Delaying Marriage. Slower growth in number of children. Pop Growth is stable. This is the case of Thailand, USA, Japan, Australia, UK and Canada
5.	Declining	Demographic Transition Model (DTM) predicts a declining Birth rate lower than Death rates resulting in 'Declining Pop Growth'. This is the case of Germany and Some East Asian Countries.

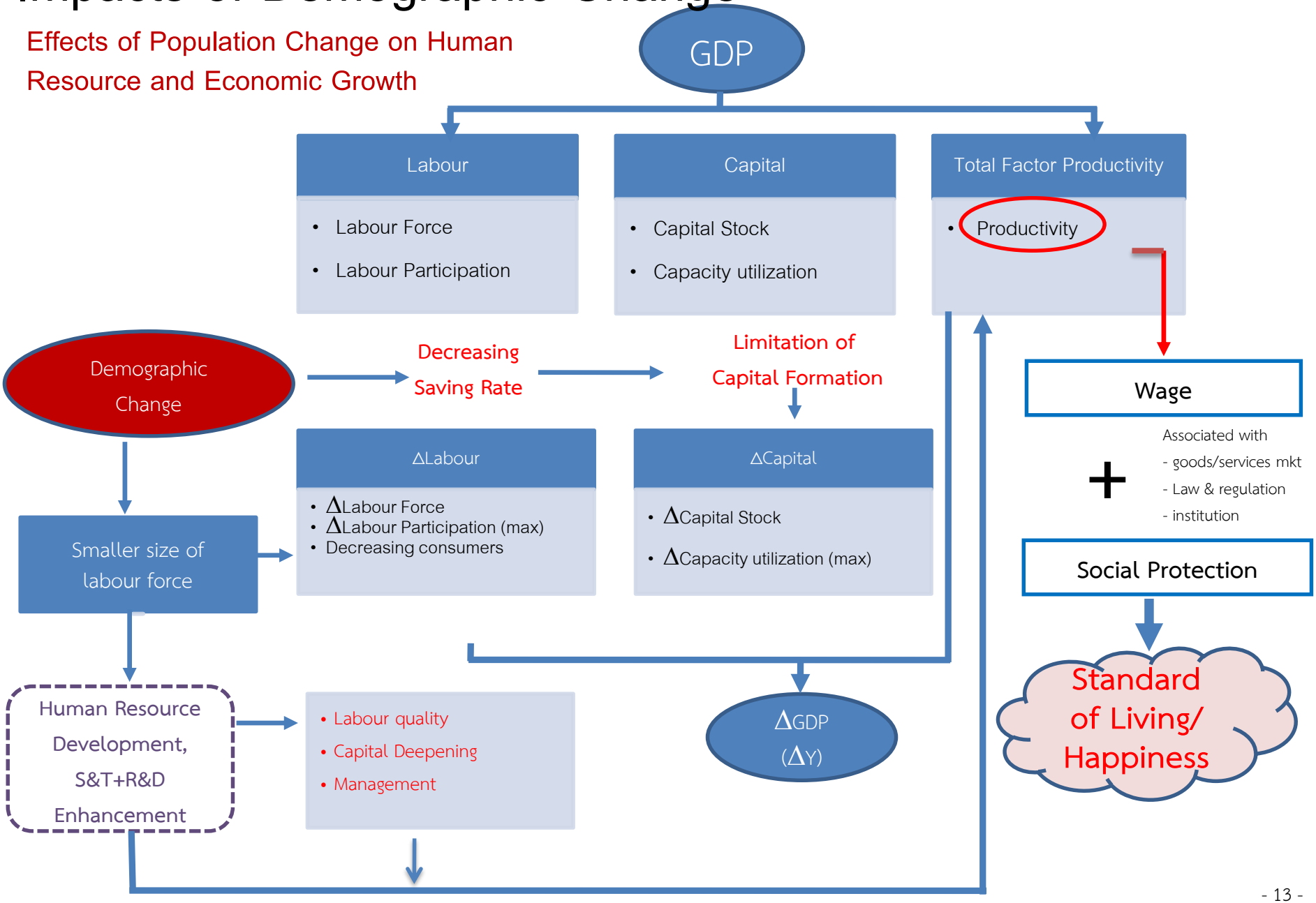
The Situations of Demographic Changes

Demographic Change: A Case of Sweden (1735-2000)



Impacts of Demographic Change

Effects of Population Change on Human Resource and Economic Growth



How many people are in the World now?

The Situations of Demographic Changes

Population of the World

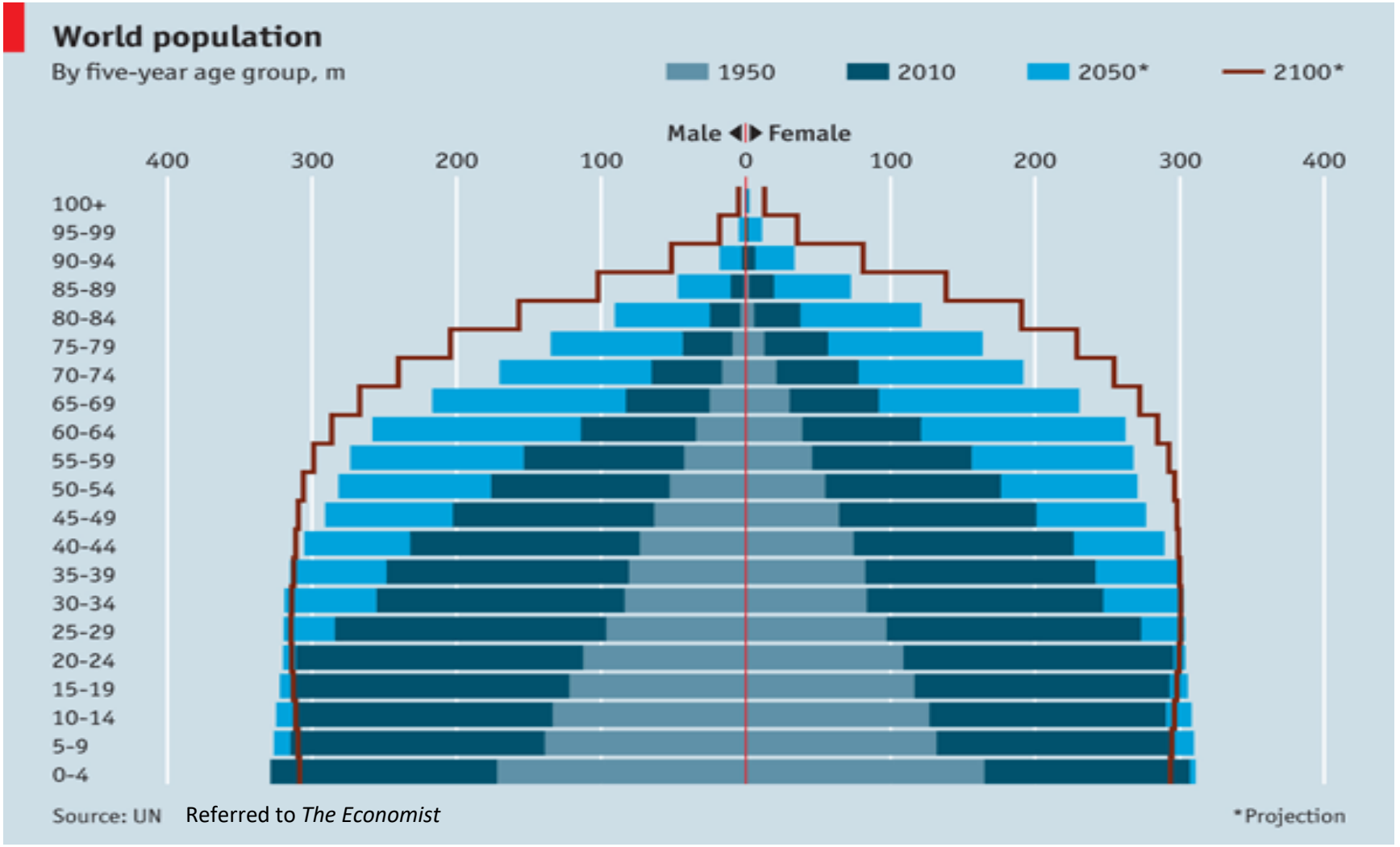
TABLE 1. POPULATION OF THE WORLD AND MAJOR AREAS, 2015, 2030, 2050 AND 2100, ACCORDING TO THE MEDIUM-VARIANT PROJECTION

Major area	*Population (millions)*				
	2015	*2030*	*2050*	*2100*	
World	7 349	8 501	9 725	11 213	↑
Africa	1 186	1 679	2 478	4 387	↑
Asia	4 393	4 923	5 267	4 889	↓
Europe	738	734	707	646	↓
Latin America and the Caribbean	634	721	784	721	↓
Northern America	358	396	433	500	↑
Oceania	39	47	57	71	↑

Source: United Nations, Department of Economic and Social Affairs, Population Division (2015). *World Population Prospects: The 2015 Revision*. New York: United Nations.

The Situations of Demographic Changes

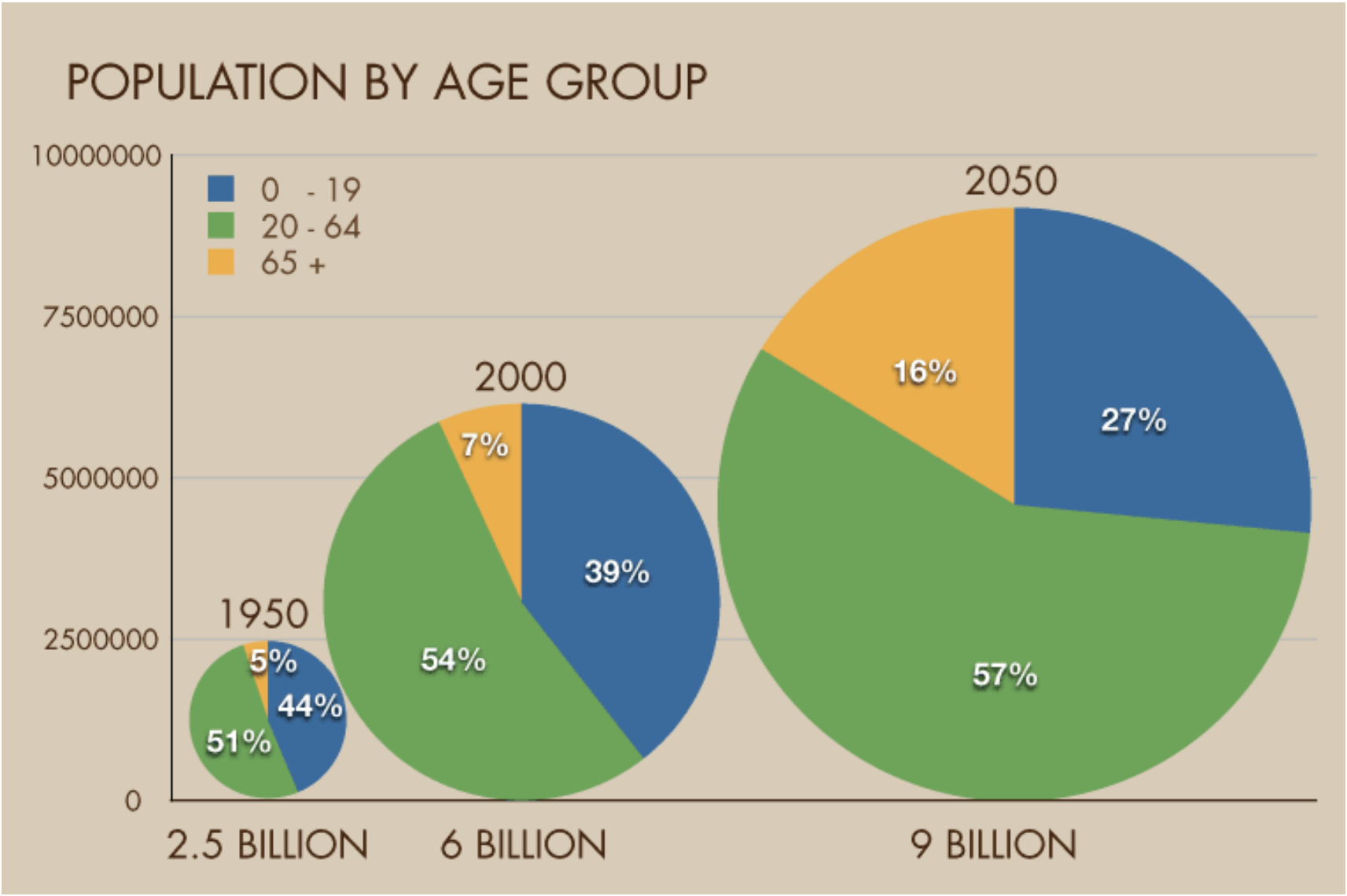
World Population: 1950 – 2100



Referred to *The Economist*

The World in 2015

The Situations of Demographic Changes

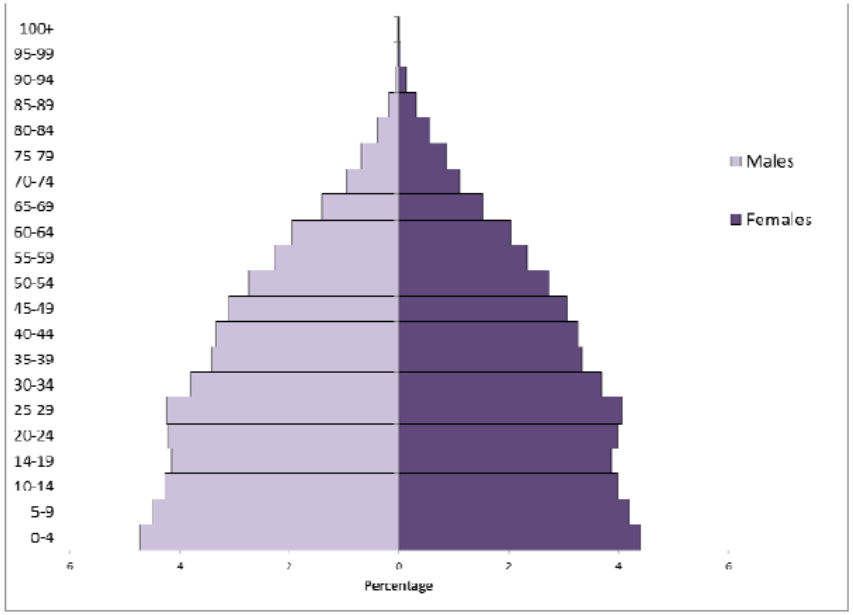


Source: http://wisdom.unu.edu/en/ageing-societies/ calculated from Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2005 Revision, http://esa.un.org/unpp

The Situations of Demographic Changes

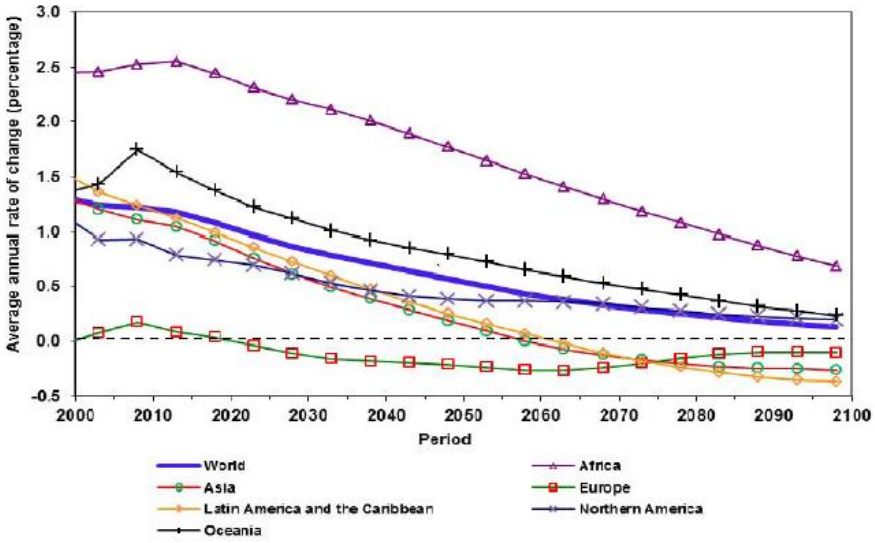
Population of the World

Figure 1. Distribution of the world's population by age and sex, 2015



Source: United Nations, Department of Economic and Social Affairs, Population Division (2015). *World Population Prospects: The 2015 Revision*. New York: United Nations.

Figure 3. Average annual rate of population change by major area, estimates, 2000-2015, and medium-variant projection, 2015-2100

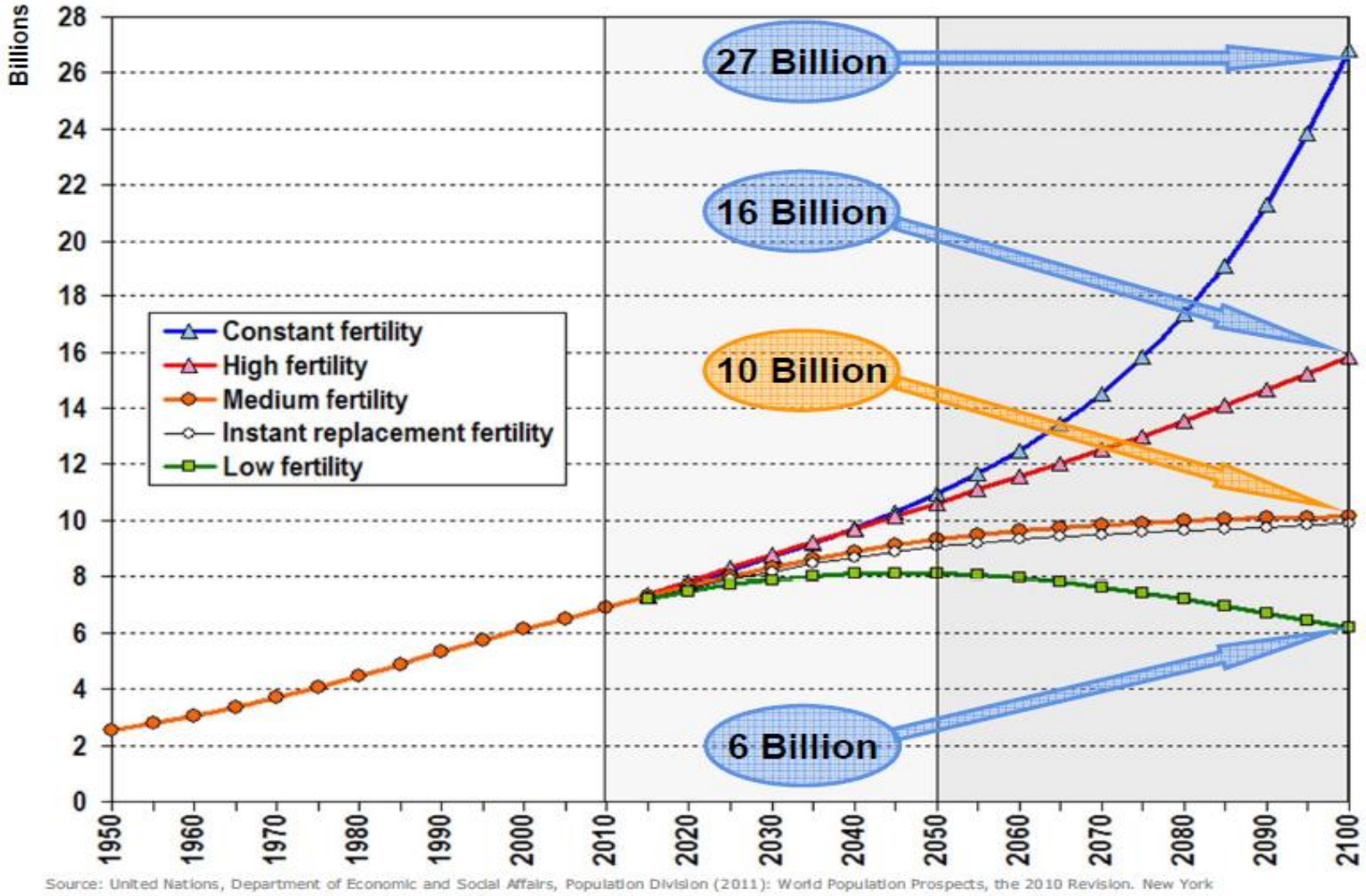


Source: United Nations, Department of Economic and Social Affairs, Population Division (2015). *World Population Prospects: The 2015 Revision*. New York: United Nations.

In 2015, 50.4 per cent of the world's population is male and 49.6 per cent is female (figure 1). The median age of the global population, that is, the age at which half the population is older and half is younger, is 29.6 years. About one-quarter (26 per cent) of the world's people are under 15 years of age, 62 per cent are aged 15-59 years, and 12 per cent are 60 or over.

The Situations of Demographic Changes

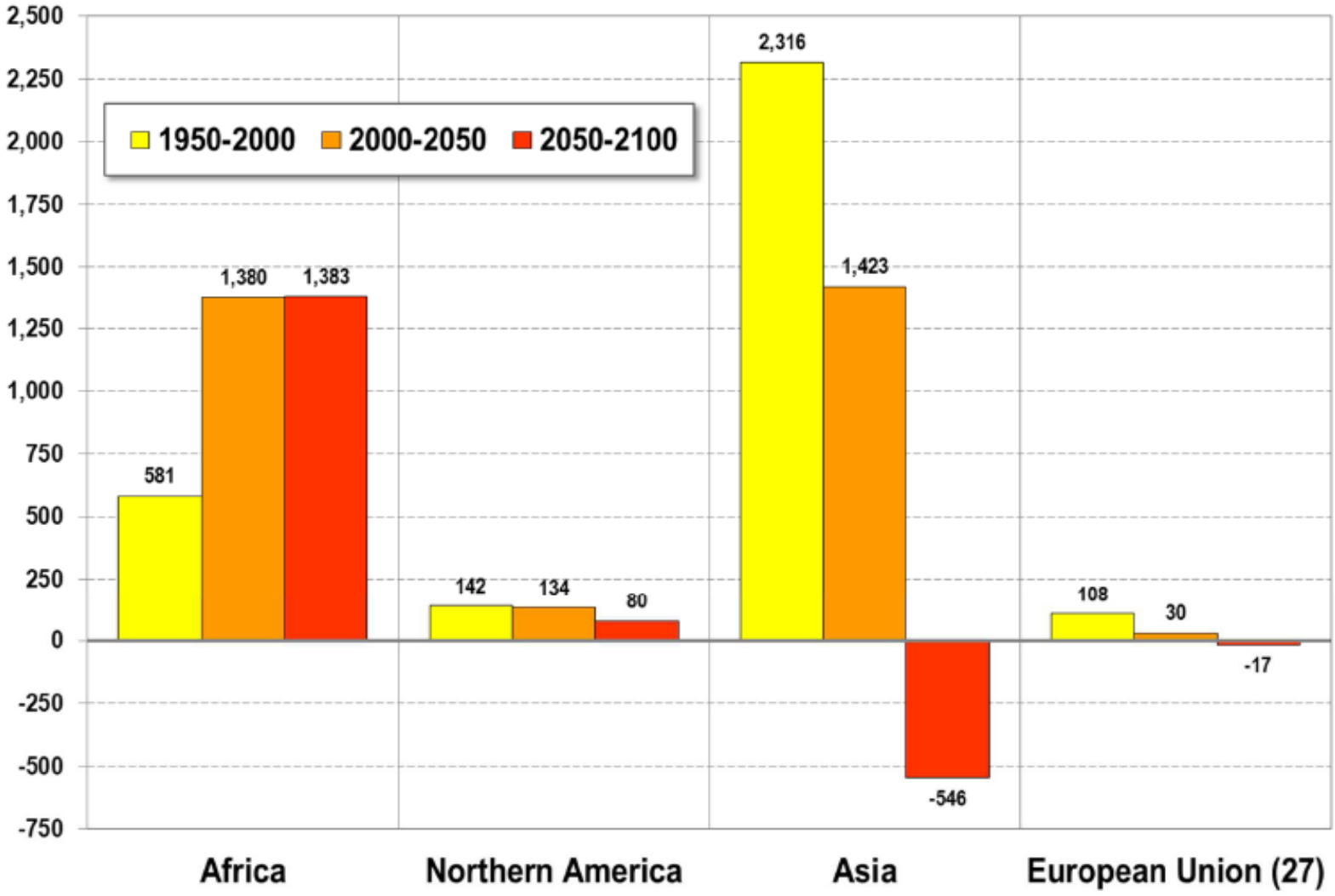
World Population: Total Population by Variant, 1950 – 2100



Referred to: Heilig, G. K. (2012), Strategic Implication of Demographic Change in Asia

The Situations of Demographic Changes

World Population: Change in Population, 1950 – 2100 (millions)

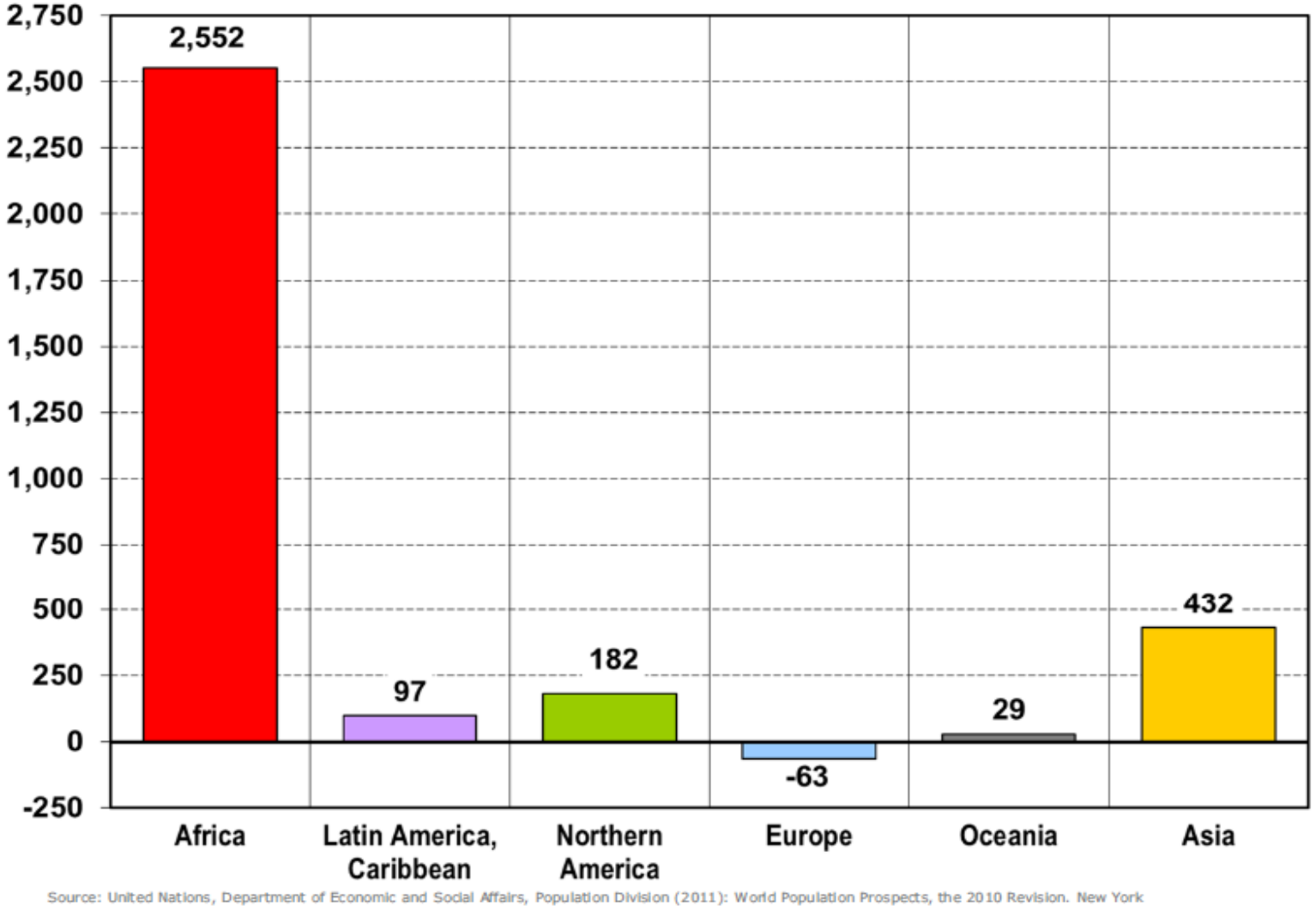


Source: United Nations, Department of Economic and Social Affairs, Population Division (2011): World Population Prospects, the 2010 Revision. New York

Referred to: Heilig, G. K. (2012), Strategic Implication of Demographic Change in Asia

The Situations of Demographic Changes

World Population: Change in Population, 2100 – 2100 (millions)

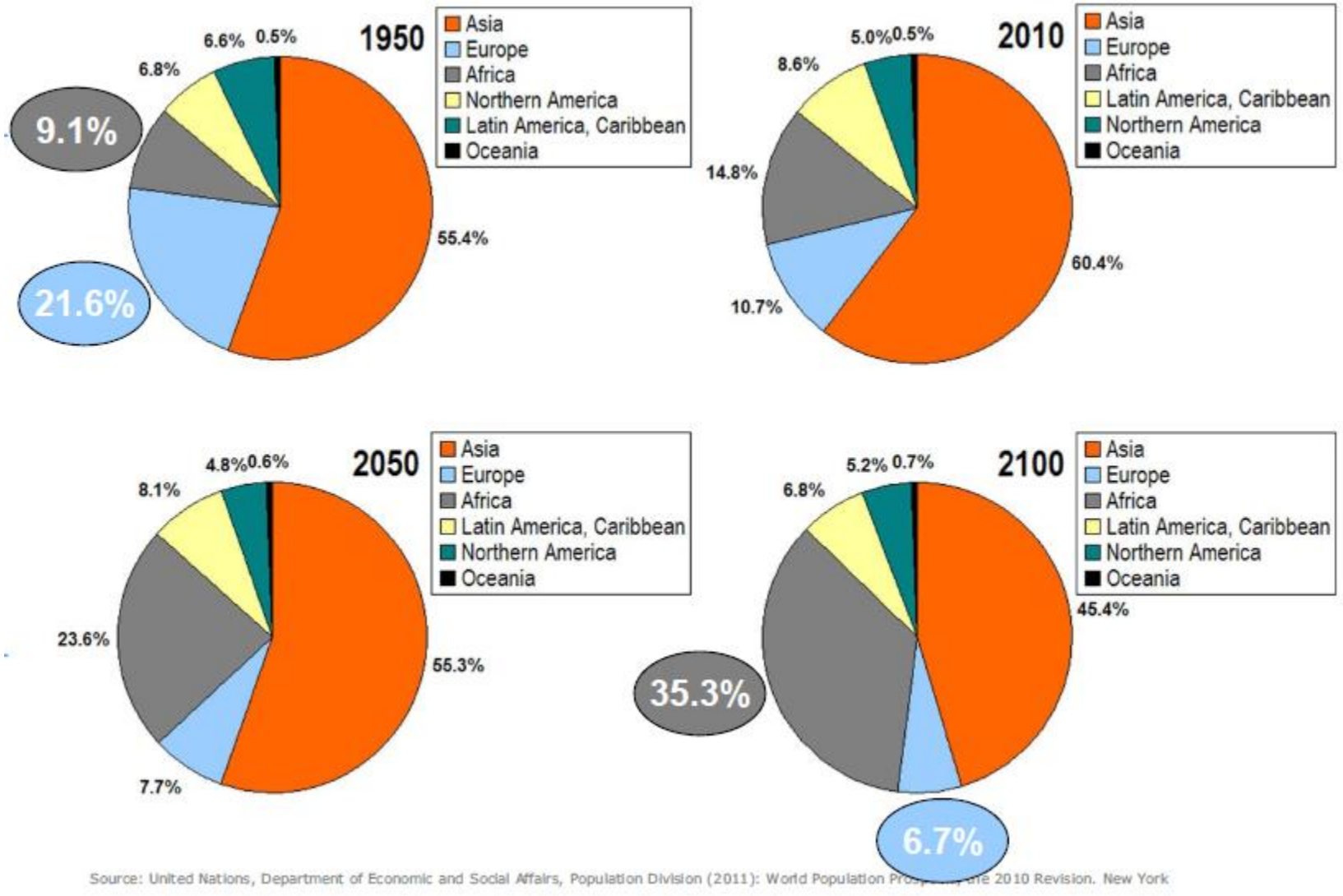


Source: United Nations, Department of Economic and Social Affairs, Population Division (2011): World Population Prospects, the 2010 Revision. New York

Referred to: Heilig, G. K. (2012), Strategic Implication of Demographic Change in Asia

The Situations of Demographic Changes

World Population: Total Population by Major Areas (1950 – 2100)

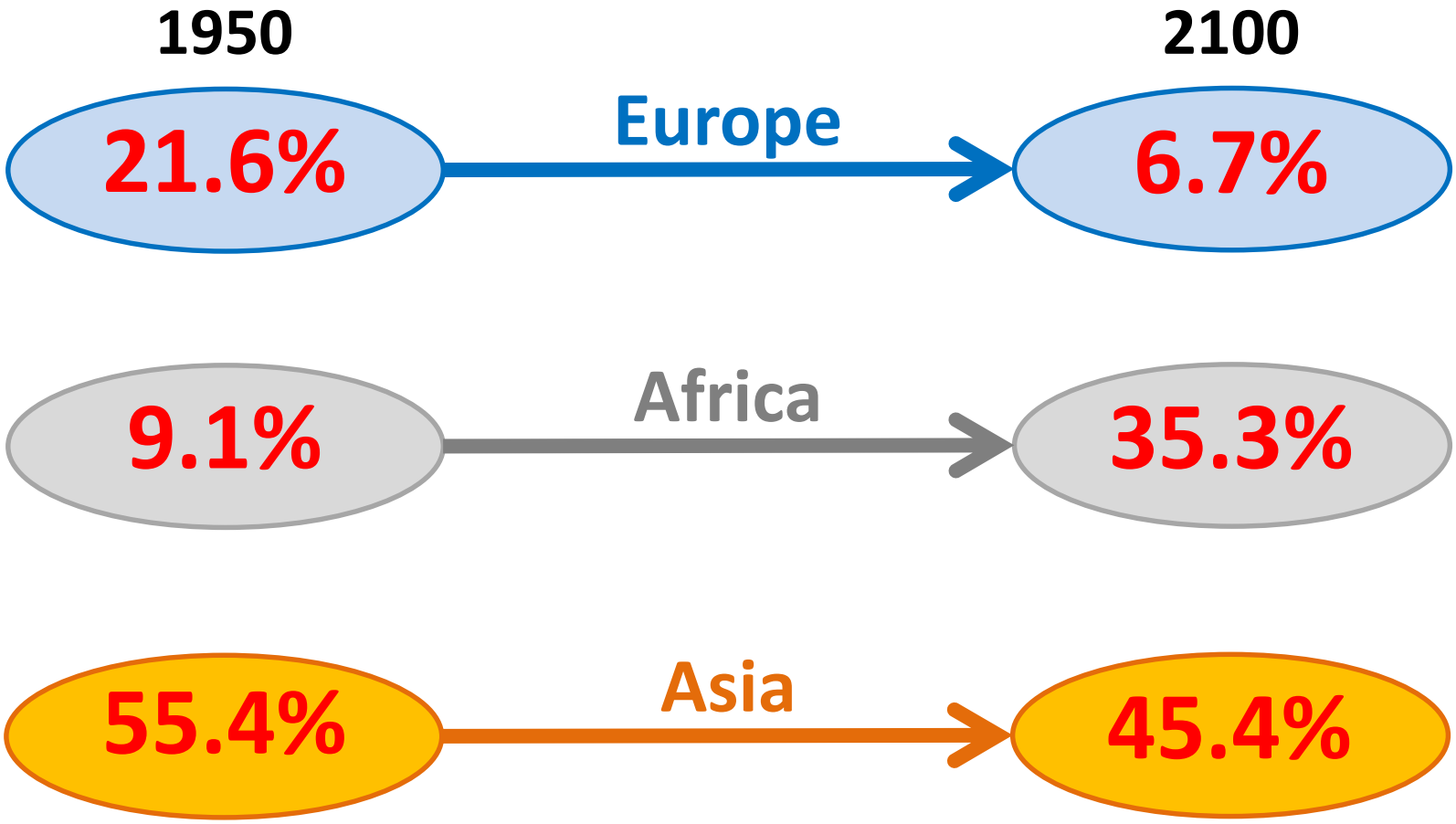


Source: United Nations, Department of Economic and Social Affairs, Population Division (2011): World Population Prospects: the 2010 Revision. New York

Referred to: Heilig, G. K. (2012), Strategic Implication of Demographic Change in Asia

The Situations of Demographic Changes

World Population: Share of Population (percent)



Referred to: Heilig, G. K. (2012), Strategic Implication of Demographic Change in Asia

World Population: 1950 & 2015

TABLE S.3. COUNTRIES ACCOUNTING FOR ABOUT 75 PER CENT OF THE WORLD POPULATION ORDERED BY POPULATION SIZE, 1950, 2015, 2050 AND 2100 (MEDIUM VARIANT)

Rank	*Country or area*	*Population in 1950 (millions)*	*Cumulated percentage*	*Rank*	*Country or area*	*Population in 2015 (millions)*	*Cumulated percentage*
1.	China	544	21.5	1.	China	1 376	18.7
2.	India	376	36.5	2.	India	1 311	36.6
3.	United States of America	158	42.7	3.	United States of America	322	40.9
4.	Russian Federation	103	46.8	4.	Indonesia	258	44.4
5.	Japan	82	50.0	5.	Brazil	208	47.3
6.	Germany	70	52.8	6.	Pakistan	189	49.8
7.	Indonesia	70	55.5	7.	Nigeria	182	52.3
8.	Brazil	54	57.7	8.	Bangladesh	161	54.5
9.	United Kingdom	51	59.7	9.	Russian Federation	143	56.5
10.	Italy	47	61.5	10.	Mexico	127	58.2
11.	France	42	63.2	11.	Japan	127	59.9
12.	Bangladesh	38	64.7	12.	Philippines	101	61.3
13.	Nigeria	38	66.2	13.	Ethiopia	99	62.6
14.	Pakistan	38	67.7	14.	Viet Nam	93	63.9
15.	Ukraine	37	69.2	15.	Egypt	92	65.2
16.	Spain	28	70.3	16.	Germany	81	66.3
17.	Mexico	28	71.4	17.	Iran (Islamic Republic of)	79	67.3
18.	Poland	25	72.4	18.	Turkey	79	68.4
19.	Viet Nam	25	73.3	19.	Dem. Rep. of the Congo	77	69.5
20.	Turkey	21	74.2	20.	Thailand	68	70.4
21.	Egypt	21	75.0	21.	United Kingdom	65	71.3
				22.	France	64	72.1
				23.	Italy	60	72.9
				24.	South Africa	54	73.7
				25.	Myanmar	54	74.4
				26.	United Rep. of Tanzania	53	75.1

World Population: 2050 & 2100

Rank	*Country or area*	*Population in 2050 (millions)*	*Cumulated percentage*	*Rank*	*Country or area*	*Population in 2100 (millions)*	*Cumulated percentage*
1.	India	1 705	17.5	1.	India	1 660	14.8
2.	China	1 348	31.4	2.	China	1 004	23.8
3.	Nigeria	399	35.5	3.	Nigeria	752	30.5
4.	United States of America	389	39.5	4.	United States of America	450	34.5
5.	Indonesia	321	42.8	5.	Dem. Rep. of the Congo	389	38.0
6.	Pakistan	310	46.0	6.	Pakistan	364	41.2
7.	Brazil	238	48.4	7.	Indonesia	314	44.0
8.	Bangladesh	202	50.5	8.	United Rep. of Tanzania	299	46.7
9.	Dem. Rep. of the Congo	195	52.5	9.	Ethiopia	243	48.8
10.	Ethiopia	188	54.5	10.	Niger	209	50.7
11.	Mexico	164	56.1	11.	Uganda	203	52.5
12.	Egypt	151	57.7	12.	Egypt	201	54.3
13.	Philippines	148	59.2	13.	Brazil	200	56.1
14.	United Rep. of Tanzania	137	60.6	14.	Bangladesh	170	57.6
15.	Russian Federation	129	62.0	15.	Philippines	169	59.1
16.	Viet Nam	113	63.1	16.	Iraq	164	60.6
17.	Japan	107	64.2	17.	Kenya	157	62.0
18.	Uganda	102	65.3	18.	Mexico	148	63.3
19.	Turkey	96	66.3	19.	Angola	139	64.5
20.	Kenya	96	67.2	20.	Mozambique	128	65.7
21.	Iran (Islamic Republic of)	92	68.2	21.	Sudan	127	66.8
22.	Iraq	84	69.0	22.	Russian Federation	117	67.8
23.	Sudan	80	69.9	23.	Madagascar	105	68.8
24.	United Kingdom	75	70.6	24.	Viet Nam	105	69.7
25.	Germany	75	71.4	25.	Zambia	105	70.7
26.	Niger	72	72.2	26.	Côte d'Ivoire	101	71.6
27.	France	71	72.9	27.	Mali	93	72.4
28.	Mozambique	66	73.6	28.	Turkey	88	73.2
29.	South Africa	66	74.2	29.	Malawi	87	73.9
30.	Angola	65	74.9	30.	Japan	83	74.7
31.	Myanmar	64	75.6	31.	Cameroon	82	75.4

Source: United Nations, Department of Economic and Social Affairs, Population Division (2015). *World Population Prospects: The 2015 Revision.* New York: United Nations.

Who are the old? Who are the young?

TABLE S.7. TEN COUNTRIES WITH THE OLDEST AND THE YOUNGEST POPULATIONS, 1950, 1980, 2015, 2030 AND 2050
(MEDIUM VARIANT)

	1950		1980		2015		2030		2050	
	Country or area	Median age (years)	Country or area	Median age (years)	Country or area	Median age (years)	Country or area	Median age (years)	Country or area	Median age (years)
					A. Oldest populations					
1.	Channel Islands	35.7	Germany	36.4	Japan	46.5	Japan	51.5	Other non-specified areas	56.2
2.	Austria	35.7	Sweden	36.2	Germany	46.2	Italy	50.8	Republic of Korea	53.9
3.	Belgium	35.5	Austria	35.0	Martinique	46.1	Portugal	50.2	Japan	53.3
4.	Germany	35.3	Luxembourg	35.0	Italy	45.9	Spain	50.1	Bosnia and Herzegovina	53.2
5.	Luxembourg	35.0	Latvia	35.0	Portugal	44.0	Greece	48.9	Singapore	53.0
6.	United Kingdom	34.9	Channel Islands	34.9	Greece	43.6	China, Hong Kong SAR	48.6	China, Hong Kong SAR	52.7
7.	France	34.7	Switzerland	34.6	Bulgaria	43.5	Germany	48.6	Portugal	52.5
8.	Sweden	34.2	Hungary	34.4	Austria	43.2	Other non-specified areas	48.1	Greece	52.3
9.	Switzerland	33.2	United Kingdom	34.4	China, Hong Kong SAR	43.2	Slovenia	48.1	Cuba	51.9
10.	Norway	32.6	Denmark	34.3	Spain	43.2	Republic of Korea	47.5	Poland	51.8
					B. Youngest populations					
1.	Niger	15.2	Kenya	15.0	Niger	14.8	Niger	15.2	Niger	17.8
2.	St. Vincent and the Grenadines	15.4	State of Palestine	15.1	Uganda	15.9	Somalia	17.7	Somalia	20.8
3.	Tonga	15.5	Yemen	15.3	Chad	16.0	Angola	17.7	Angola	21.0
4.	Grenada	16.3	Mayotte	15.4	Angola	16.1	Chad	17.9	Zambia	21.4
5.	Paraguay	16.5	Jordan	15.5	Mali	16.2	Mali	17.9	Mali	21.4
6.	Djibouti	16.5	Zimbabwe	15.5	Somalia	16.5	Uganda	18.1	Chad	21.7
7.	Samoa	16.6	Swaziland	15.6	Gambia	16.8	Gambia	18.3	Burundi	21.8
8.	Fiji	16.6	Syrian Arab Republic	15.6	Zambia	16.9	Burundi	18.5	Uganda	21.9
9.	Vanuatu	16.8	Zambia	15.9	Dem. Republic of the Congo	16.9	Zambia	18.5	Gambia	22.1
10.	United Republic of Tanzania	16.9	Rwanda	16.0	Burkina Faso	17.0	Dem. Republic of the Congo	18.6	United Republic of Tanzania	22.2
	WORLD	23.5	WORLD	22.5	WORLD	29.6	WORLD	33.1	WORLD	36.1

Source: United Nations, Department of Economic and Social Affairs, Population Division (2015). *World Population Prospects: The 2015 Revision*. New York: United Nations.
NOTE: Only countries or areas with 90,000 persons or more in 2015 are considered.

	Median age (years)					
Country or area	1950	1980	2015	2030	2050	2100
World	**23.5**	**22.5**	**29.6**	**33.1**	**36.1**	**41.7**
Thailand	18.6	19.7	38.0	44.8	50.6	51.9

Total Fertility Rate (TFR)

TABLE S.10. TEN COUNTRIES WITH THE HIGHEST AND THE LOWEST TOTAL FERTILITY, 1975-1980, 2010-2015, 2025-2030 AND 2045-2050

1975-1980			*2010-2015*			*2025-2030*			*2045-2050*		
Rank	*Country or area*	*Total fertility (average number of children per woman)*	*Rank*	*Country or area*	*Total fertility (average number of children per woman)*	*Rank*	*Country or area*	*Total fertility (average number of children per woman)*	*Rank*	*Country or area*	*Total fertility (average number of children per woman)*
					A. Highest fertility						
1.	Yemen	8.50	1.	Niger	7.63	1.	Niger	6.68	1.	Niger	4.87
2.	Rwanda	8.43	2.	Somalia	6.61	2.	Somalia	5.22	2.	Somalia	3.79
3.	Oman	8.10	3.	Mali	6.35	3.	Mali	5.03	3.	Zambia	3.73
4.	Mayotte	7.91	4.	Chad	6.31	4.	Angola	4.98	4.	Burundi	3.69
5.	Côte d'Ivoire	7.81	5.	Angola	6.20	5.	Burundi	4.89	5.	Angola	3.64
6.	Libya	7.67	6.	Dem. Republic of the Congo	6.15	6.	Gambia	4.87	6.	Nigeria	3.59
7.	Kenya	7.64	7.	Burundi	6.08	7.	Chad	4.85	7.	Mali	3.57
8.	Niger	7.63	8.	Uganda	5.91	8.	Dem. Republic of the Congo	4.77	8.	Gambia	3.48
9.	Malawi	7.60	9.	Timor-Leste	5.91	9.	Nigeria	4.74	9.	Chad	3.46
10.	State of Palestine	7.50	10.	Gambia	5.78	10.	Uganda	4.62	10.	Dem. Republic of the Congo	3.43
					B. Lowest fertility						
1.	China, Macao SAR	1.41	1.	Other non-specified areas	1.07	1.	Other non-specified areas	1.15	1.	Singapore	1.38
2.	Luxembourg	1.49	2.	China, Macao SAR	1.19	2.	Bosnia and Herzegovina	1.29	2.	Other non-specified areas	1.45
3.	Germany	1.51	3.	China, Hong Kong SAR	1.20	3.	Republic of Moldova	1.31	3.	Bosnia and Herzegovina	1.51
4.	Channel Islands	1.52	4.	Singapore	1.23	4.	Singapore	1.31	4.	Portugal	1.52
5.	Switzerland	1.54	5.	Republic of Korea	1.26	5.	Portugal	1.31	5.	Republic of Moldova	1.52
6.	Netherlands	1.60	6.	Republic of Moldova	1.27	6.	Greece	1.37	6.	Greece	1.56
7.	Austria	1.65	7.	Bosnia and Herzegovina	1.28	7.	Poland	1.38	7.	Poland	1.56
8.	Finland	1.66	8.	Portugal	1.28	8.	Thailand	1.43	8.	Thailand	1.58
9.	Sweden	1.66	9.	Spain	1.32	9.	China, Hong Kong SAR	1.44	9.	Bhutan	1.59
10.	Denmark	1.68	10.	Hungary	1.34	10.	Republic of Korea	1.45	10.	Cyprus	1.60
	WORLD	3.87		WORLD	2.51		WORLD	2.38		WORLD	2.25

Source: United Nations, Department of Economic and Social Affairs, Population Division (2015). *World Population Prospects: The 2015 Revision*. New York: United Nations.
NOTE: Only countries or areas with 90,000 persons or more in 2015 are considered.

	Total fertility (average number of children per woman)							
Country or area	*1975-1980*	*1990-1995*	*2005-2010*	*2010-2015*	*2015-2020*	*2025-2030*	*2045-2050*	*2095-2100*
World	**3.87**	**3.04**	**2.56**	**2.51**	**2.47**	**2.38**	**2.25**	**1.99**
Thailand	3.92	1.99	1.56	1.53	1.46	1.43	1.58	1.78

Outline

1. Labour and Demography
2. **Human Resource Development**
3. Selected Topics: Ageing Society & Its Economic Impacts

2. Human Resource Development

✓Education

- Age-earning profile
- Investment in education
- Public & private returns

✓Training

- General and specific training
- Players & payers

✓Migration

- Push & pull factors
- Benefit-cost analysis
- Intra- & inter-migration, brain drain

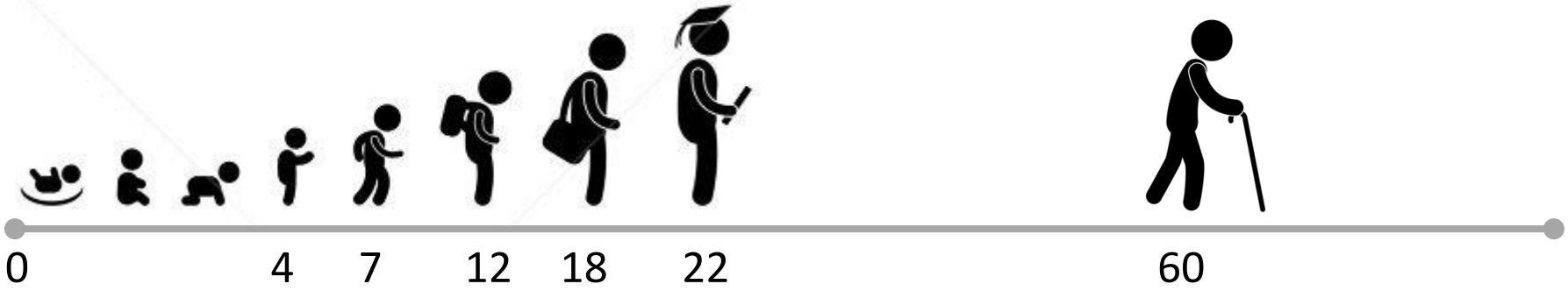
✓Healthcare

2. Human Resource Development

(1) Education

2. Human Resource Development

(1) Education – investment or consumption?

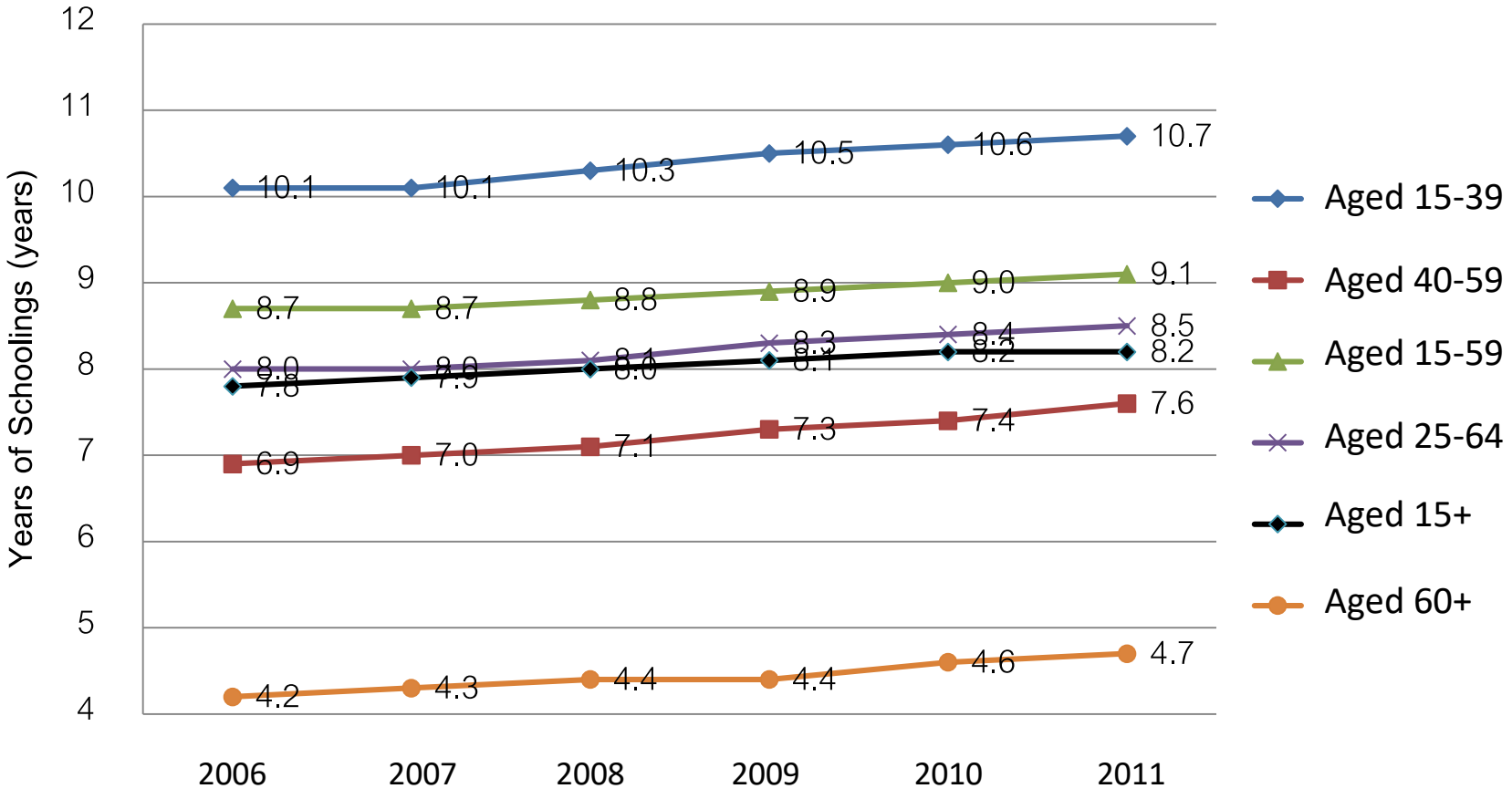


- Who decide to study?
- Who invest in education?
- Who get benefits from education investment?

- Student?
- Parents?
- Government?
- Society?
- Or else?

2. Human Resource Development

(1) Education – average years of schooling, Thailand (2006-2011)



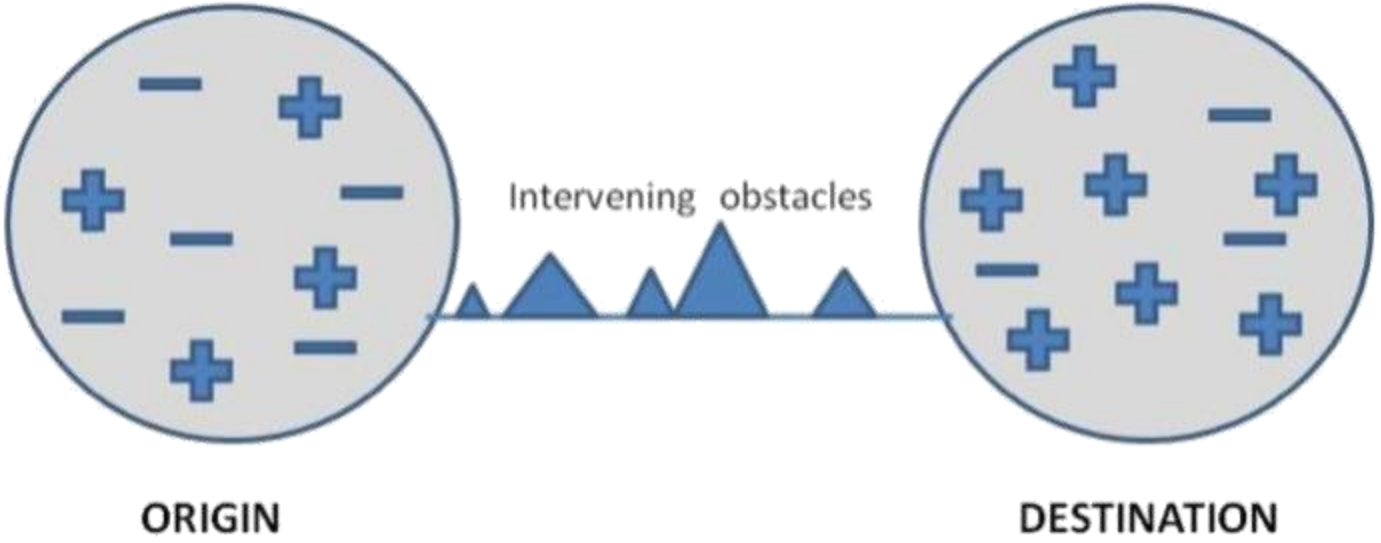
2. Human Resource Development

(2) Training – to increase labour productivity

- Training: aiming to increase labour productivity
- Reasons: changes of socio-economic factors, and technology & innovation
- There are 4 types of trainings:
  (1) On-the-job training
  (2) Off-the-job-training
  (3) On-the-chance training
  (4) Self-improvement

2. Human Resource Development

(3) Migration – from one place to another place

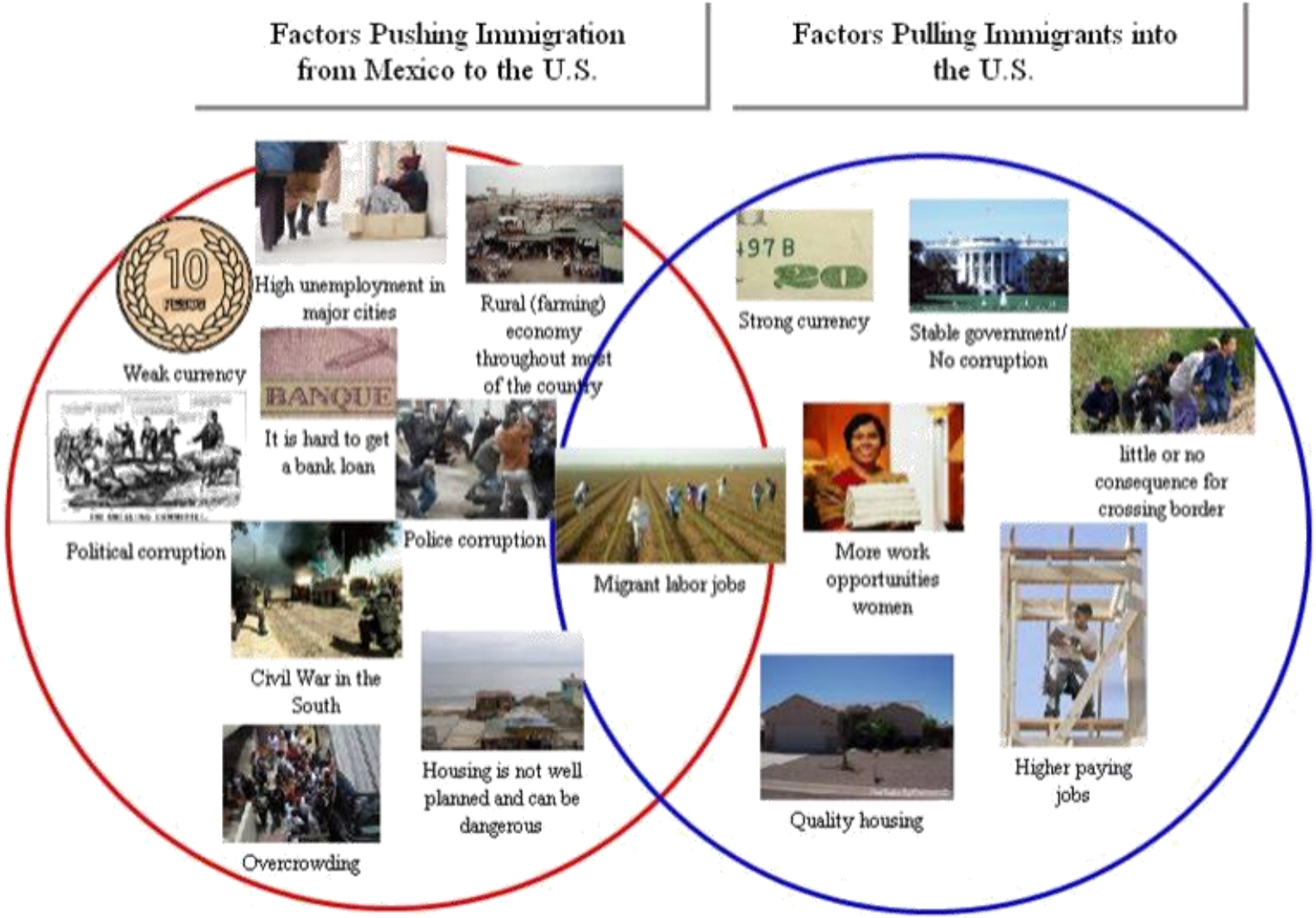


Factors of migration

- **Push Factors (–)** i.e. high cost of living, bad neighbour, and insufficient resources.
- **Pull Factors (+)** i.e. low cost of living, good standard of living, good environment, and resources.

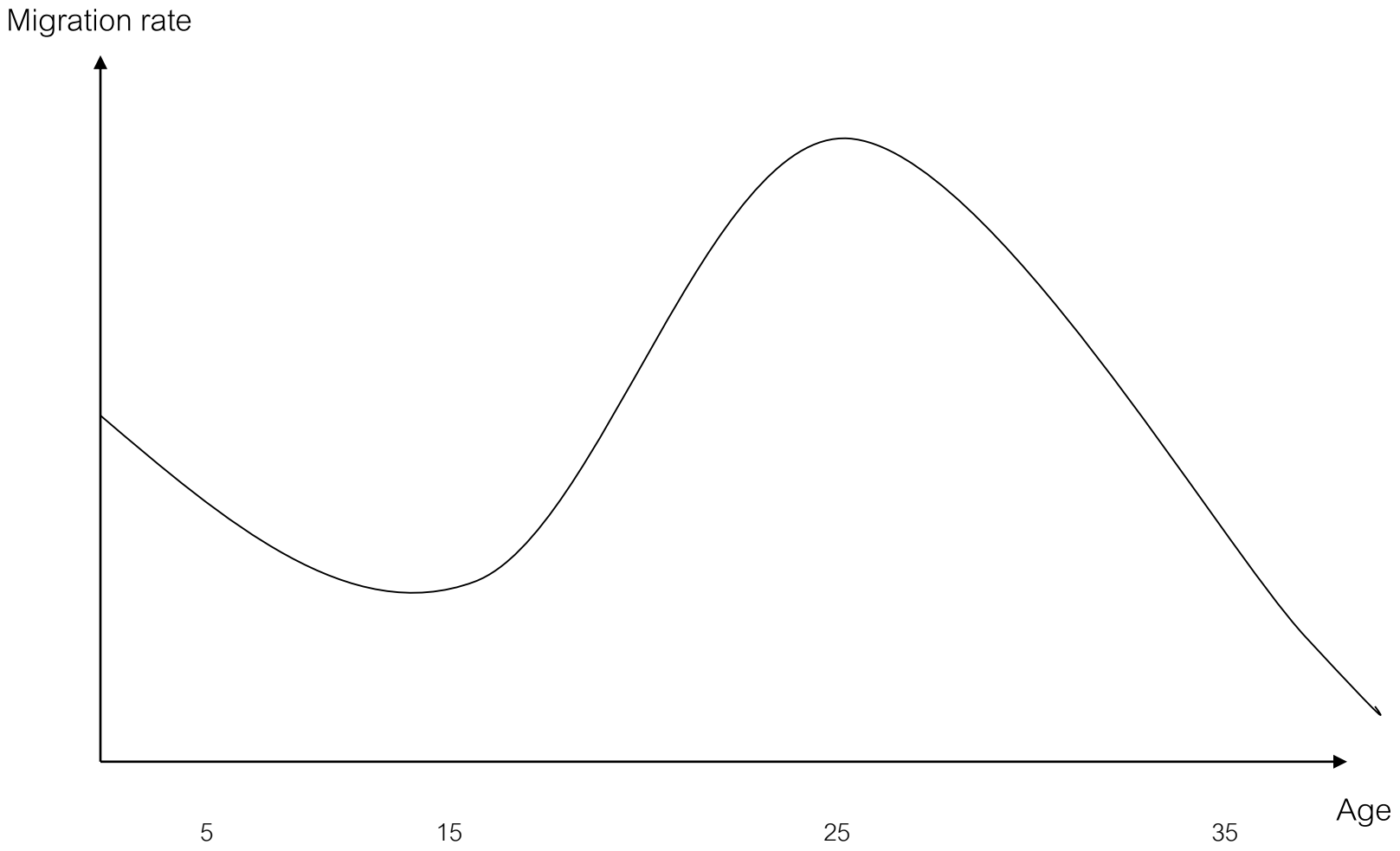
2. Human Resource Development

(3) Migration - case of Mexico & the U.S.



2. Human Resource Development

(3) Migration – in general, people migrate around the ages of 20-30

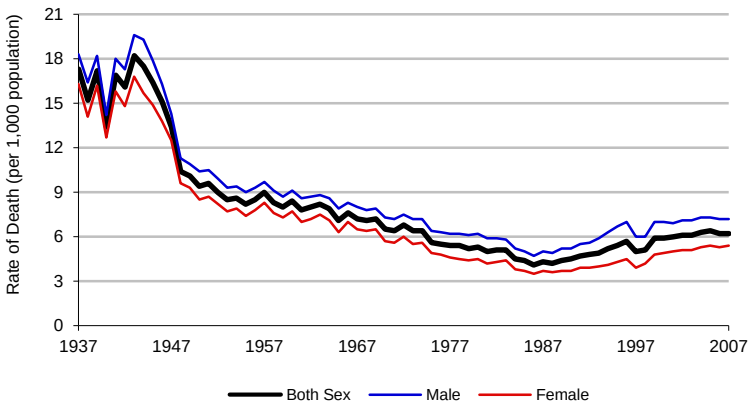


Source: Williamson (1985) in Chaiyuth Punyasavatsut

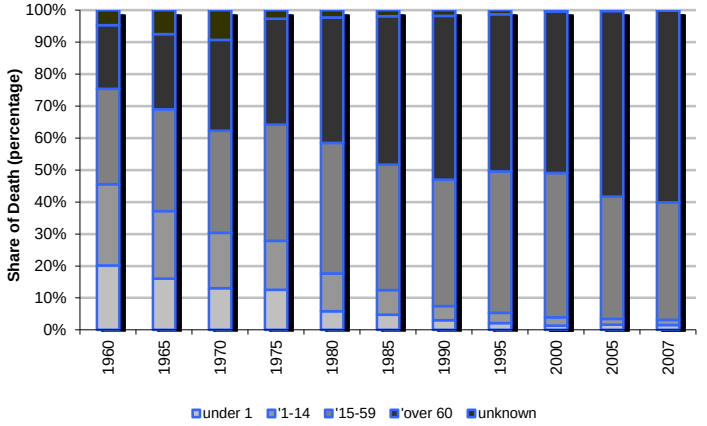
2. Human Resource Development

(4) Healthcare – to strengthen people, which aims to increase productivity

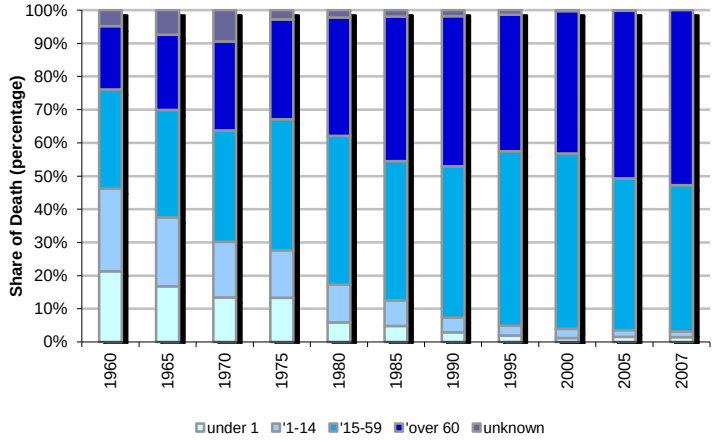
(a) Trend of Death Rate by Gender, 1937-2007



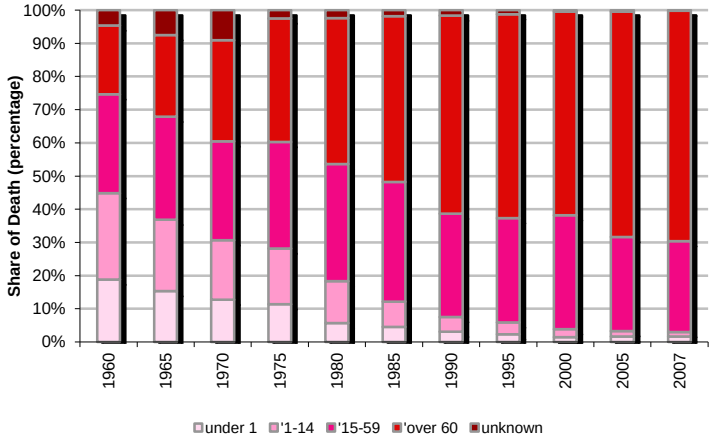
(b) Share of Death, both sex, 1960-2007



(c) Share of Death. Male, 1960-2007



(d) Share of Death, Female, 1960-2007



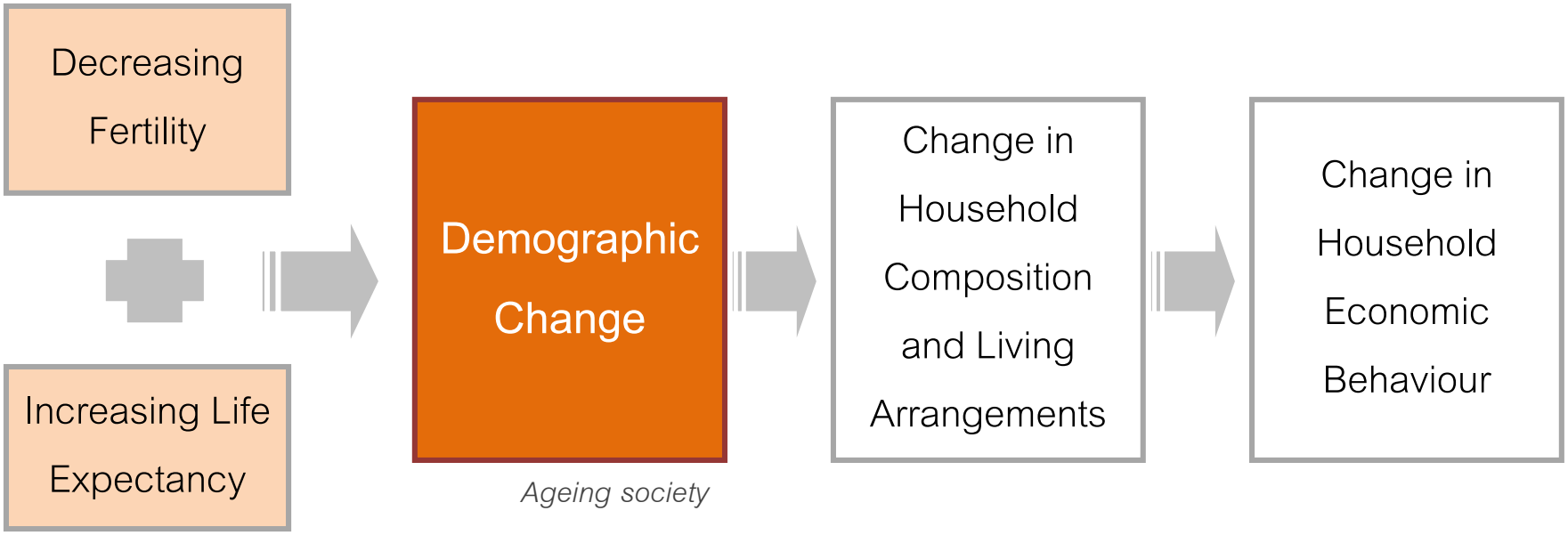
Source: Ministry of Public Health (2010), http://bps.ops.moph.go.th/E-book/ebook.html,

Outline

1. Labour and Demography
2. Human Resource Development
3. **Selected Topics: Ageing Society & Its Economic Impacts**

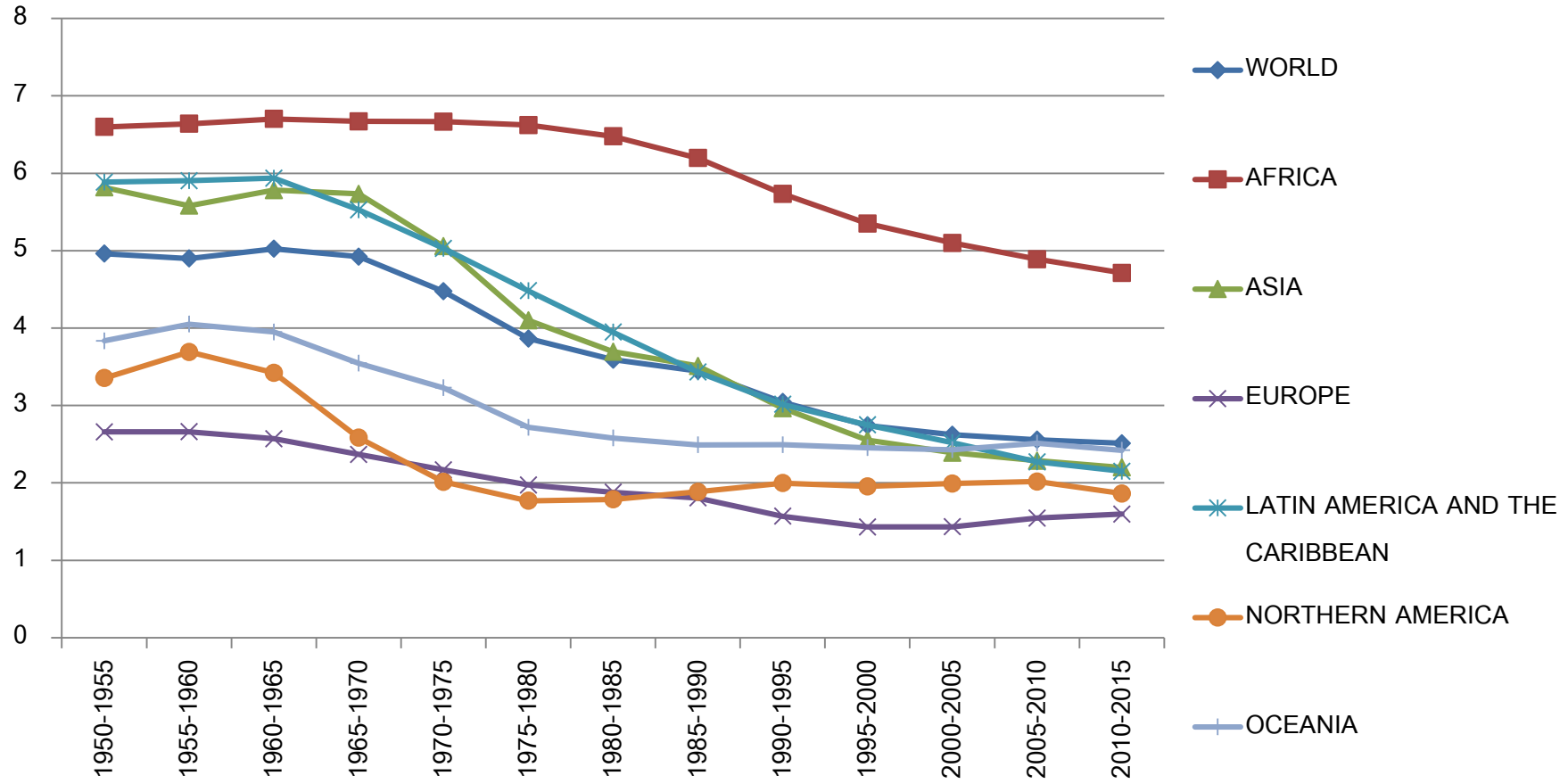
Factors leading to Changes in Demographic Structure

Demographic Change: Framework



Factors leading to Change

Fertility Trends by Major of the World (1950-2010)



Source: United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, DVD Edition.

Factors leading to Change

Fertility Trends in Asia: 1970-1975 to 2000-2005

Table 1. Fertility trends in Asia: 1970-1975 to 2000-2005

Fertility level	1970-1975	1990-1995	2000-2005
High (TFR ? 5.0)	Afghanistan Mongolia Maldives Viet Nam Pakistan Iran (Islamic Republic of) Bangladesh Lao PDR Timor-Leste Philippines Bhutan Nepal Myanmar Cambodia India Brunei Darussalam Turkey Indonesia Malaysia Thailand	Afghanistan Maldives Lao PDR Pakistan Bhutan Cambodia Nepal	Timor-Leste Afghanistan
Transitional (TFR 3.0 to 4.9)	China Republic of Korea Sri Lanka DPR Korea Macao, China	Timor-Leste Iran (Islamic Republic of) Philippines Bangladesh India Myanmar Malaysia Mongolia Viet Nam Brunei Darussalam	Lao PDR Bhutan Maldives Pakistan Cambodia Nepal Bangladesh Philippines India
Near-replacement (TFR 2.2 to 2.9)	Hong Kong, China Singapore	Indonesia Turkey Sri Lanka DPR Korea	Malaysia Brunei Darussalam Turkey Myanmar Mongolia Indonesia Viet Nam
Low (TFR 1.6 to 2.1)	Japan	Thailand China Singapore Republic of Korea Macao, China	Iran (Islamic Republic of) DPR Korea Sri Lanka Thailand China
Critically low (TFR =<1.5)		Japan Hong Kong, China	Singapore Japan Republic of Korea Hong Kong, China Macao, China

- The replacement rate is the number of children each woman needs to have to maintain current population levels or what is known as zero population growth for her and her partner.
- In developed countries, the necessary replacement rate is about 2.1.
- In less developed countries, the replacement rate is around 2.3 due to higher childhood and adult death rates.

Source: World Population Prospects: The 2004 Revision, United Nations Population Division, cited in Gubhaju (2007)

Factors leading to Change

Fertility Trends in Asia: 1970-1975 to 2000-2005

Table 2. Percentage decline in total fertility rate in Asia: 1970-1975 to 2000-2005

Fertility level	Country	TFR			% Decline	
		1970-75	1990-95	2000-05	1970-75 to 1990-95	1990-95 to 2000-05
High	Timor-Leste	6.2	4.8	7.8	-22.8	64.1
(TFR =>5.0)	Afghanistan	7.7	8.0	7.5	3.9	-6.5
Transitional	Lao PDR	6.2	5.8	4.8	-5.7	-16.8
(TFR 3.0 TO 4.9)	Bhutan	5.9	5.6	4.4	-5.7	-21.0
	Maldives	7.0	6.0	4.3	-13.7	-28.3
	Pakistan	6.6	5.7	4.3	-13.6	-25.1
	Cambodia	5.5	5.4	4.1	-3.3	-22.6
	Nepal	5.8	5.0	3.7	-13.7	-25.8
	Bangladesh	6.2	4.1	3.3	-33.1	-21.2
	Philippines	6.0	4.1	3.2	-31.0	-22.2
	India	5.4	3.8	3.1	-29.8	-19.4
Near-replacement	Malaysia	5.2	3.6	2.9	-29.7	-19.0
(TFR 2.2 to 2.9)	Brunei Darussalam	5.4	3.1	2.5	-42.8	-19.0
	Myanmar	5.8	3.8	2.5	-33.9	-35.3
	Turkey	5.3	2.9	2.5	-45.3	-15.3
	Mongolia	7.3	3.4	2.5	-54.0	-27.4
	Indonesia	5.2	2.9	2.4	-44.2	-18.4
	Viet Nam	6.7	3.3	2.3	-50.7	-29.6
Low	Iran (Islamic Republic of)	6.4	4.3	2.1	-32.4	-50.9
(TFR 1.6 to 2.1)	DPR Korea	3.9	2.3	2.0	-40.3	-13.4
	Sri Lanka	4.1	2.4	2.0	-41.1	-17.9
	Thailand	5.0	2.1	1.9	-57.8	-8.2
	China	4.9	1.9	1.7	-60.5	-11.5
Critically low	Singapore	2.6	1.8	1.4	-32.8	-23.3
(TFR <=1.5)	Japan	2.1	1.5	1.3	-28.0	-10.7
	Republic of Korea	4.3	1.7	1.2	-60.4	-27.7
	Hong Kong, China	2.9	1.2	0.9	-57.8	-23.0
	Macao, China	3.2	1.6	0.8	-51.6	-45.8

Source: World Population Prospects: The 2004 Revision, United Nations Population Division, cited in Gubhaju (2007)

Factors leading to Change

Factors affecting Fertility Decline - fertility transition theory

- **Caldwell (1976)** – the introduction of western ideas
  - The direction of wealth flow between generations: from an upward direction (children to parents) to a downward one (parents to children).
  - Westernisation, development of education, mass education, and the increasing cost of education and other expenditure for children.
  - Having children becomes more costly.

- **Easterlin and Crimmins (1985)** – fertility decline is the result of a cost-benefit analysis of the demand for children, the supply of children and the cost of fertility regulation.
  - Demand for children = f(household income, prices of other goods, preference of parents)
  - Supply of children depends on the proximate determinants of fertility i.e. age at marriage, frequency of intercourse and probability of foetal loss.
  - The cost of fertility regulation is the aggregate costs of using contraception.
  - If supply > demand, there will be unwanted children. Then, people will start to regulate fertility.
  - Thus, increasing gap between supply and demand is the key to fertility reduction.

Factors leading to Change

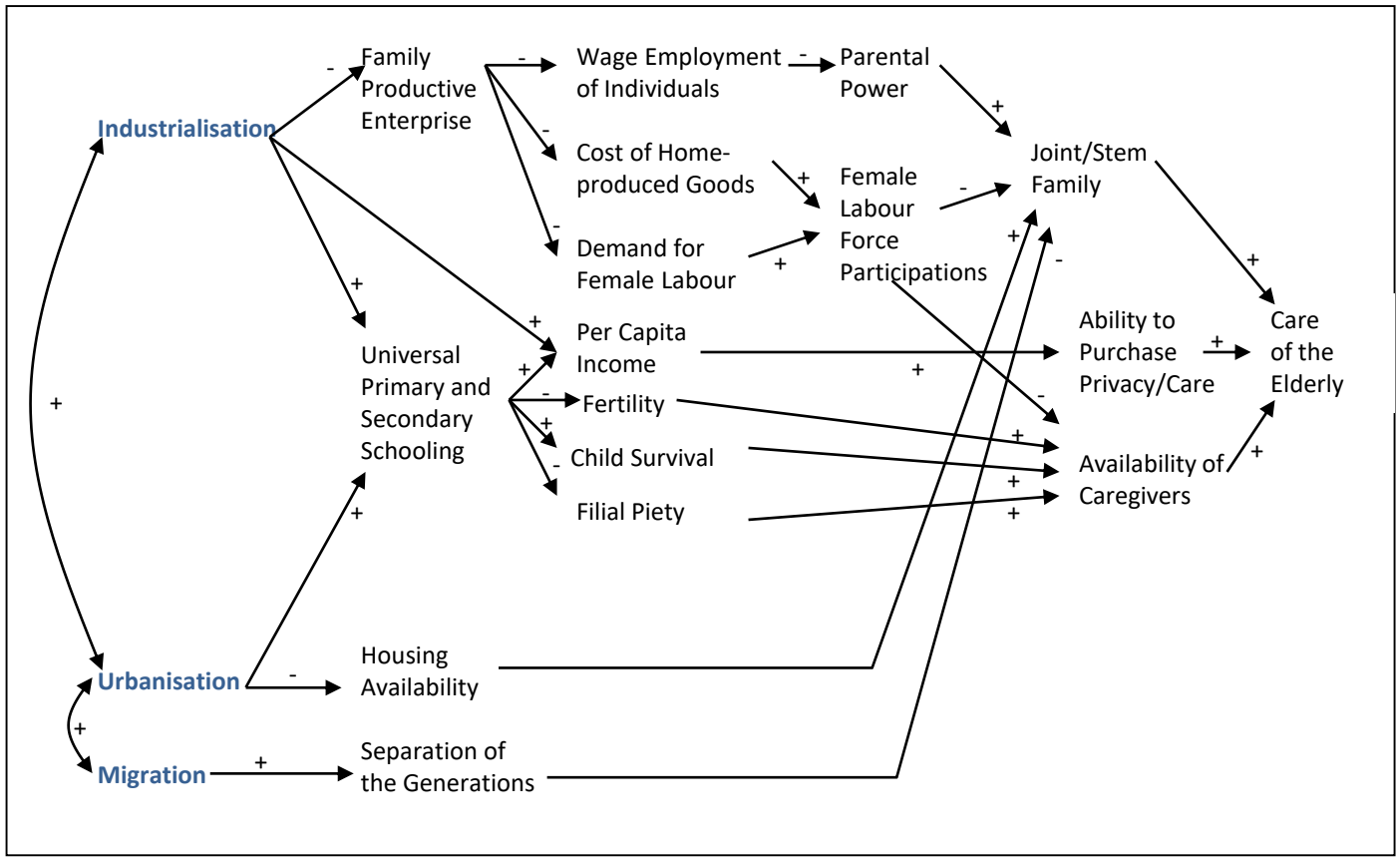
Factors affecting Fertility Decline - fertility transition theory

Relationship between socio-economic development and the changing level of fertility

- United Nations (2002) – factors affecting fertility decline are (1) decline in mortality, (2) increased female education, and (3) labour force participation rates.
- Other factors, such as, economic development, the success of family planning programmes, people's attitude towards having children, changing social norms and tradition.
- Role of government (policies/measures) – see Caldwell & others (2002), Leete & Alam (1992)

Factors leading to Change

Factors affecting Family Structure - industrialisation, urbanisation, migration

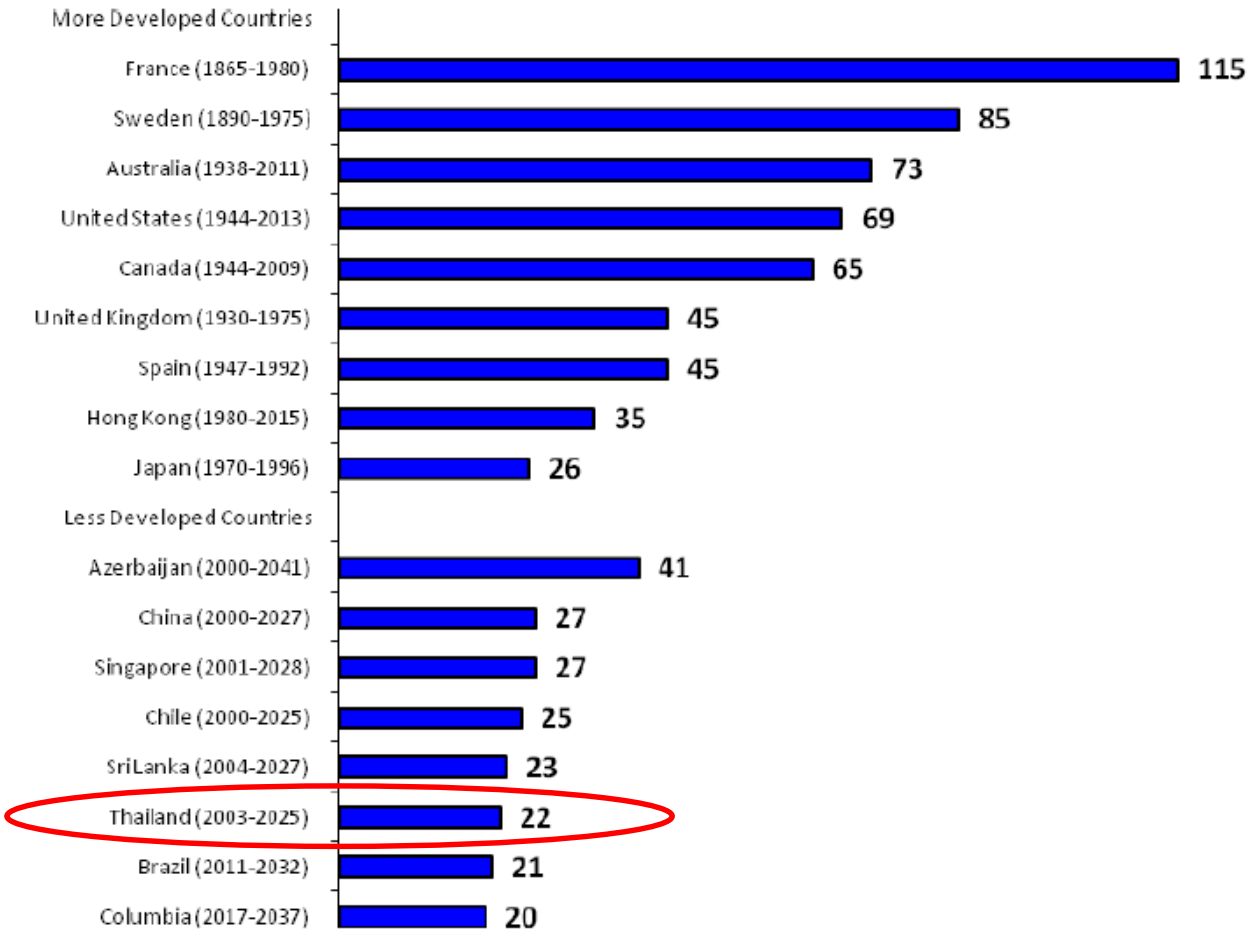


Remarks: - Straight and single-headed arrows show casual relationships that run from the cause to the effect; meanwhile, curved and double-headed arrows represent correlated factors,

- *A sign shown next to the arrow demonstrates a relation between factors. The net impact of factors can be calculated by multiplying the signs. For example, if there is a negative sign between factor A and B, and also a negative sign between factor B and C, the relationship of factors A and C is positive.*

Source: *Mason (1992), Figure 1*

Speed of Population Ageing



Remark: The figures are numbers of years required/expected for percentage of population aged 65 and over to rise from 7 percent to 14 percent

Source: Kinsella and Velkoff (2001), Figure 2-6, p.13.

Impacts of Demographic Change

Speed of Population Ageing

- Thailand is now ageing; meanwhile, Indonesia will be ageing in the 2020s.
- Thailand is expected to be aged and super-aged in the next 11 and 23 years respectively.

	Percentage of population aged 65+			Years took for transition	
	7%	14%	20%	7% → 14%	14% → 20%
Thailand[1]	2001	2023	2035	22	12
Indonesia[1]	2020	2037	2053	17	16
Japan[2]	1970	1994	2006	24	12
Korea[2]	2000	2019	2026	19	7
Germany[2]	1932	1972	2012	40	40
Italy[2]	1927	1988	2007	61	19
USA[2]	1942	2013	2028	71	15
Sweden[2]	1887	1972	2012	85	40
France[2]	1864	1979	2020	115	41

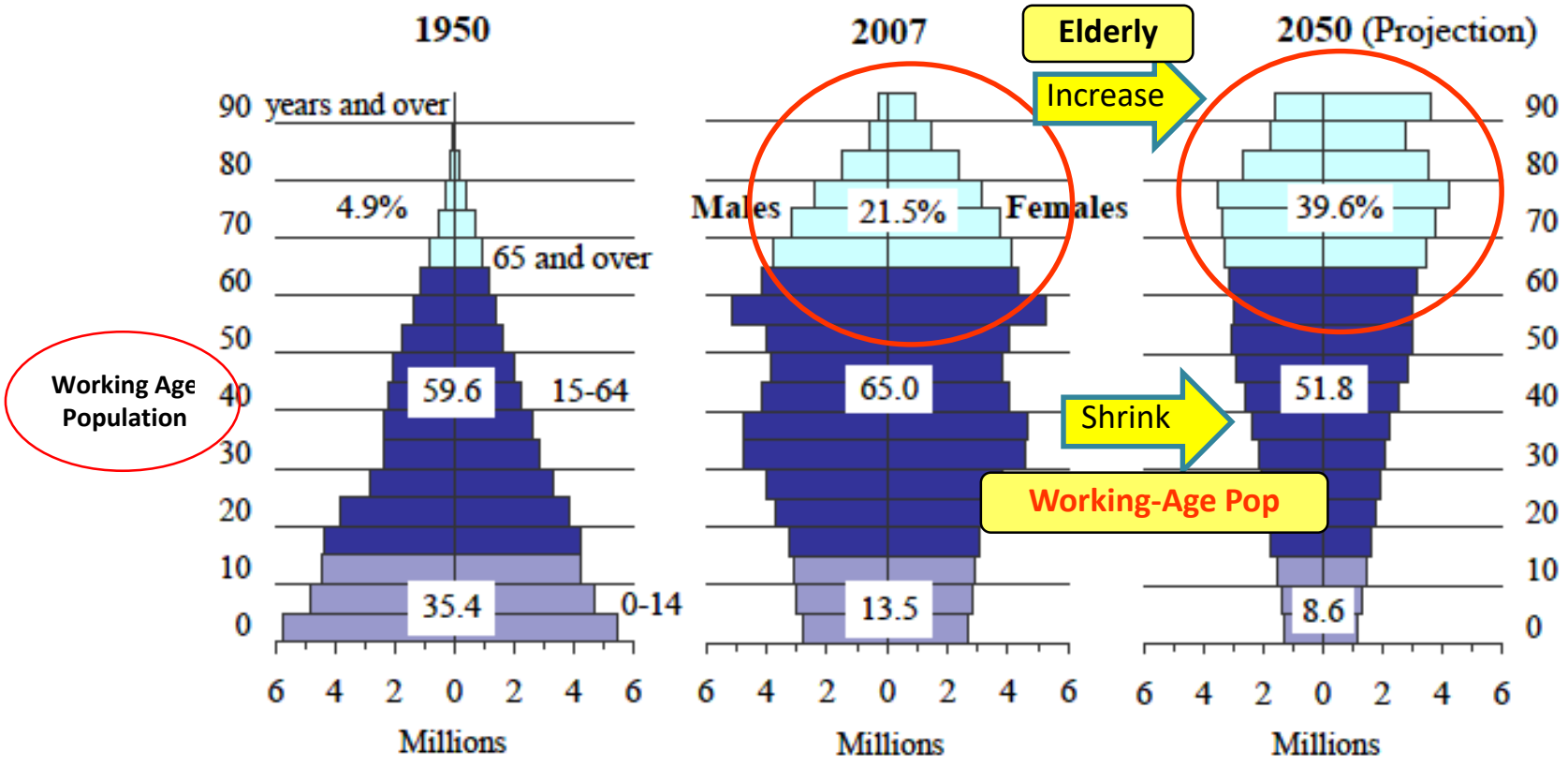
Sources: 1 Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2010 Revision*, http://esa.un.org/unpd/wpp/index.htm

2 Kim, Eungi http://ocw.korea.edu/ocw/division-of-international-studies/contemporary-korean-society/14_aging_in_korea.pdf

Demographic Change in other countries

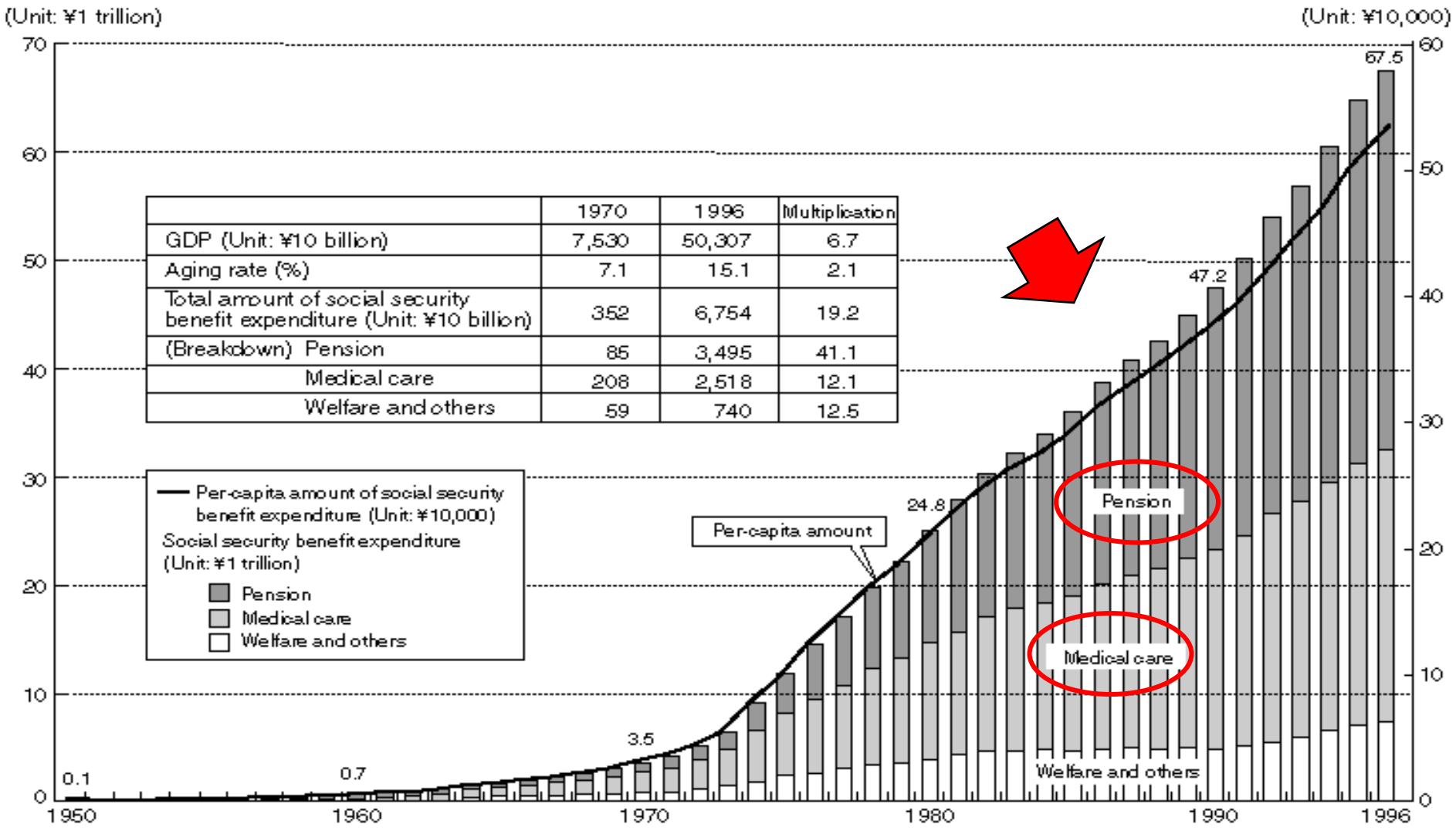
Smaller labour force in Japan

Figure 2.3
Changes in the Population Pyramid



Source: Statistics Bureau, MIC; Ministry of Health, Labour and Welfare.

Larger proportion in pension and medical care expenditure in Japan

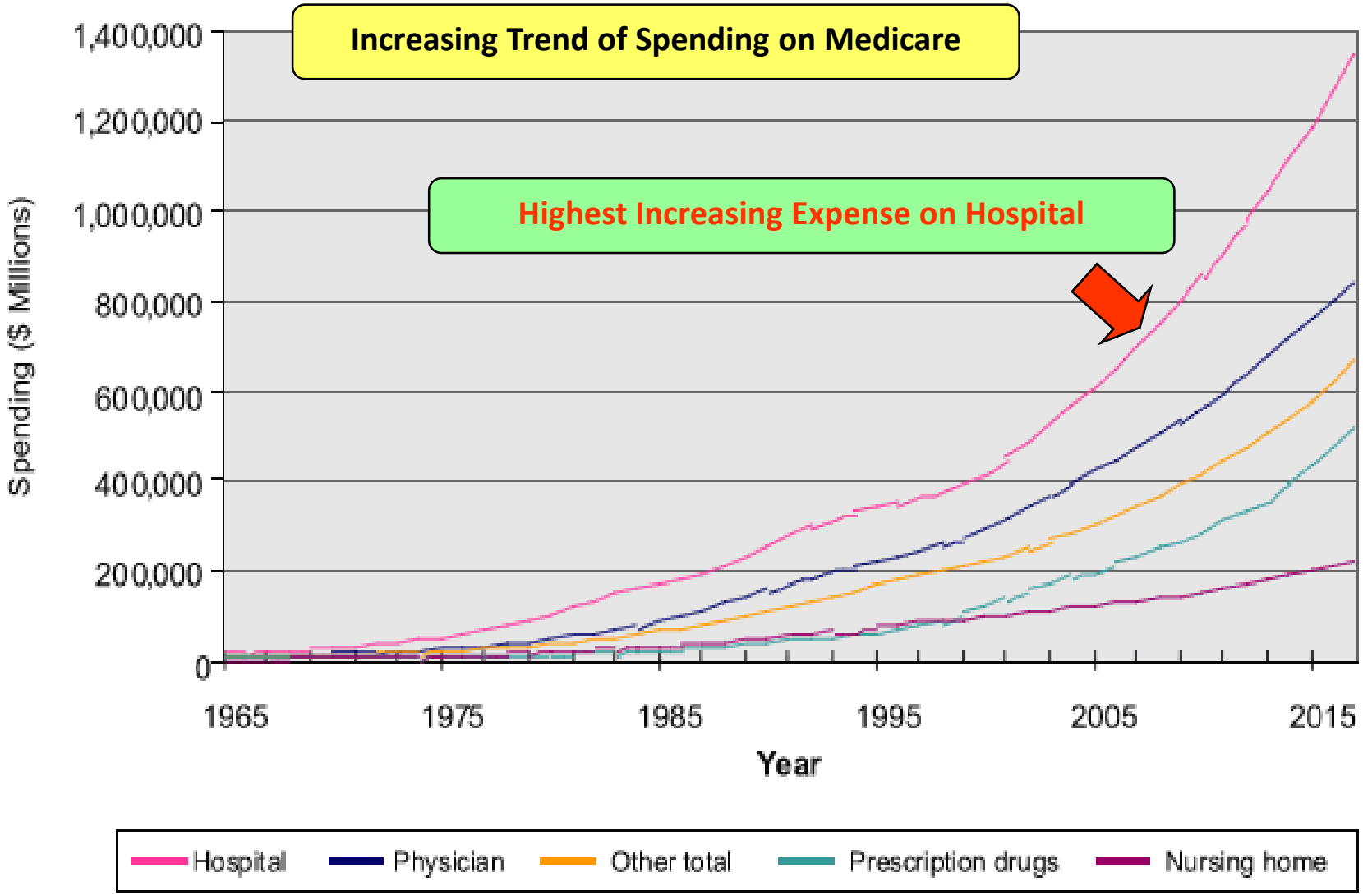


	1970	1996	Multiplication
GDP (Unit: ¥10 billion)	7,530	50,307	6.7
Aging rate (%)	7.1	15.1	2.1
Total amount of social security benefit expenditure (Unit: ¥10 billion)	352	6,754	19.2
(Breakdown) Pension	85	3,495	41.1
Medical care	208	2,518	12.1
Welfare and others	59	740	12.5

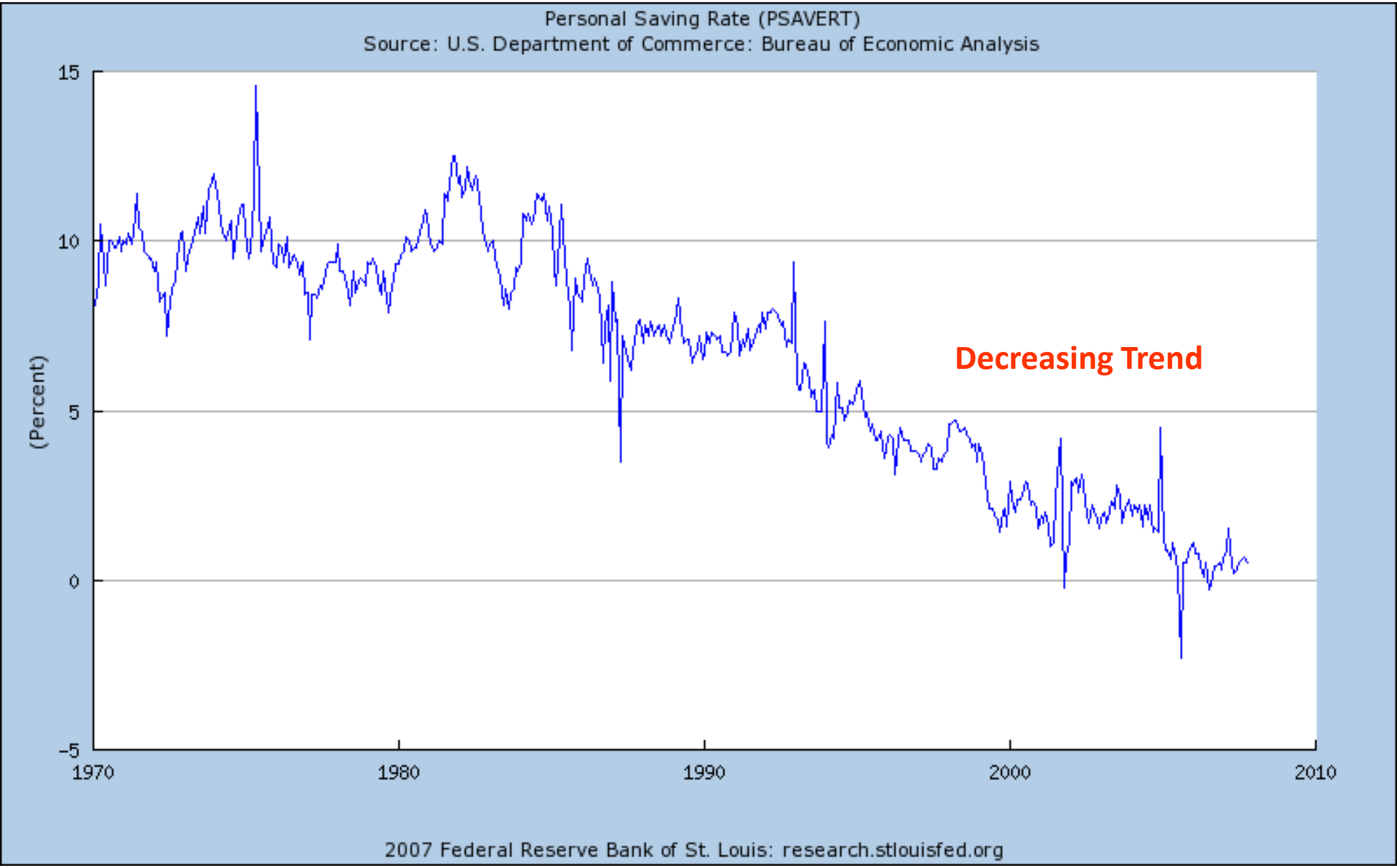
Source: "Social Security Expenditure" by the National Institute of Population and Social Security Research

Note: The values shown in the Figure are the social security benefit expenditures (unit: ¥1 trillion) for 1950, 1960, 1970, 1980, 1990 and 1996 respectively.

Increasing Trend of Spending on Medicare in the U.S.



Personal Saving Rates (1970-2010) in the U.S.



How many people are in Thailand now?

Population Dynamics

TFR has been decreasing and is now below the replacement level.

Phase 1 : High TFR : before B.E. 2513

Phase 2 : Decreasing TFR : B.E. 2513 - 2533

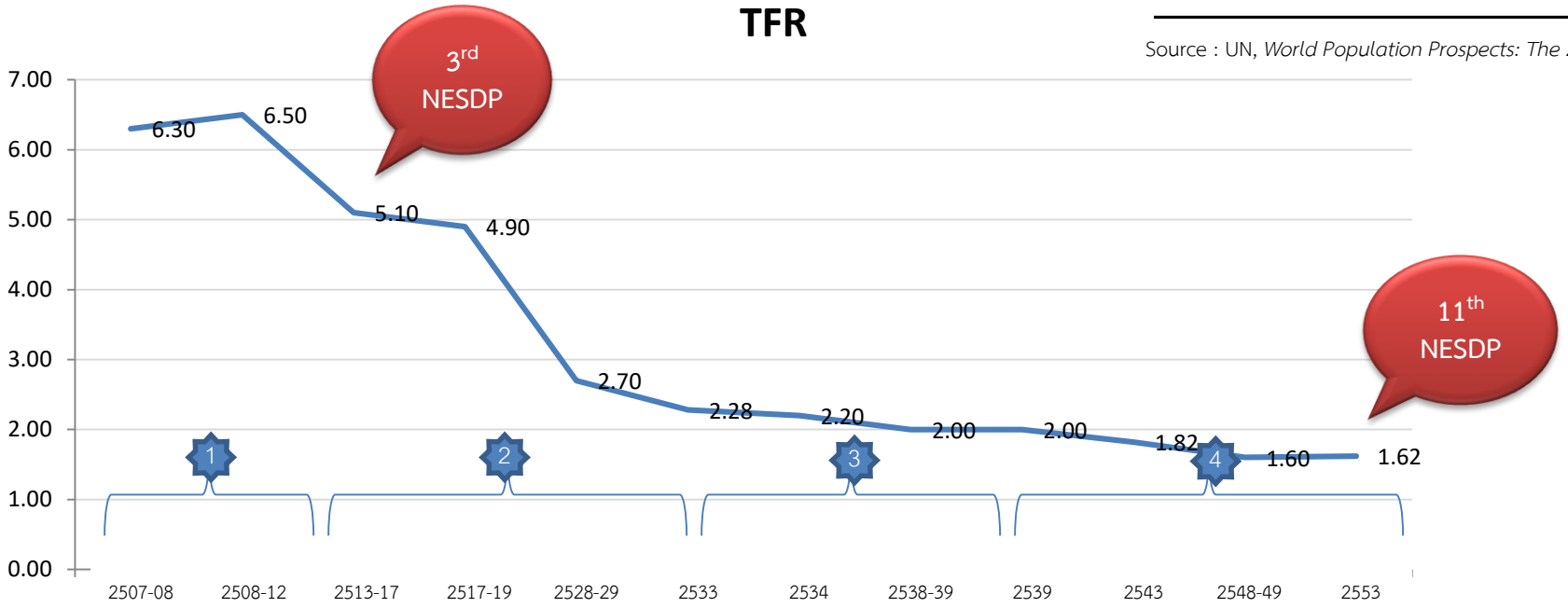
Phase 3 : Low TFR : B.E. 2534 - 2539

Phase 4 : TFR below the replacement level : B.E. 2541 – present

Thailand's TFR is about Japan's TFR

Country	TFR
Malaysia	2.07
Vietnam	1.75
Thailand	1.41
Japan	1.41
Korea (South)	1.32
China	1.66

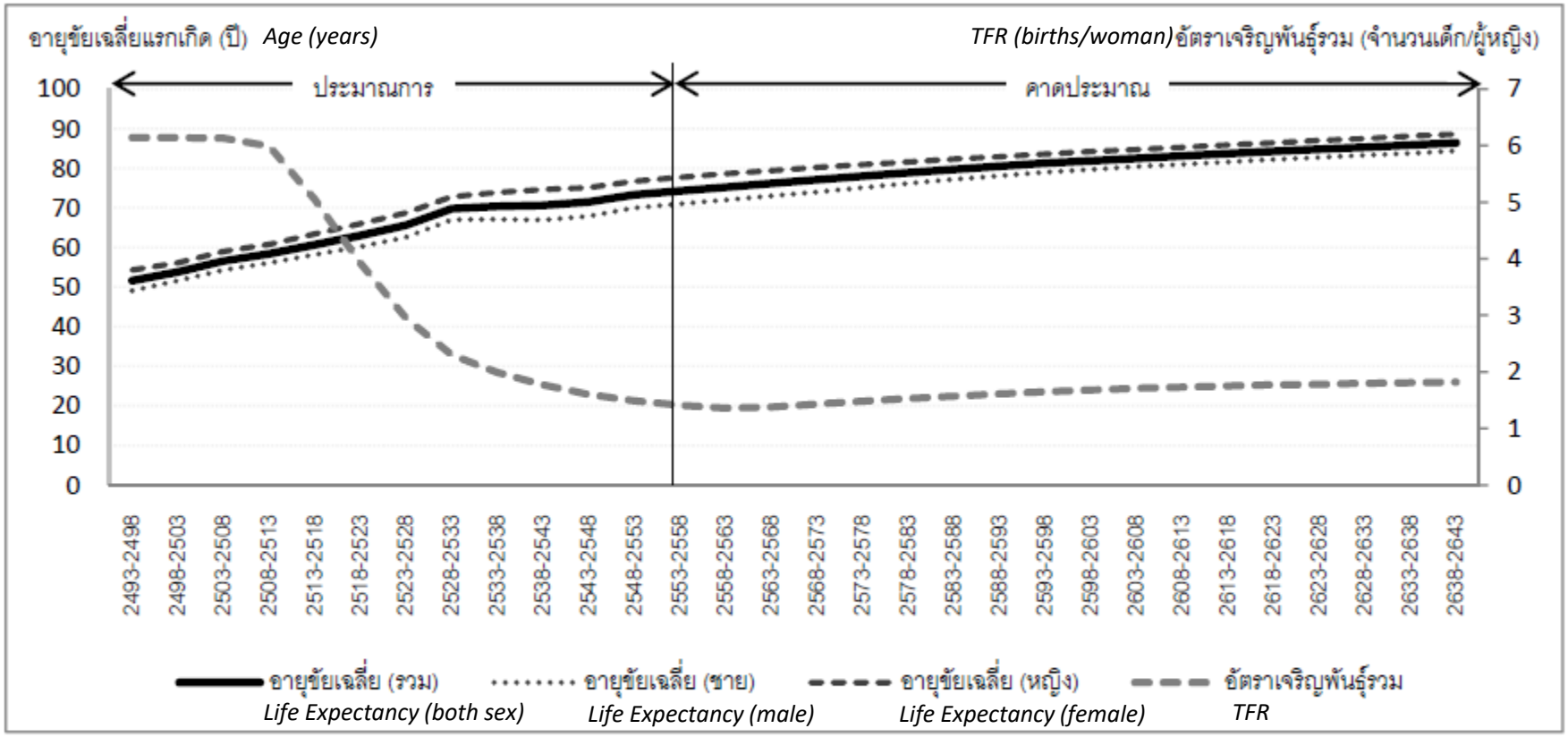
Source : UN, *World Population Prospects: The 2012 Revision*



Source: NESDB

Demographic Change in Thailand

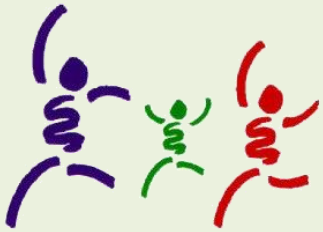
Increasing life expectancy



หมายเหตุ: คาดประมาณโดยใช้สมมติฐาน Medium Variant

ที่มา: United Nations (2013). Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2012 Revision, http://esa.un.org/unpd/wpp/index.htm

Factors affecting changes in the demographic structure



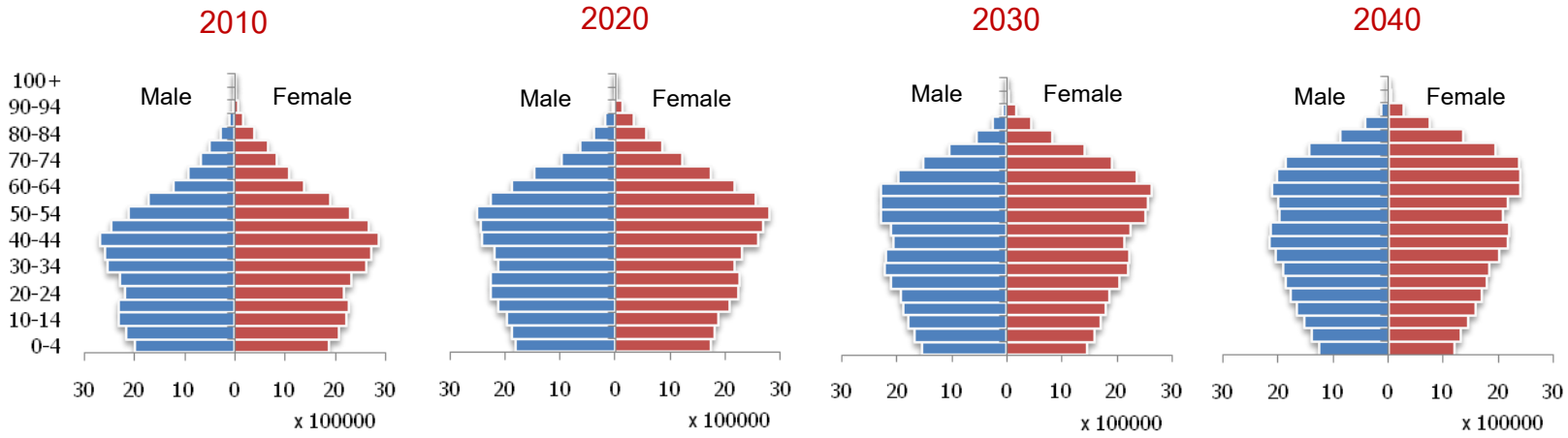
Family Planning and Contraception the government had encouraged people to practice contraception in the 1970s. The rate of contraception uses increased from 15 percent in 1970 to 70 percent in 1978 and almost 80 percent in these days.

Trend of 'being single' nowadays, people tend not to marry and stay single; the statistical evidence shows that the ratio of married women decreased from 71 percent in 1960 to 67 percent in 2010

Changing Family Patterns people tend to have fewer numbers of children either just one or no child; the family patterns of Single-Income-No-Kids (SINKs) or Double-Income-No-Kids (DINKs) are commonly found in the society; numbering to 14.4 percent in 2008.

Population Dynamics

Demographic Change in Thailand – Thailand is now ageing



Population Projection*

	2010	2020	2030	2040
Total	*63.8 million*	*66.0 millions*	*66.2 millions*	*63.9 millions*
(65 years+)	(9.1%)	(13.0%)	(19.1%)	(25.0%)
60 years+	13.2%	19.1%	26.6%	32.1%
15-59 years	67.0%	64.1%	58.6%	55.1%
0-14 years	19.8%	16.8%	14.8%	12.8%

*Population projection, next 30 years; assumption TFR 1.62 → 1.30

Source: NESDB (2013)

Regional Population Ageing in Thailand

Region	Ratio of Elderly People (%)				
	2010	2020^{e}	2030^{e}	2035^{e}	2040^{e}
Whole Kingdom	13.2	19.1	26.6	29.6	32.1
Bangkok and Vicinity	10.2	15.0	22.8	27.1	-
Central (excld. BKK)	13.4	18.2	24.7	27.5	-
North	15.5	24.2	32.9	35.1	-
Northeast	14.3	21.5	29.7	32.8	-
South	12.2	16.3	22.7	25.7	-

Region	Old-age Dependency Ratio (%)				
	2010	2020^{e}	2030^{e}	2035^{e}	2040^{e}
Whole Kingdom	19.7	29.8	45.3	52.3	58.3
Bangkok and Vinicity	13.4	20.9	34.5	42.7	-
Central (excld. BKK)	19.7	27.9	40.6	46.4	-
North	23.8	40.3	61.7	68.0	-
Northeast	23.0	35.9	56.3	65.3	-
South	18.7	25.9	38.5	44.7	-

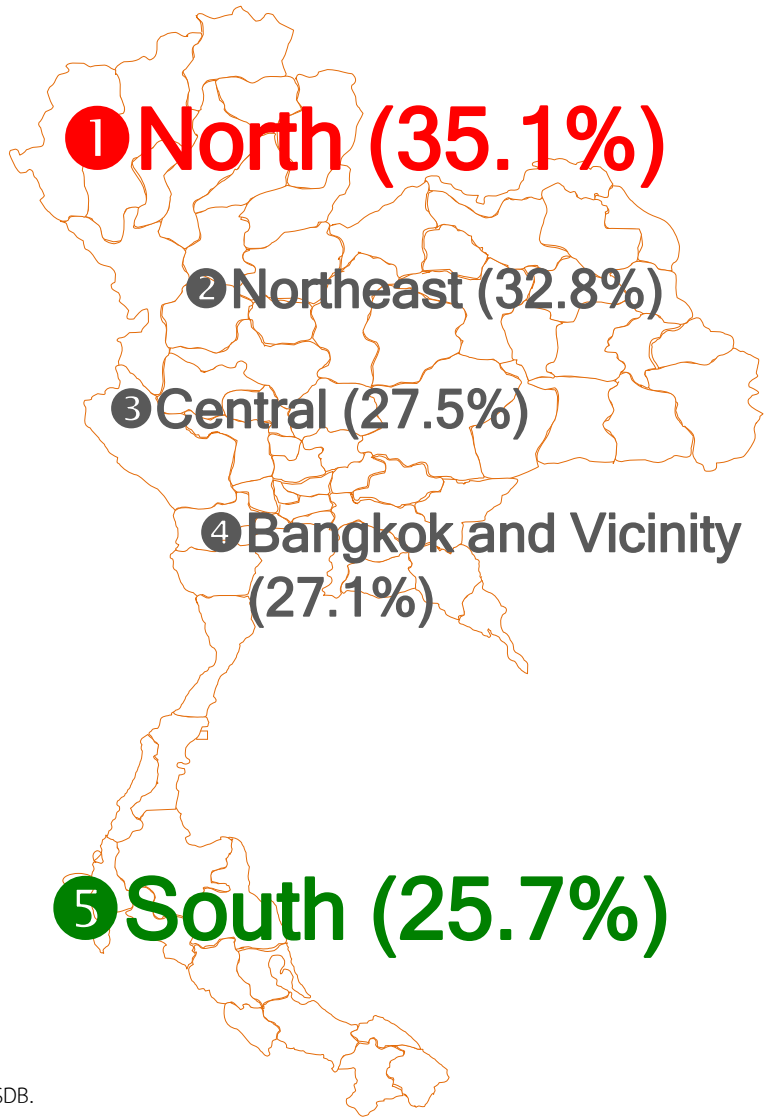
Source: Keeratipongpaiboon (2012), compiled the data of population projection 2010 – 2040 proposed by NESDB.

2035

Ratio of Elderly People (%)

RED is that with the highest ratio

GREEN is that with the lowest ratio

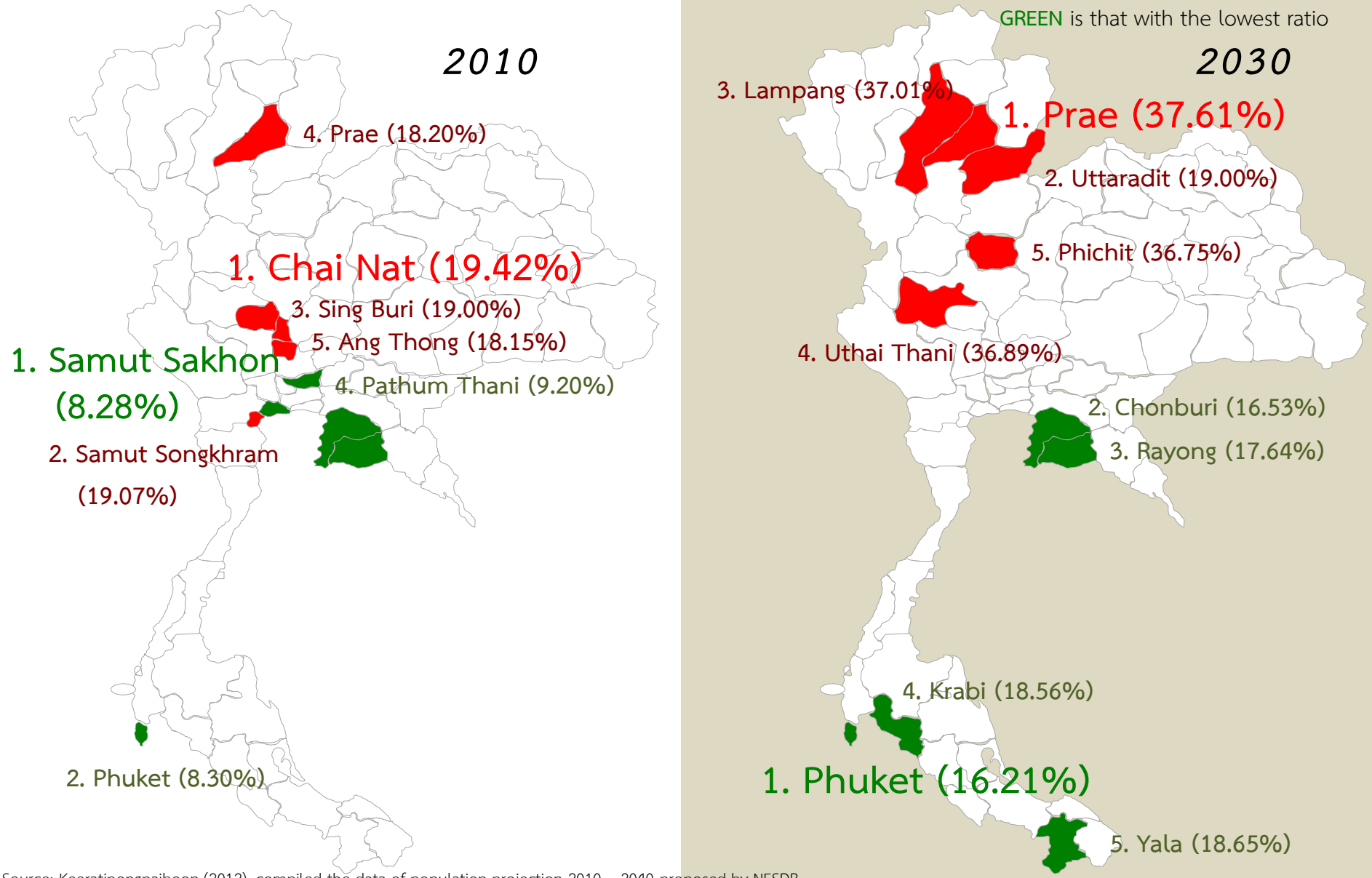


Provincial Population Ageing in Thailand

Ratio of Elderly People (%)

RED is that with the highest ratio

GREEN is that with the lowest ratio



Source: Keeratipongpaiboon (2012), compiled the data of population projection 2010 – 2040 proposed by NESDB.

Changes in Household Composition

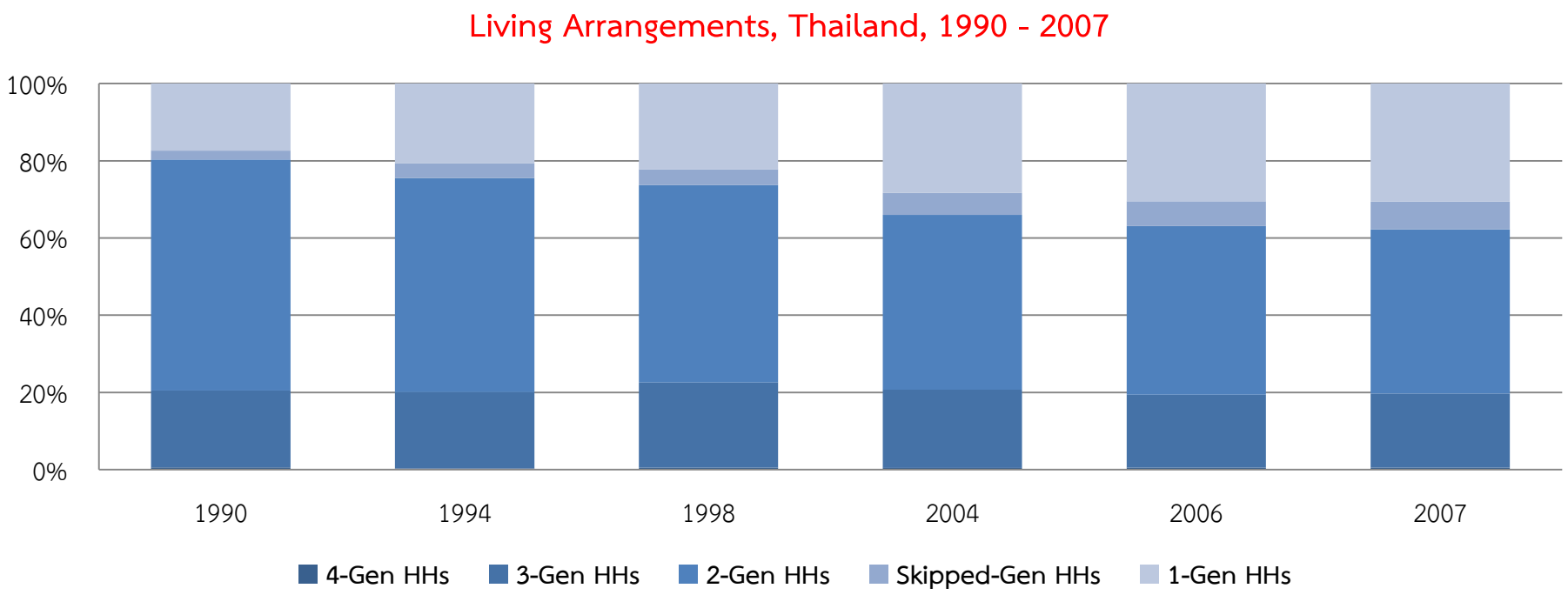
Dynamic of Household Composition during 1990 - 2007

- Smaller and older households
- Increasing number of elderly people and decreasing number of children in a household
- Higher ratio of female-headed households

Year	Size (persons) ↓	Age of HH Heads (years) ↑	Number of Elderly (persons) ↑	Number of Children (persons) ↓	Ration of male-headed hh (%) ↓
1990	4.09	46.14	0.34	1.22	79.78
1992	3.89	46.34	0.35	1.14	79.82
1994	3.77	47.23	0.37	1.04	76.36
1996	3.67	47.83	0.39	1.00	75.78
1998	3.73	48.15	0.41	0.98	74.28
2000	3.61	48.54	0.43	0.93	74.13
2002	3.51	48.59	0.42	0.89	72.09
2004	3.44	49.66	0.44	0.85	70.15
2006	3.34	49.56	0.45	0.81	68.95
2007	3.33	50.74	0.47	0.79	68.33

Source: Keeratipongpaiboon (2012) calculated from Socio-Economic Survey (SES) data (1990 – 2007)

Changes in Household Living Arrangements



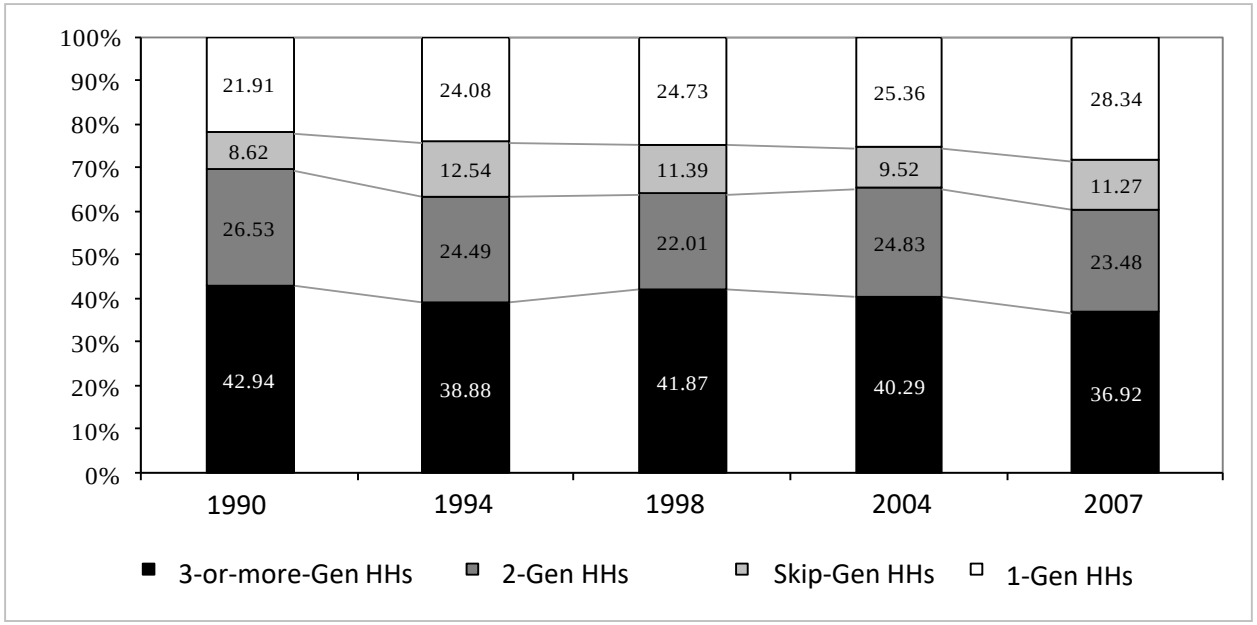
Changes in Living Arrangements

- Multi-generational households are commonly found in Thailand
- Ratios of one-generational and skipped-generational households have been increasing over time
- In 1990, the ratio of skipped-generational household was just 2.34%; it increased dramatically to 7.18 percent in 2007.

Source: Keeratipongpaiboon (2012) calculated from Socio-Economic Survey (SES) data (1990 – 2007)

Elderly persons in Thailand

Percentage of elderly persons, classified by living arrangement, 1990 - 2007



Percentage of elderly people, classified by working status, 1990 – 2007

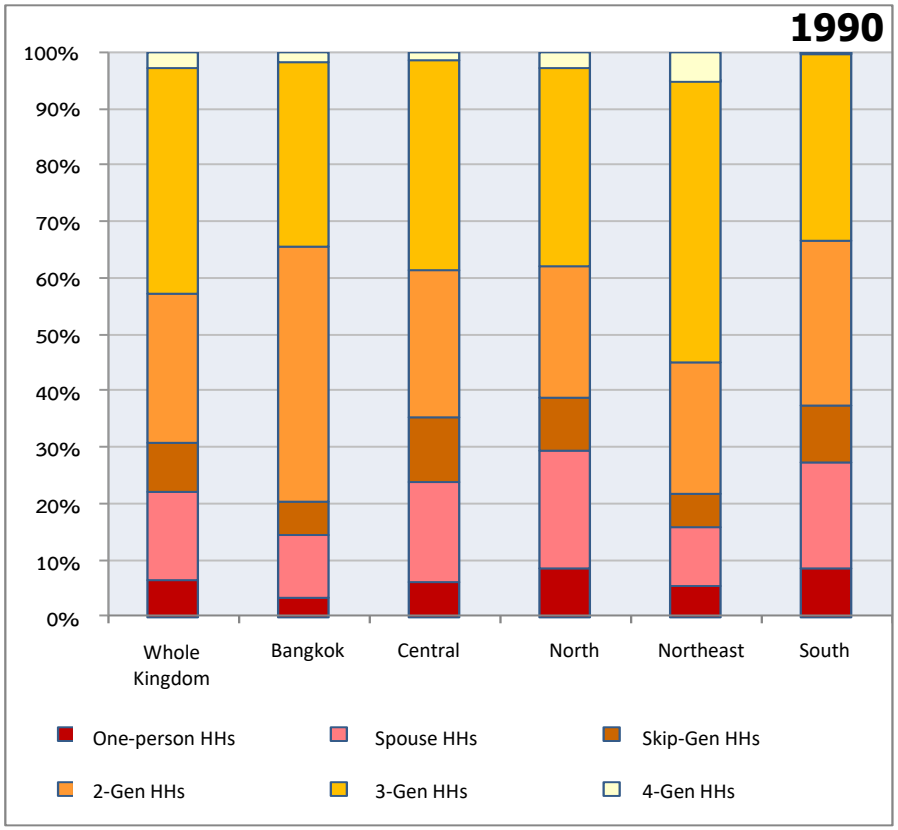
Characteristics of Thai Elderly People (2007)

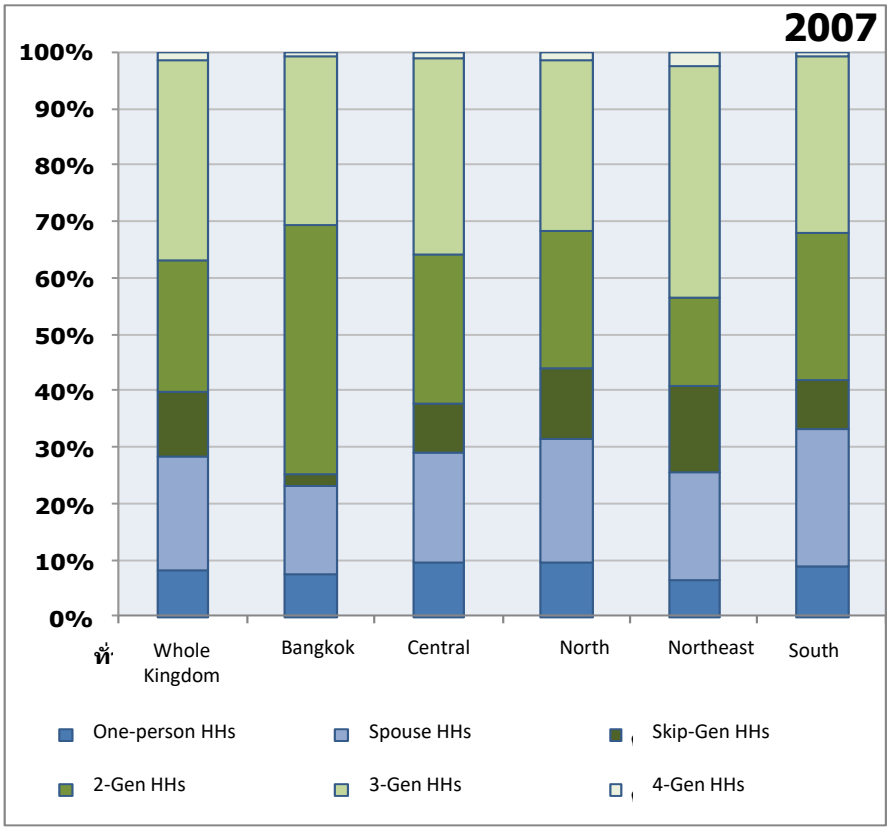
- Primary or lower educated (91.78%)
- Females (56.27%)
- Household heads (59.87%)
- Married (60.68%)
- Active (87.08%)
- Not working (58.09%)
- No pension (94.60%)
- Living in the Northeast (35.39%)
- Living with children (60.39%)
- Living in 3-or-more-generational households (36.92%)

Average age of the elderly increased from 69.15 in 1990 to 69.72 in 2007

Source: Keeratipongpaiboon (2012) calculated from Socio-Economic Survey (SES) data (1990 – 2007) and Survey on the Elderly People (2007)

Living Arrangements of the Elderly in Thailand



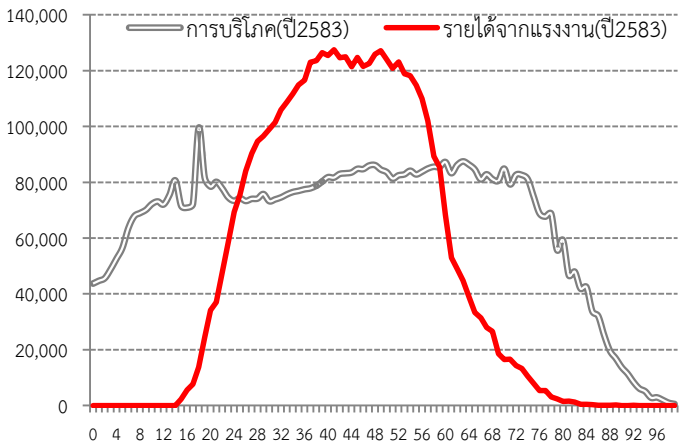


- Majority of elderly people in Bangkok live in two-generational households; while majority of elderly people in the Northeast and the Central live in three-generational households.
- Elderly people in every region tend to live in one-generational HH, either one-person or spouse HHs.
- Skipped-generational households are mostly found in the North and the Northeast. The ratio tend to increase.
- Household size has been decreasing over time due to delay of marriage and child-bearing.

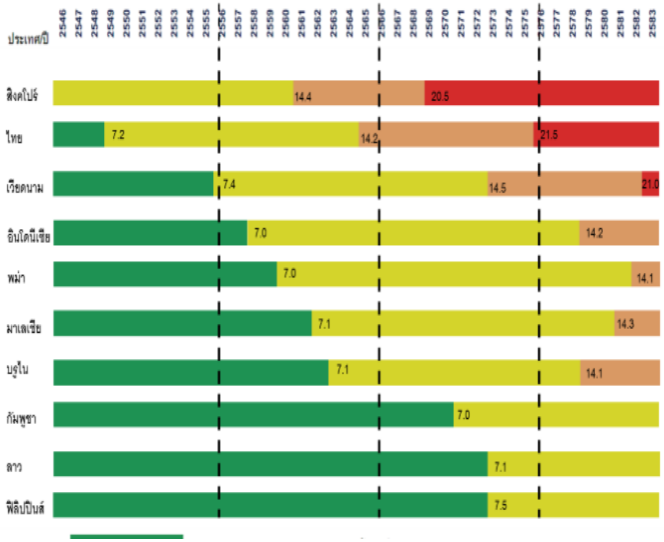
Source: Keeratipongpaiboon (2012) calculated from Socio-Economic Survey (SES) data (1990 – 2007)

Why should the elderly be economically active?

National Transfer Account (NTA), 2040



Population in ASEAN



Income deficit

Unsecured

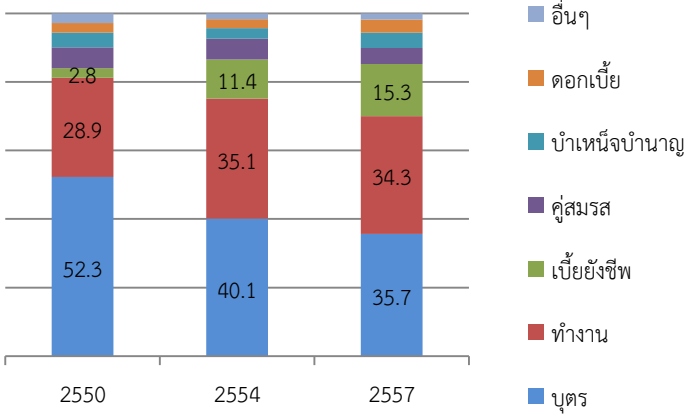
Dependency

5.8 :1 → 1.7 :1

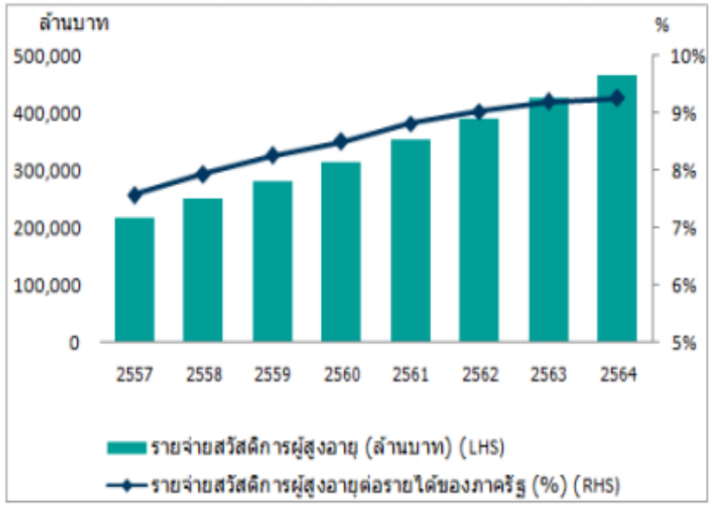
Labour shortage

Financial burden

Sources of Income of the Elderly, 2007 – 2014



ประมาณการรายจ่ายสวัสดิการผู้สูงอายุ และสัดส่วนต่อรายได้ของภาครัฐ



ที่มา: การประมาณการงบประมาณสำหรับผู้สูงอายุและแหล่งที่มาของเงิน, TDRI และสำนักงานส่งเสริมสวัสดิภาพและพิทักษ์เด็กและเยาวชน ผู้ด้อยโอกาส และผู้สูงอายุ, มี.ค. 55

Old-Age Employment

Labour Force Participation, 2005

Region/Country[1]	Age Group					
	25-54		55-64		65+	
	Men	Women	Men	Women	Men	Women
World	95.1	66.7	73.5	38.7	30.2	11.3
Developed Countries	91.9	75.3	63.9	44.9	13.4	6.3
Economies in Transition	90.7	81.3	52.6	31.2	14.2	7.8
Africa	96.2	61.0	86.5	48.3	57.4	25.8
Asia	96.3	64.2	77.6	35.4	38.0	13.2
Latin America and the Caribbean	94.3	64.3	76.1	37.2	37.2	13.7
Oceania	87.4	73.3	76.0	60.6	51.4	33.4
Thailand	**95.9**	**82.2**	**81.8**	**65.7**	**41.0**	**21.7**

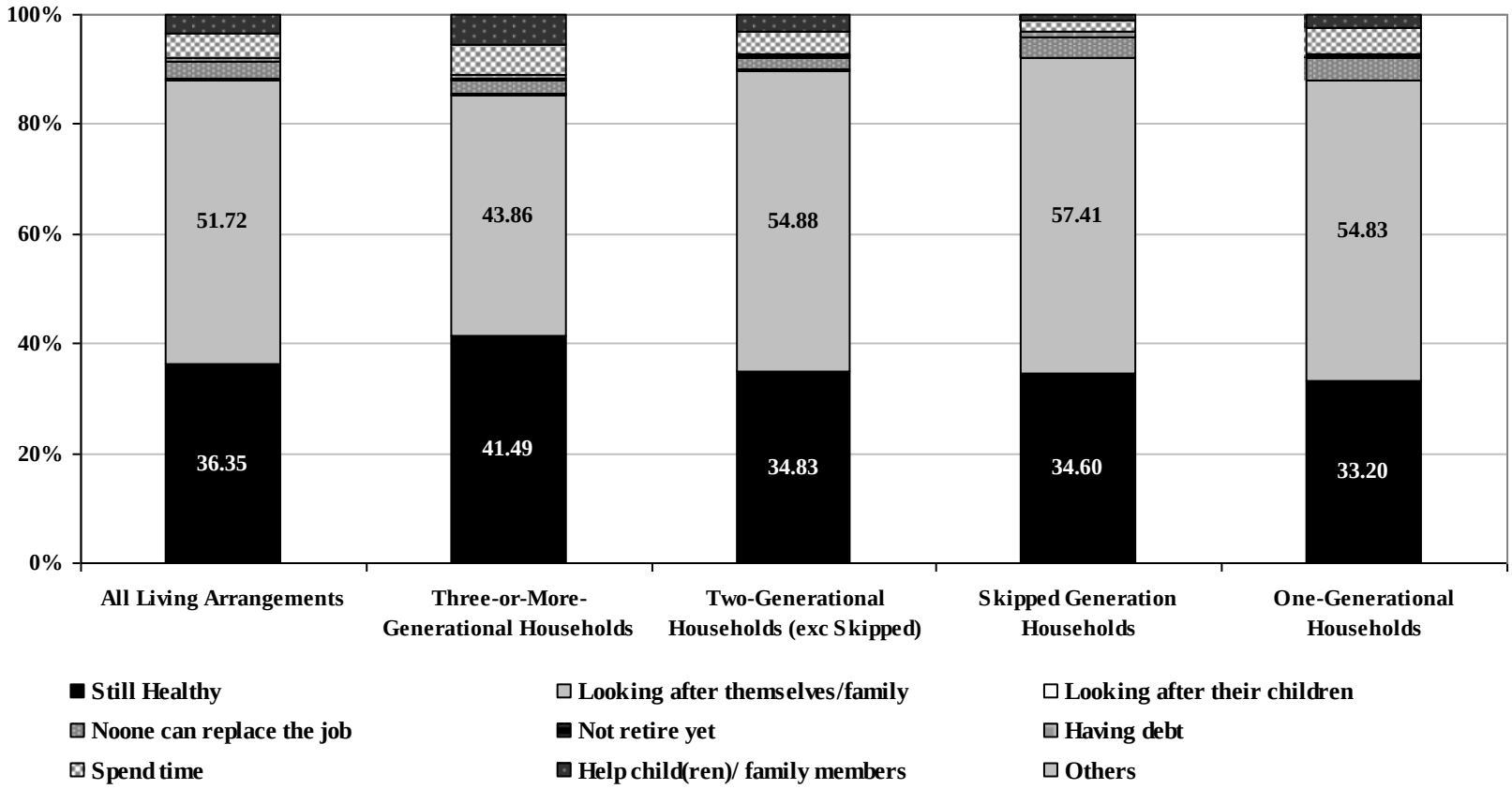
Source: United Nations (2007, p.61, Table IV.2), *Development in an Ageing World*; Author's own calculation from the ILO's data, http://laborsta.ilo.org/ accessed on 12 march 2012.

Source: summarised from the Ministry of Labour (2007), *The Situation of Old-Age Employment in Thailand.*

- LF participation rates of Thailand are more than the world's averages.
- About one-fifth of the elderly females (65+) were found in the LF in 2005.
- LF rate of female elderly people is more than that of Asia, Latin America and the Caribbean (LAC), Economies in Transition and the World.
- Percentage of the elderly in LF increased from 3.7 in 1986 to 5.1 and 7.0 in 1996 and 2006, respectively

Employment Situations in Thailand

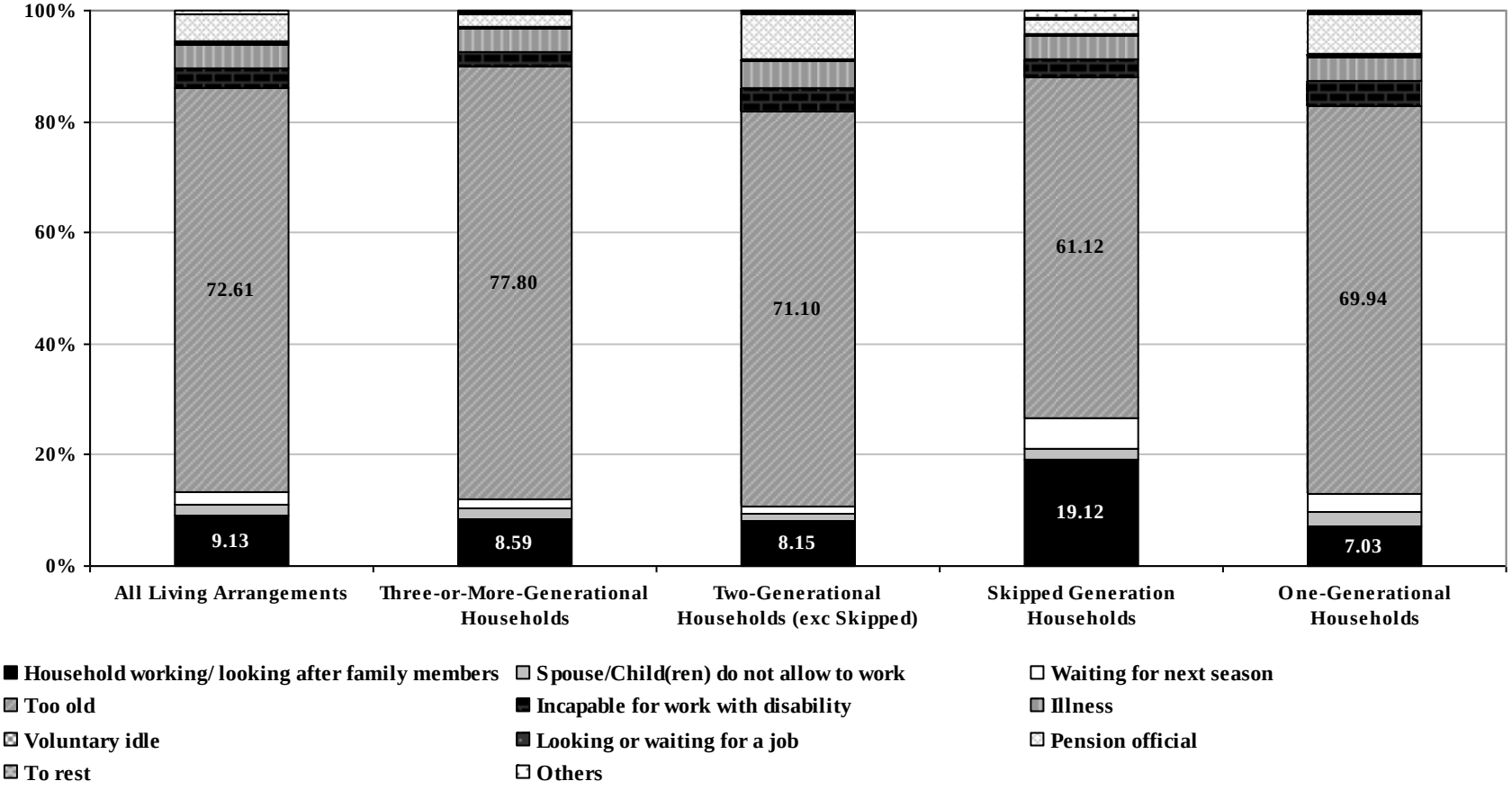
Reasons for Remaining in the Labour Force of the Elderly, by living arrangements, 2007



Source: Keeratipongpaiboon (2012) calculated the 2007 Survey on the Older Persons data

Employment Situations in Thailand

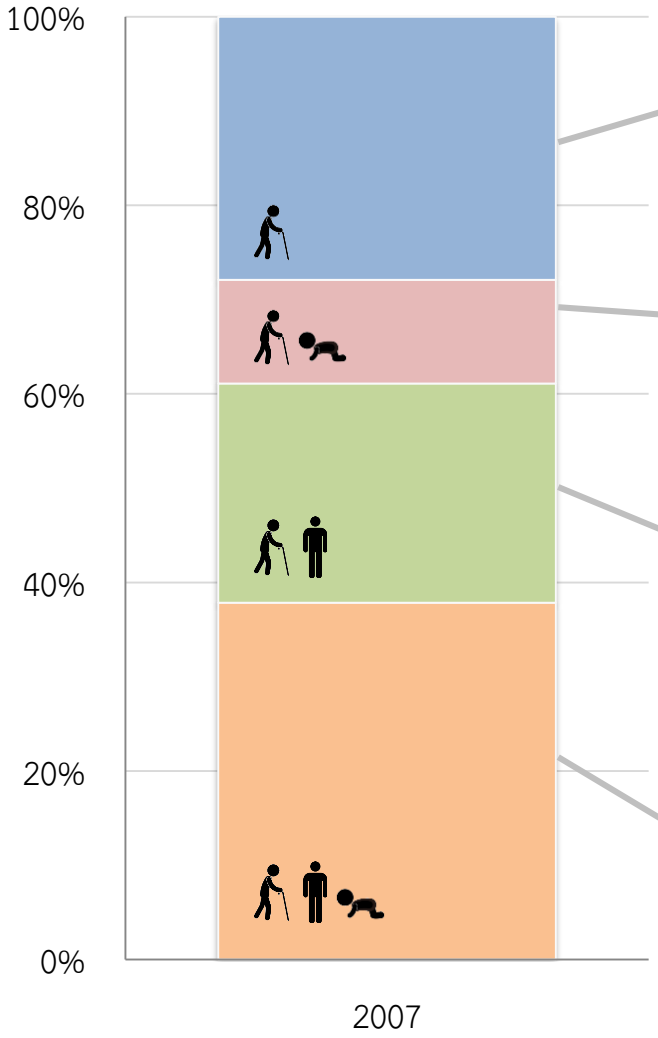
Reasons for Leaving the Labour Force of the Elderly, by living arrangements, 2007



Source: Keeratipongpaiboon (2012) calculated the 2007 Survey on the Older Persons in Thailand data

Old-Age Employment

Percentage of elderly people (60+), classified by living arrangement and employment status, 2007



One-Gen HHs (27.89%)

Working 42.99%

Skipped-Gen HHs(11.00%)

Working 42.55%

Two-Gen HHs (23.25%)

Working 32.96%

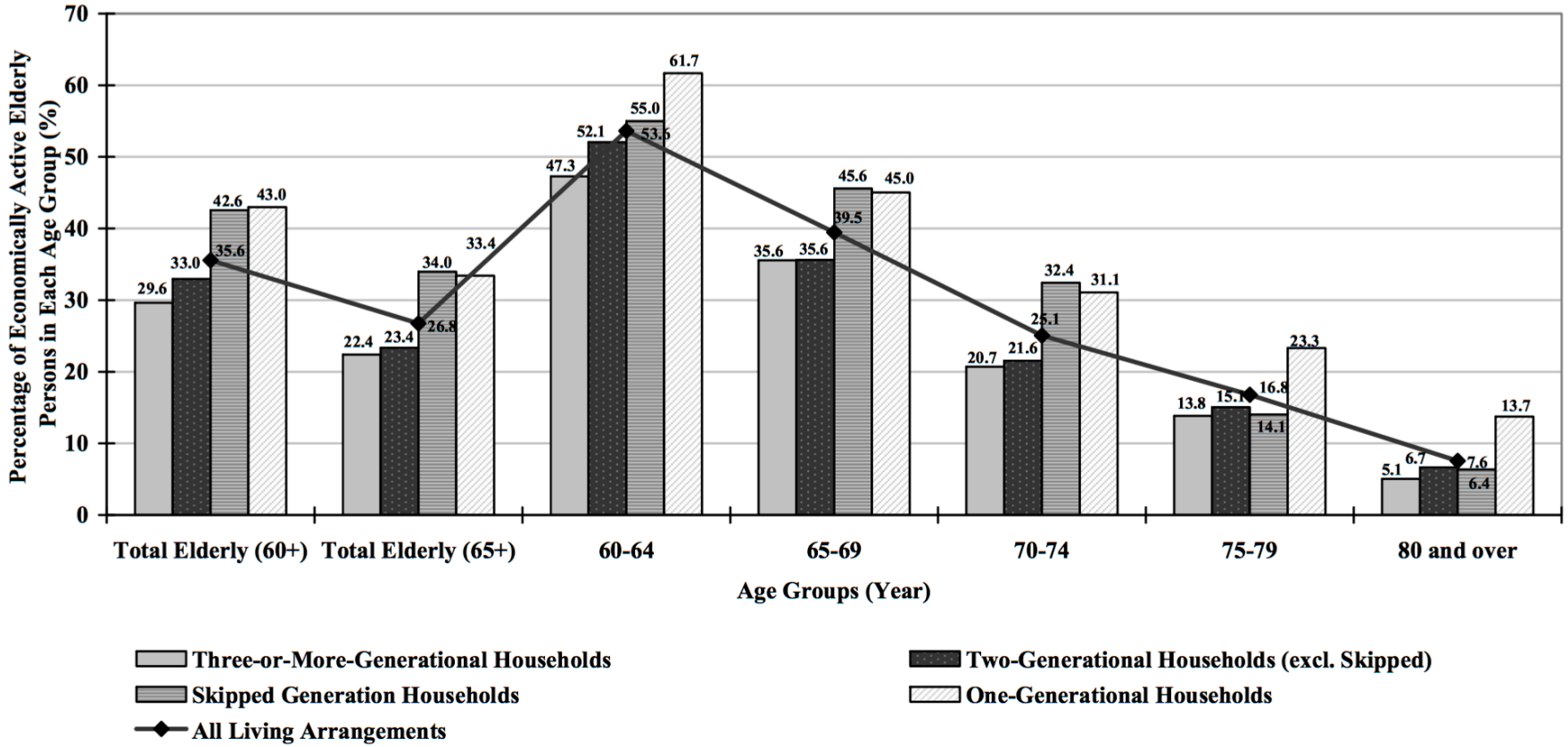
Three-or-more-Gen HHs (37.86%)

Working 29.63%

Source: Keeratipongpaiboon (2012) calculated the 2007 Survey on the Older Persons data

Old-Age Employment

The Situation of Old-Age Employment in Thailand, by Living Arrangement and Age Group, 2007



Source: Keeratipongpaiboon (2012) calculated the 2007 Survey on the Older Persons in Thailand data

Factors affecting the Old-Age Employment

Probit Regression: $Pr(working)_i = \beta_0 + \beta_i X$

Variables	Year				
	1990	1994	1998	2004	2007
I. Demographic Factors					
- Age	-0.027***	-0.028***	-0.029***	-0.029***	-0.028***
	(-11.14)	(-14.41)	(-18.38)	(-17.17)	(-22.15)
- Secondary Education	-0.207***	-0.018	-0.012	-0.014	-0.037
	(-3.31)	(-0.30)	(-0.19)	(-0.35)	(-1.21)
- Bachelor's Degree	0.011	-0.107	0.050	-0.038	-0.117***
	(0.10)	(-1.16)	(0.43)	(-0.73)	(-2.64)
- Master's Degree or Higher			0.187	-0.024	-0.204**
			(1.40)	(-0.16)	(-2.45)
- Male	0.118***	0.056*	0.113***	0.075***	0.165***
	(2.67)	(1.72)	(4.19)	(3.32)	(8.83)
- Household Head	0.177***	0.262***	0.188***	0.273***	0.228***
	(3.37)	(6.90)	(7.11)	(12.40)	(12.23)
- Married	0.191***	0.220***	0.173***	0.177***	0.156***
	(4.81)	(6.87)	(7.13)	(7.73)	(8.42)
- Able to go out by Themselves without Assistance					0.269***
					(10.98)
- Access to Medical Welfare				-0.014	0.004
				(-0.40)	(0.11)
II. Economic Factors					
- Pensions (Yes)	-0.086	-0.145**	-0.066	-0.145***	-0.114***
	(-1.23)	(-1.99)	(-1.27)	(-3.05)	(-3.09)
- Transfer Payments (Yes)	0.024	-0.026	0.012	-0.026	
	(0.61)	(-0.88)	(0.58)	(-1.31)	
- Poverty (Yes)	0.055	0.093**	0.036	0.080***	0.024
	(1.27)	(2.50)	(1.01)	(2.67)	(0.90)
- Savings (Yes)	0.007	-0.017	0.014	-0.003	-0.012
	(0.22)	(-0.67)	(0.60)	(-0.21)	(-0.73)

Variables	Year				
	1990	1994	1998	2004	2007
III. Household Characteristics					
- Central	0.049	0.050	0.073	0.048	0.126***
	(0.61)	(0.84)	(1.19)	(1.40)	(3.78)
- North	0.032	-0.022	0.050	0.040	0.122***
	(0.39)	(-0.38)	(0.81)	(1.14)	(3.53)
- Northeast	-0.013	0.055	-0.020	0.058	0.112***
	(-0.16)	(0.90)	(-0.36)	(1.62)	(3.25)
- South	0.170*	0.081	0.125**	0.127***	0.187***
	(1.84)	(1.25)	(1.97)	(3.21)	(4.91)
- Rural	-0.073*	0.000	0.013	-0.060***	-0.035**
	(-1.65)	(0.02)	(0.39)	(-3.72)	(-2.46)
- Live in Three-or-More-Generational Household		-0.040	-0.017	-0.125***	-0.056*
		(-0.69)	(-0.41)	(-3.07)	(-1.84)
- Live in Two-Generational Household	-0.085	-0.208***	-0.154***	-0.230***	-0.198***
	(-1.65)	(-5.72)	(-5.51)	(-9.10)	(-9.35)
- Live in Skipped Generation Household	0.288***	0.280***	0.309***	0.254***	0.295***
	(4.39)	(5.92)	(7.46)	(7.63)	(10.00)
- Household Size	-0.210***	-0.205***	-0.186***	-0.213***	-0.256***
	(-10.76)	(-9.73)	(-13.61)	(-15.37)	(-22.38)
- Household In the Agricultural Sector	0.086**	0.114***	0.102***	0.430***	0.386***
	(2.25)	(3.57)	(4.15)	(20.47)	(20.59)
- Number of Recipients in Household	-0.119***	-0.133***	-0.129***	0.001	
	(-4.96)	(-7.05)	(-7.50)	(0.12)	
- Number of Earners in Household	0.431***	0.493***	0.465***	0.438***	0.494***
	(15.17)	(19.82)	(23.57)	(27.01)	(34.02)
Number of Observations	2,279	5,861	6,913	15,478	20,120
Wald Chi-Squared	474.66	894.06	1085.73	1883.94	2785.62
Probability > Chi-Squared	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
Pseudo R-Squared	0.4974	0.5670	0.5660	0.6041	0.6240
Log Pseudo-Likelihood	-796.59	-1724.72	-1986.62	-4175.35	-5144.71

Source: Keeratipongpaiboon (2012) calculated from Socio-Economic Survey (SES) data (1990 – 2007)

Factors affecting the Old-Age Employment (by area)

Probit Regression: $\Pr(\text{working})_i = \beta_0 + \beta_i X$

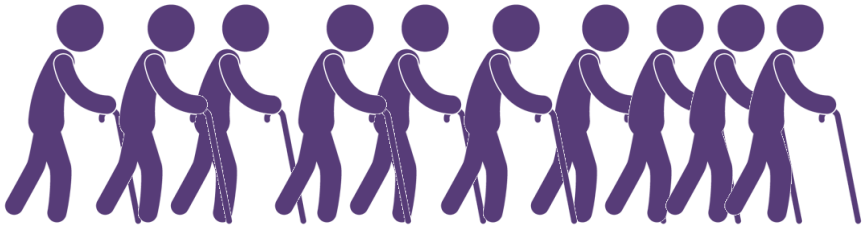
ตัวแปร	ทั้งประเทศ	ภูมิภาค				
		กทม.	กลาง	เหนือ	อีสาน[3]	ใต้
I. กลุ่มปัจจัยทางประชากร						
อายุ	-0.028***	-0.009***	-0.024***	-0.029***	-0.031***	-0.029***
	(-22.15)	(-5.13)	(-12.58)	(-12.07)	(-11.82)	(-9.29)
มัธยมศึกษา (ใช่ = 1)	-0.037	-0.042*	-0.042	-0.023	0.006	0.132
	(-1.21)	(-1.77)	(-1.05)	(-0.31)	(0.10)	(1.13)
ปริญญาตรี (ใช่ = 1)	-0.117***	-0.049**	-0.094*	-0.244***	-0.081	0.104
	(-2.64)	(-2.00)	(-1.84)	(-3.26)	(-0.65)	(0.60)
ปริญญาโท/สูงกว่า (ใช่ = 1)	-0.204**	-0.062*	-0.005	-0.300**		-0.318*
	(-2.45)	(-1.70)	(-0.04)	(-2.36)		(-1.94)
เพศชาย (ใช่ = 1)	0.165**	0.081***	0.150***	0.179***	0.161***	0.146***
	(8.83)	(3.70)	(5.61)	(4.43)	(3.76)	(3.00)
เป็นหัวหน้าครัวเรือน (ใช่ = 1)	0.228***	0.053**	0.144***	0.252***	0.314***	0.314***
	(12.23)	(2.48)	(5.84)	(6.26)	(6.91)	(6.27)
สมรสแล้ว (ใช่ = 1)	0.156***	0.006	0.122***	0.145***	0.263***	0.156***
	(8.42)	(0.29)	(4.32)	(3.83)	(6.13)	(2.97)
สุขภาพดี (สามารถออกนอกบ้านได้ด้วยตัวเอง) (ใช่ = 1)	0.269***	0.079**	0.227***	0.268***	0.330***	0.364***
	(10.98)	(2.44)	(5.99)	(6.12)	(5.50)	(4.71)
เข้าถึงสวัสดิการทางการแพทย์ (ใช่ = 1)	0.004	-0.003	-0.013	-0.041	0.061	0.104
	(0.11)	(-0.13)	(-0.20)	(-0.35)	(0.68)	(0.90)
II. กลุ่มปัจจัยทางเศรษฐกิจ						
ได้รับบำเหน็จ/บำนาญ (ใช่ = 1)	-0.114***	-0.017	-0.107**	-0.102	-0.173*	-0.171
	(-3.09)	(-0.55)	(-2.24)	(-1.49)	(-1.90)	(-1.22)
ยากจน (ใช่ = 1)	0.024	0.351***	0.197***	0.005	-0.059	0.188**
	(0.90)	(2.61)	(3.17)	(0.12)	(-1.20)	(2.51)
มีเงินออม (ใช่ = 1)	-0.012	-0.046	-0.029	-0.026	-0.016	0.060
	(-0.73)	(-1.53)	(-1.06)	(-0.72)	(-0.43)	(1.30)

ตัวแปร	ทั้งประเทศ	ภูมิภาค				
		กทม.	กลาง	เหนือ	อีสาน[3]	ใต้
III. กลุ่มปัจจัยลักษณะครัวเรือน						
ภาคกลาง (ใช่ = 1)	0.126***					
	(3.78)					
ภาคเหนือ (ใช่ = 1)	0.122***					
	(3.53)					
ภาคตะวันออกเฉียงเหนือ (ใช่ = 1)	0.112***					
	(3.25)					
ภาคใต้ (ใช่ = 1)	0.187***					
	(4.91)					
ครัวเรือนนอกเขตเทศบาล (ใช่ = 1)	-0.035**		-0.000	-0.051*	-0.048*	-0.020
	(-2.46)		(-0.04)	(-1.95)	(-1.59)	(-0.45)
ครัวเรือนสามรุ่นอายุคนขึ้นไป (ใช่ = 1)	-0.056*	0.026	-0.059	-0.093	-0.094	-0.077
	(-1.84)	(0.75)	(--1.37)	(-1.21)	(-1.38)	(-0.90)
ครัวเรือนสองรุ่นอายุคน (ไม่นับครัวเรือนรุ่นกระโดด) (ใช่ = 1)	-0.198***	-0.064***	-0.173***	-0.222***	-0.202***	-0.278***
	(-9.35)	(-2.67)	(-6.09)	(-4.71)	(-3.38)	(-4.40)
ครัวเรือนรุ่นกระโดด (ใช่ = 1)	0.295***	0.062	0.148***	0.381***	0.311***	0.243***
	(10.00)	(0.82)	(3.33)	(6.10)	(5.58)	(3.15)
ขนาดครัวเรือน	-0.256***	-0.105***	-0.227***	-0.304***	-0.249***	-0.272***
	(-22.38)	(-7.72)	(-14.21)	(12.12)	(-10.19)	(-9.41)
ครัวเรือนเกษตร (ใช่ = 1)	0.386***	0.253**	0.362***	0.316***	0.444***	0.444***
	(20.59)	(2.31)	(12.46)	(8.47)	(11.56)	(9.60)
จำนวนผู้มีรายรับในครัวเรือน	0.494***	0.178***	0.434***	0.593***	0.516***	0.542***
	(34.02)	(8.74)	(23.25)	(18.79)	(17.02)	(14.41)
จำนวนกลุ่มตัวอย่าง	20,120	878	5,647	5,511	5,570	2,514
Probability > Chi-Squared	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***
Pseudo R-Squared	0.6240	0.4277	0.5959	0.6393	0.6741	0.6135
Log Pseudo-Likelihood	-5144.71	-255.12	-1507.28	-1352.98	-1254.42	-673.45

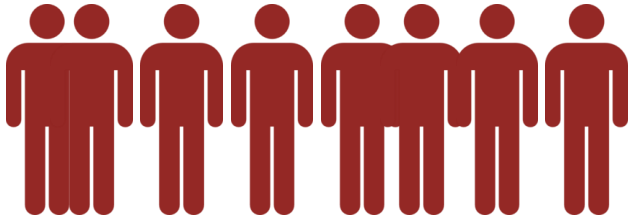
Source: Keeratipongpaiboon (2012) calculated from Socio-Economic Survey (SES) data (1990 – 2007)

Workshop: Demographic Change!

CURRENT TREND



Elderly people ↑↑↑



Working-age people ↓↓

Children ↓↓↓

End of Lecture