

A Step towards Overcoming Methodological Limits

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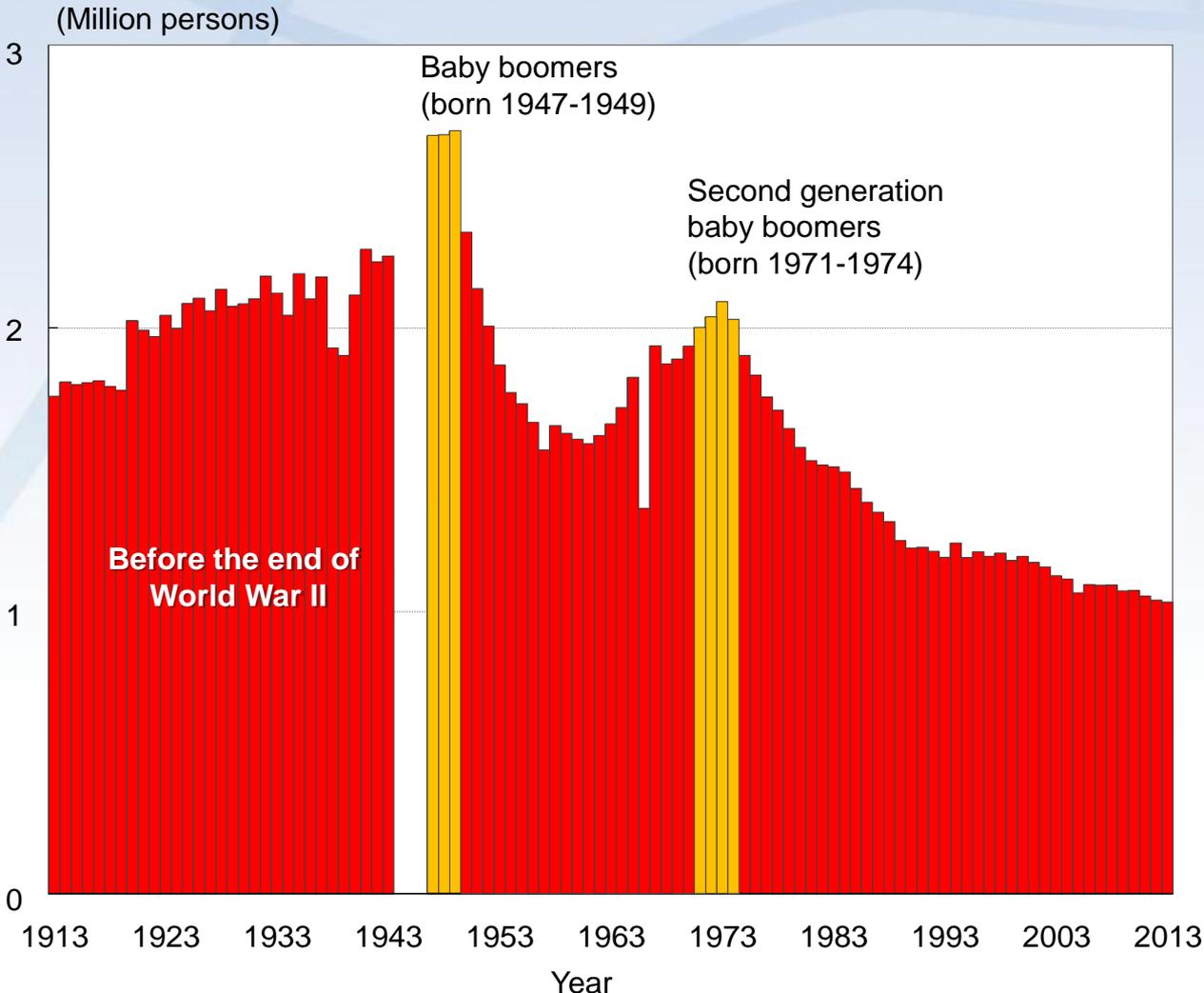
Population Aging Defined

- (1) Relative increase in the number of the elderly and relative decrease in the number of the young
- (2) **Declining fertility**: most important factor in inducing population aging at an early stage of demographic transformation

Population Aging Defined

(3) **Declining mortality**: increasingly important demographic source of population aging at a later stage, particularly when life expectancy at birth exceeds 70 years

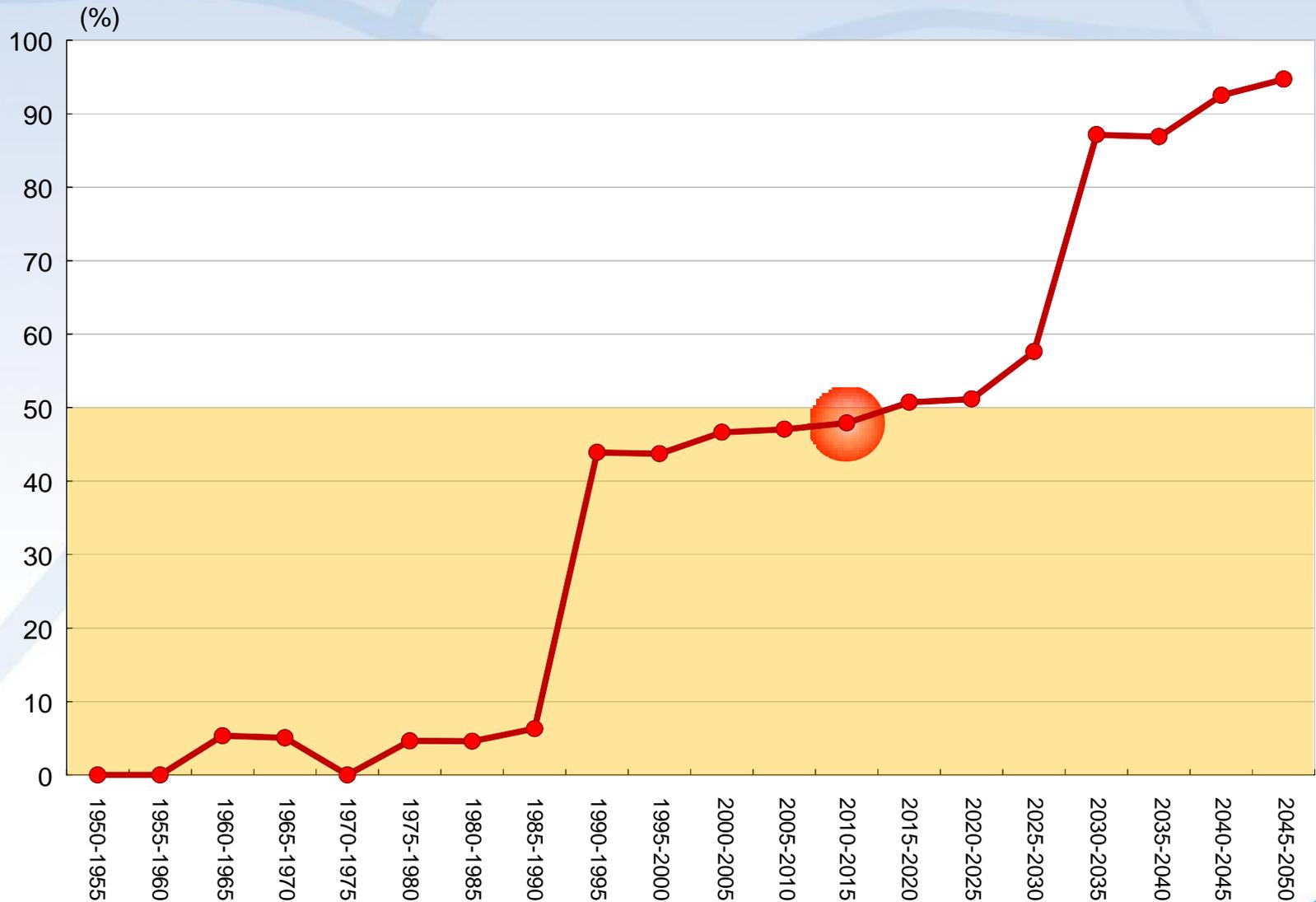
Changes in annual number of births in Japan, 1913-2013



Source: Ministry of Health, Labour and Welfare (various years) *Vital Statistics of Japan*.



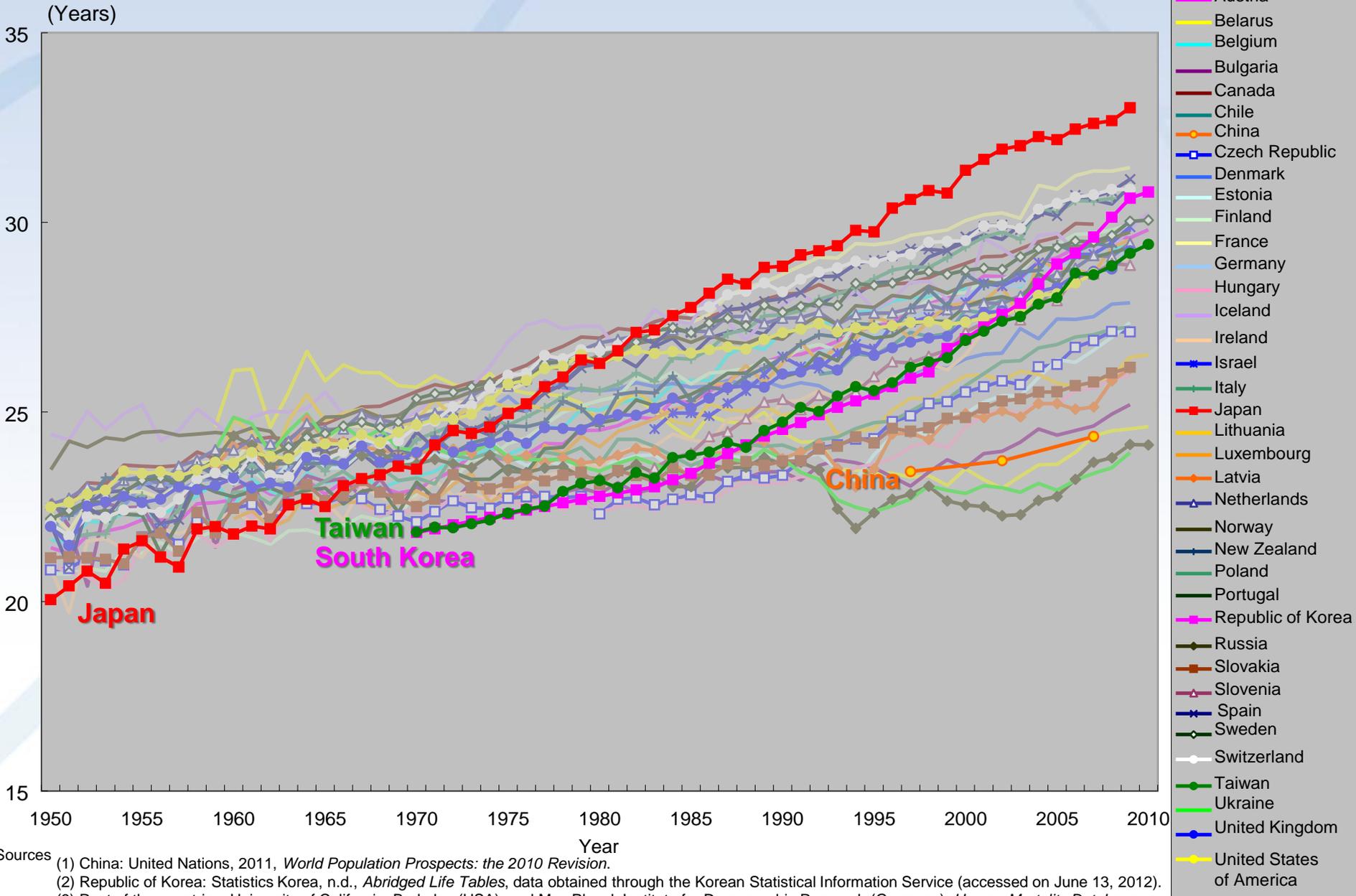
Share of the population of countries with below replacement-level fertility in Asia's total population



Note: Calculated by the author based on the data from United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2012 Revision*.



Female life expectancy at age 55

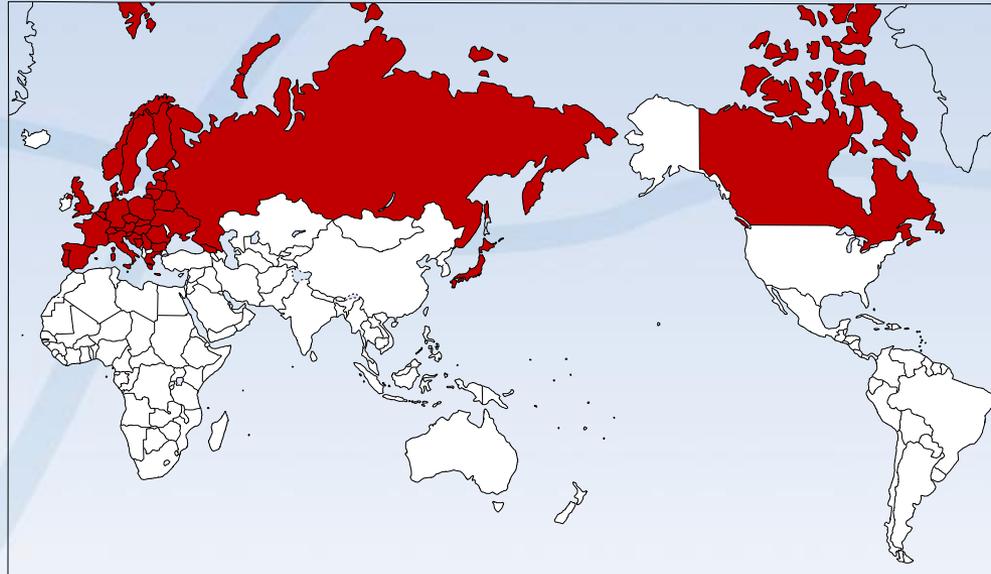


Sources (1) China: United Nations, 2011, *World Population Prospects: the 2010 Revision*.
 (2) Republic of Korea: Statistics Korea, n.d., *Abridged Life Tables*, data obtained through the Korean Statistical Information Service (accessed on June 13, 2012).
 (3) Rest of the countries: University of California, Berkeley (USA), and Max Planck Institute for Demographic Research (Germany). *Human Mortality Database*. Available at www.mortality.org or www.humanmortality.de (Data downloaded on June 8, 2012).

Warning signs in contemporary Asia

- **Japan**: Taxpayer revolt threatens public pension system
- **China, India, Thailand, and many other Asian countries**: Facing numerous challenges to establish and/or improve their social protection programs
- **South Korea and Taiwan**: Serious shortage of caregivers for the frail elderly

2010



Spread of elderly abundant societies



Spread of aged economies

2040



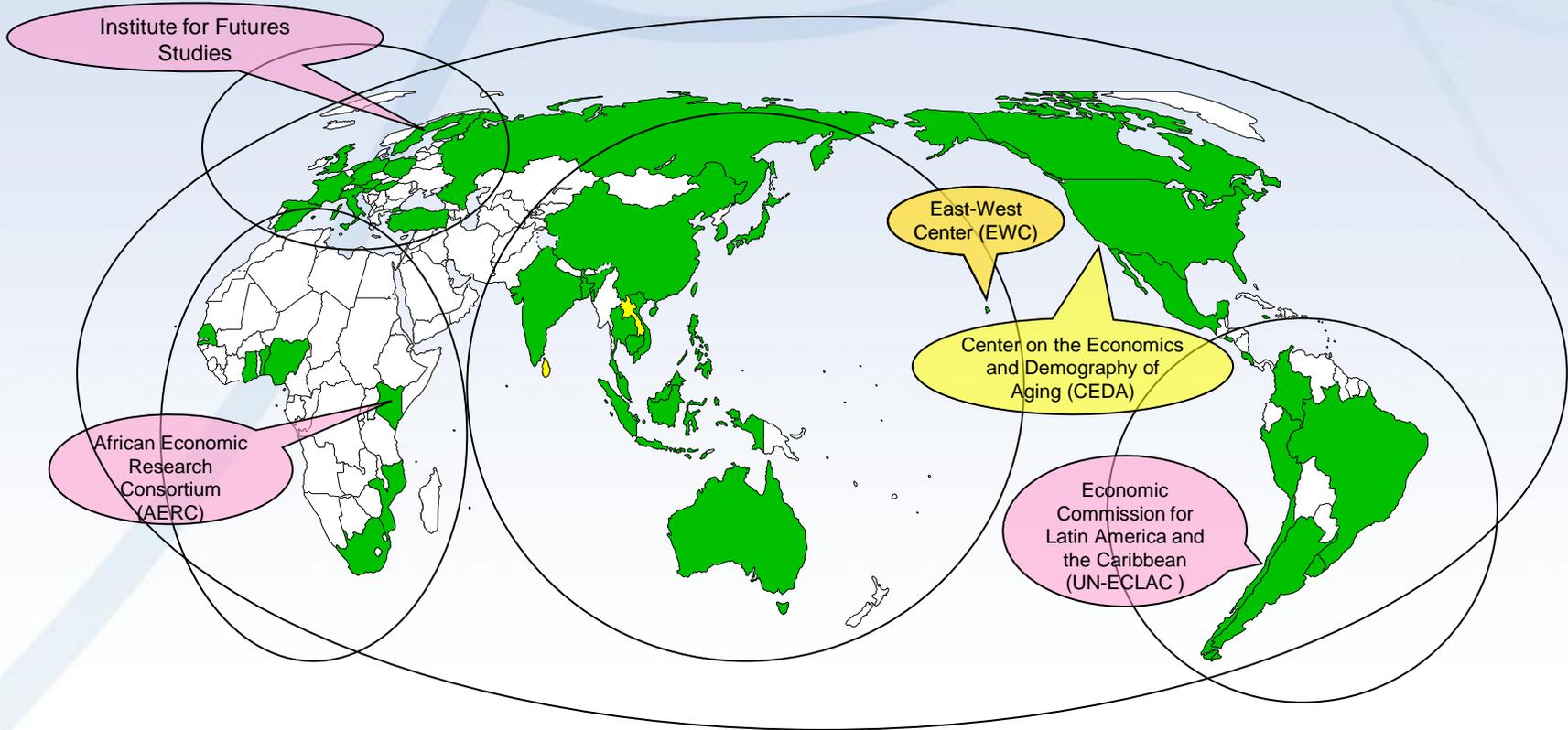
Spread of elderly abundant societies



Spread of aged economies

NTA Member Countries

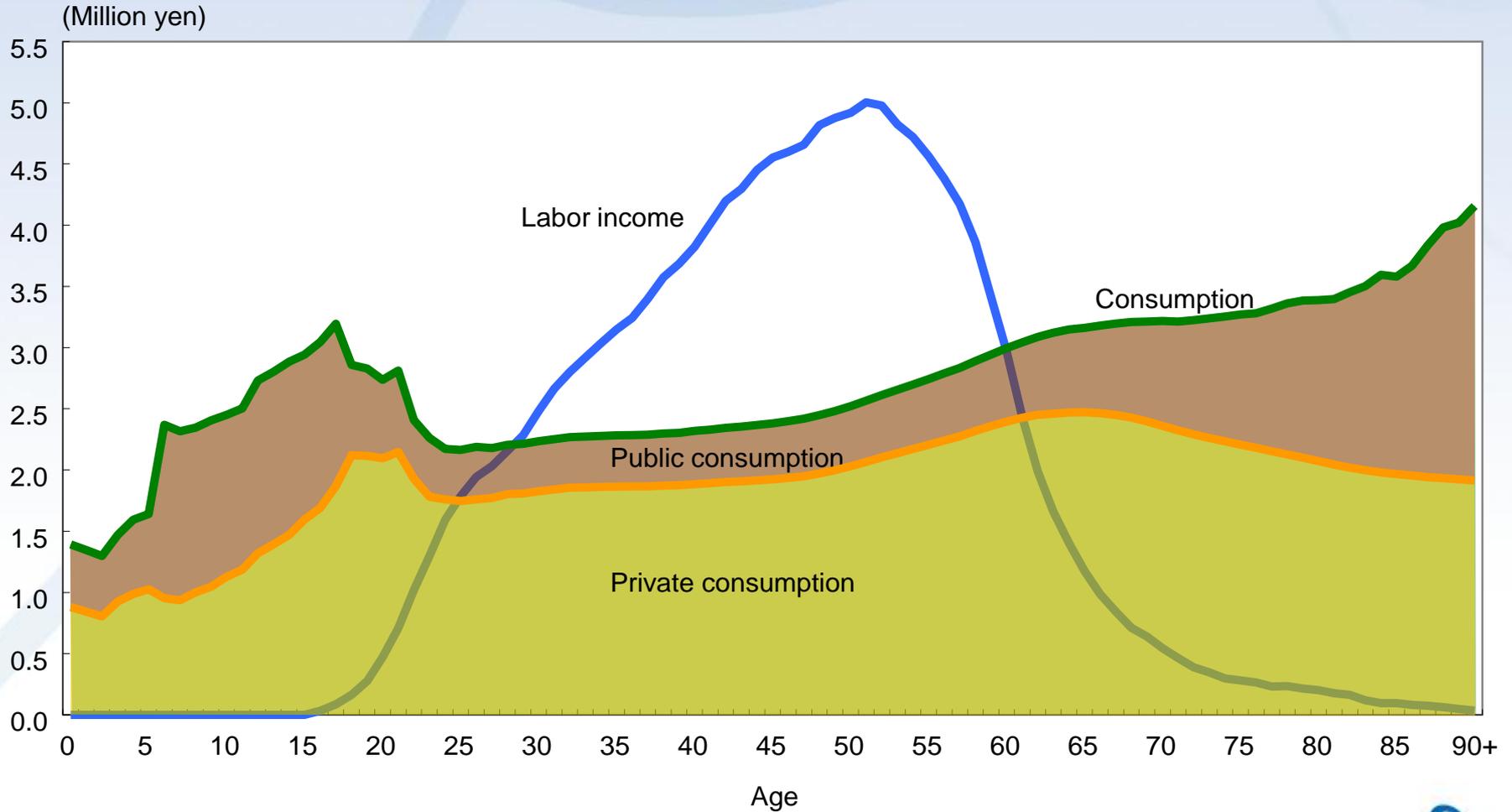
49 countries as of October 2015
(including 2 prospective member countries)



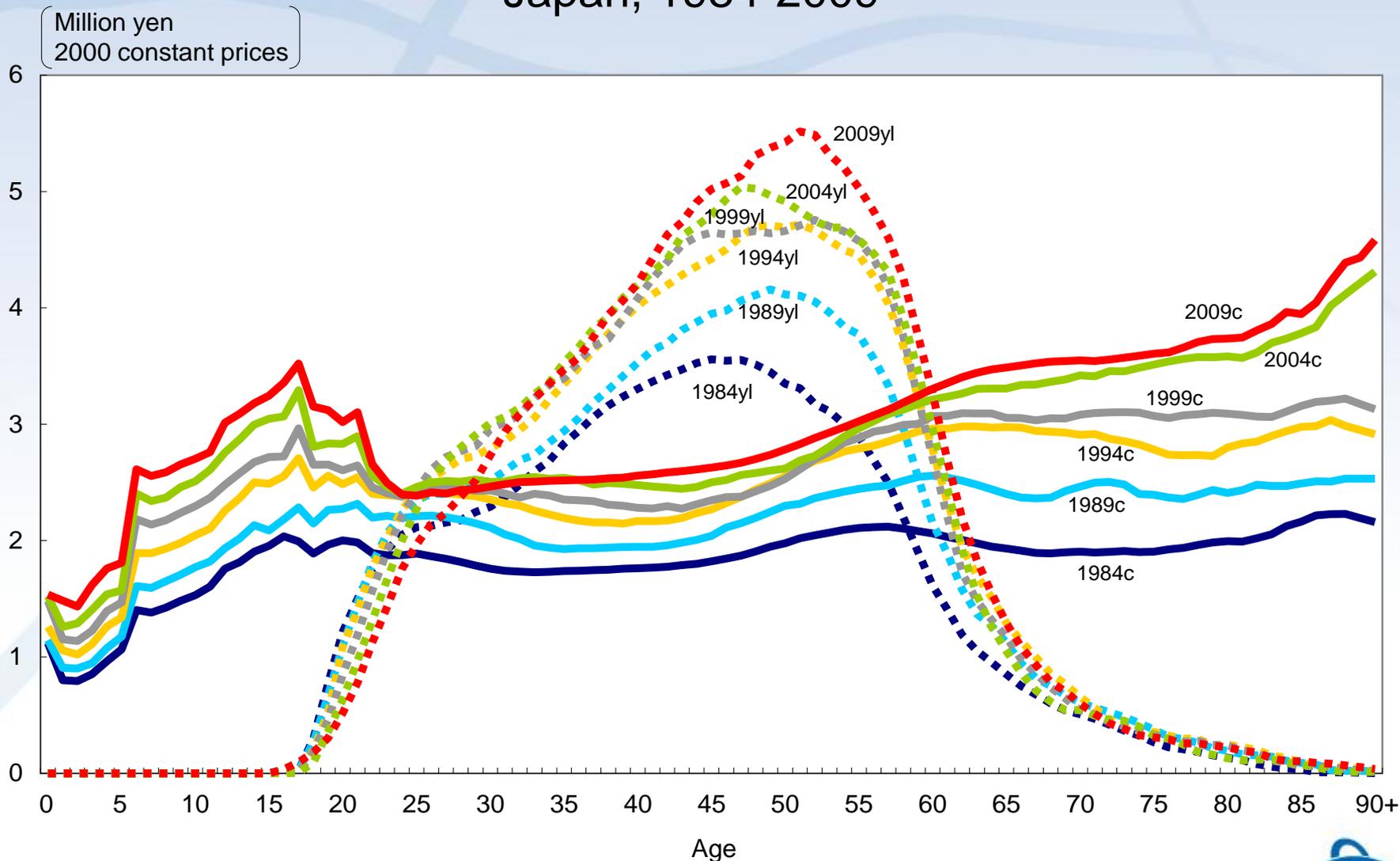
Asia-Pacific			The Americas		Europe			Africa	
Australia	Japan	Malaysia	Argentina	El Salvador	Austria	Luxembourg	Sweden	Benin	South Africa
Bangladesh	Philippines	Lao PDR	Brazil	Jamaica	Finland	Netherlands	Turkey	Ghana	
Cambodia	Republic of Korea	Sri Lanka	Canada	Mexico	France	Poland	United Kingdom	Kenya	
China	Taiwan		Chile	Peru	Germany	Russia		Mozambique	
India	Thailand		Colombia	United States	Hungary	Slovenia		Nigeria	
Indonesia	Viet Nam		Costa Rica	Uruguay	Italy	Spain		Senegal	

Japan's Most Important Graph

Per capita lifecycle: Japan (2009)

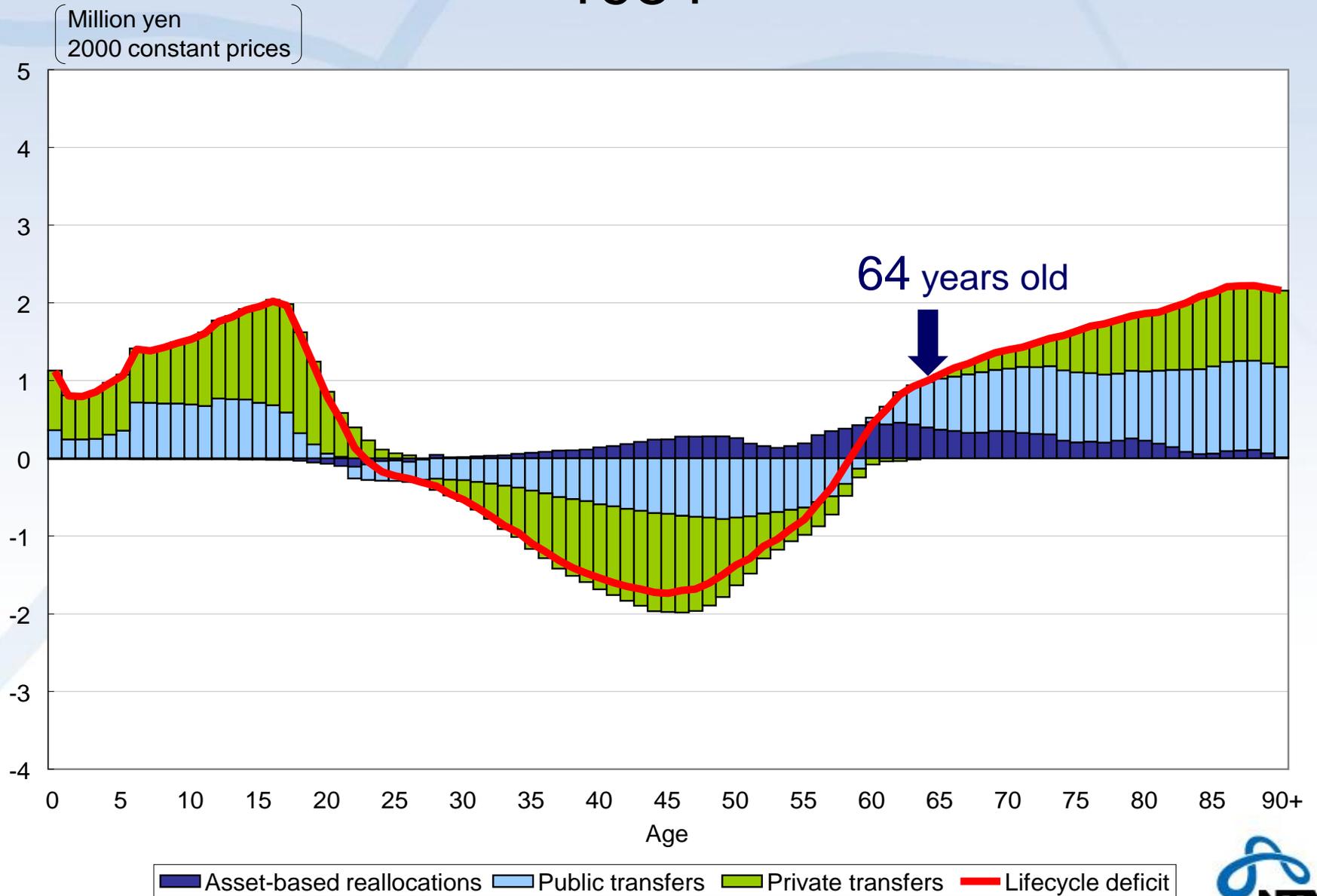


Per capita age specific profiles of consumption and labor income Japan, 1984-2009

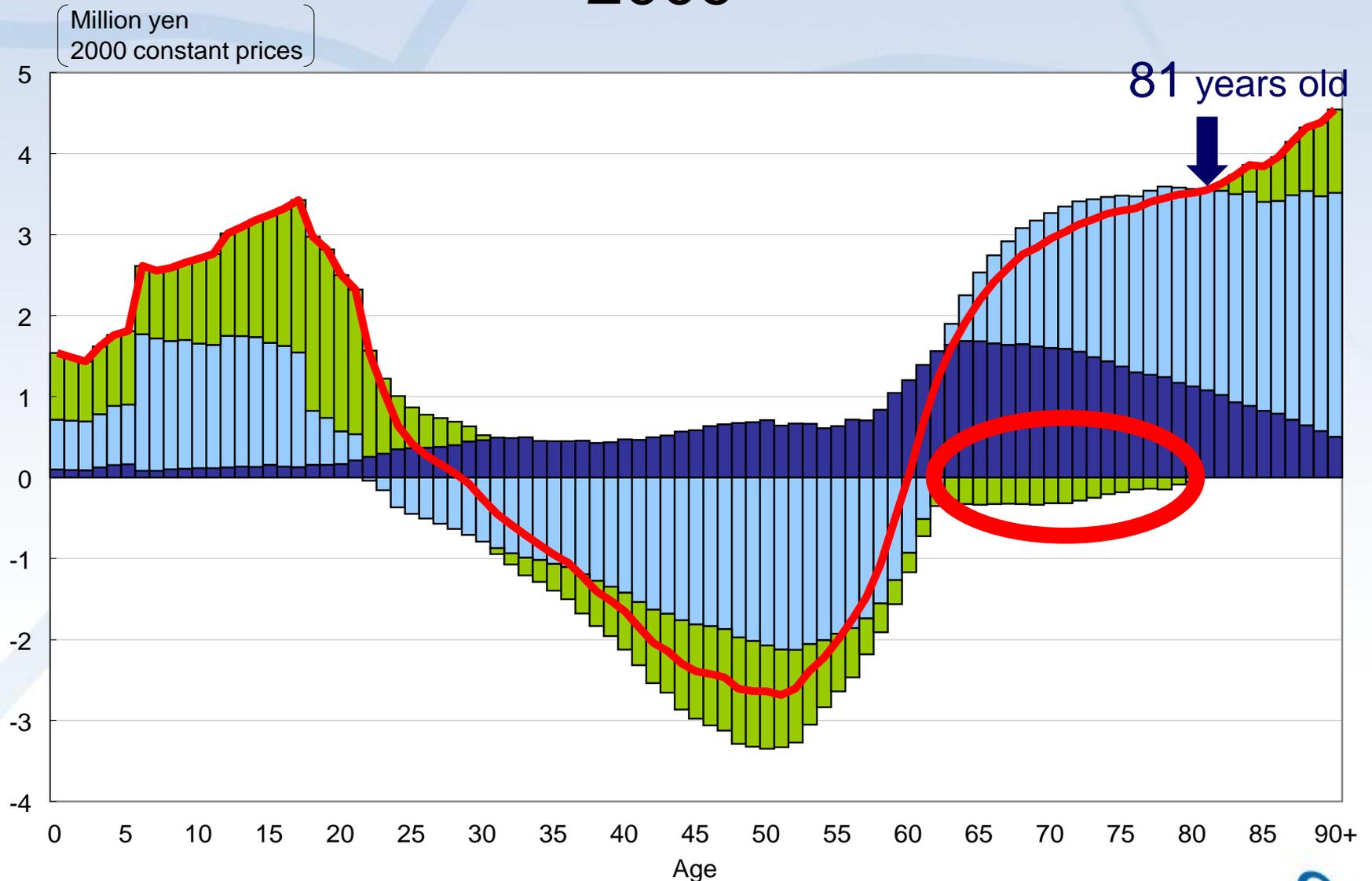


Note: "c" denotes consumption, and "yl" denotes labor income.

1984



2009

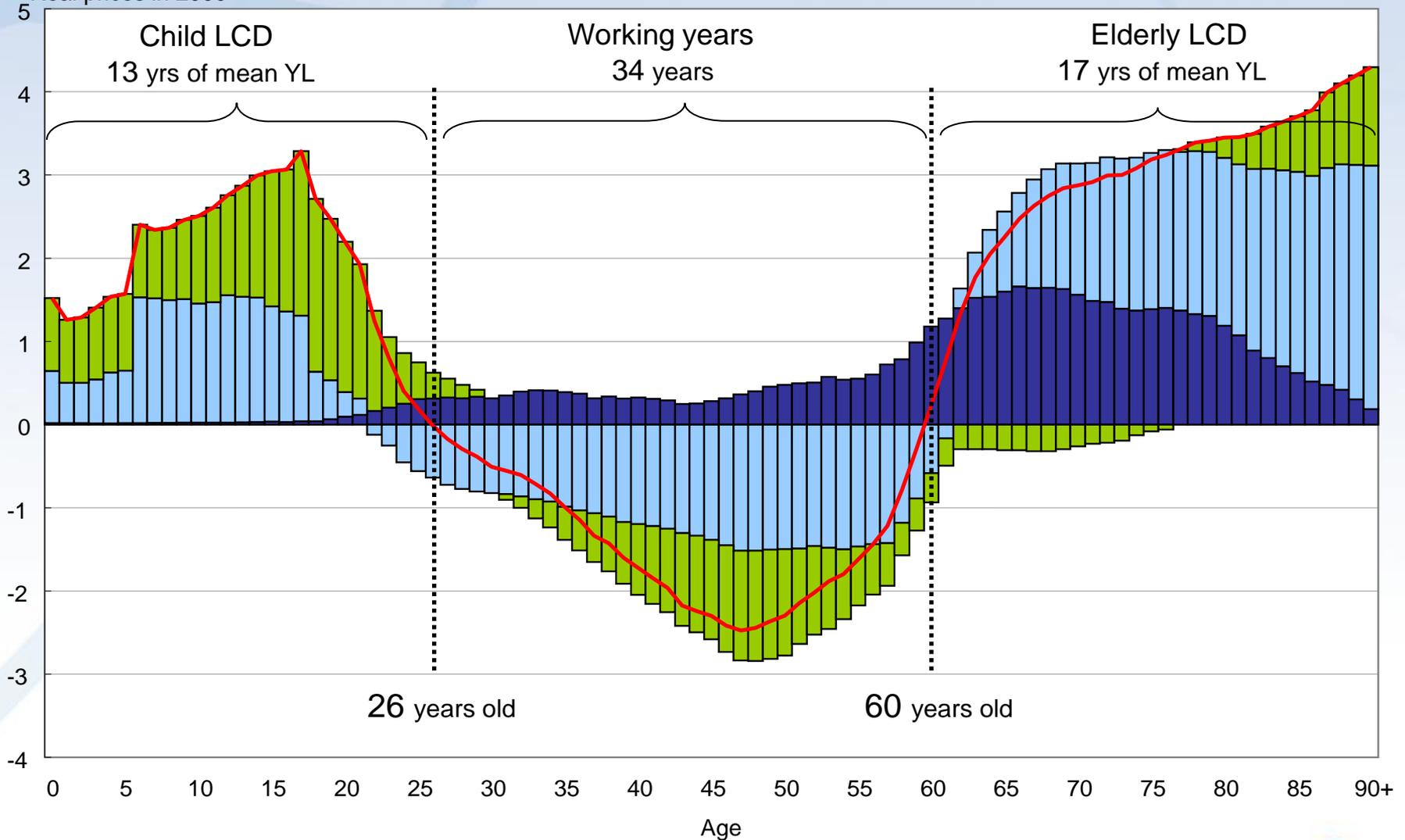


Asset-based reallocations Public transfers Private transfers Lifecycle deficit

Changing pattern of the components of per capita reallocation of lifecycle deficits in Japan

2004

Million yen
Real prices in 2000



Asset-based Reallocations Public Transfers Private Transfers Lifecycle Deficit



A Simple Calculation for Japan **1984**

Working years (in **1984**) · · · **36** years of LY

Lifecycle deficit per child · · · · **10** years of mean LY

Lifecycle deficit in retirement · **12** years of mean LY

TFR · **1.8**

A Simple Calculation for Taiwan 2005

Working years (in 2005) 28 years of LY

Lifecycle deficit per child 18 years of mean LY

Lifecycle deficit in retirement . 18 years of mean LY

TFR . 2.5

**Challenging to
improve NTA-
based policy
analytical power**

- **Expressed only in terms of “average” persons” and the variance among individuals is ignored**
- **Gender elements excluded**
- **Time-use study (in connection with gender issues)**
- **No urban-rural classification**
- **Construction of “stock” accounts is needed**
- **Incorporation of inheritance and bequests**
- **Tracing cohort-based change and time-series transformation**
- **Construction of policy-oriented simulation models**

Current trends in research on low fertility and population aging

- Empirical-based approaches
 - Analysis based on the National Transfer Accounts
 - Empirical micro analyses
- Approaches using macro-economic modelling
 - Overlapping Generations Model
 - Using virtual data (computer simulation data)
- However, **all of these have both strong and weak points.**

Analysis based on the National Transfer Accounts

Advantages

- The NTA capture consumption and labor income true to the data
- They capture both private and public consumption
- They enable calculation **in congruence with GNP stats which are the basis of any policy making**

⇒ Thus, the NTA are effective as a means of grasping the actual state of things : even the World Bank uses that method.

Analysis based on the National Transfer Accounts

Weaknesses

- Provides **no model** of how consumption and labor income are determined
- **Does not allow prediction** as to how consumption and labor income change in response to policy changes
 - ⇒ Thus, **policy evaluation is not possible**

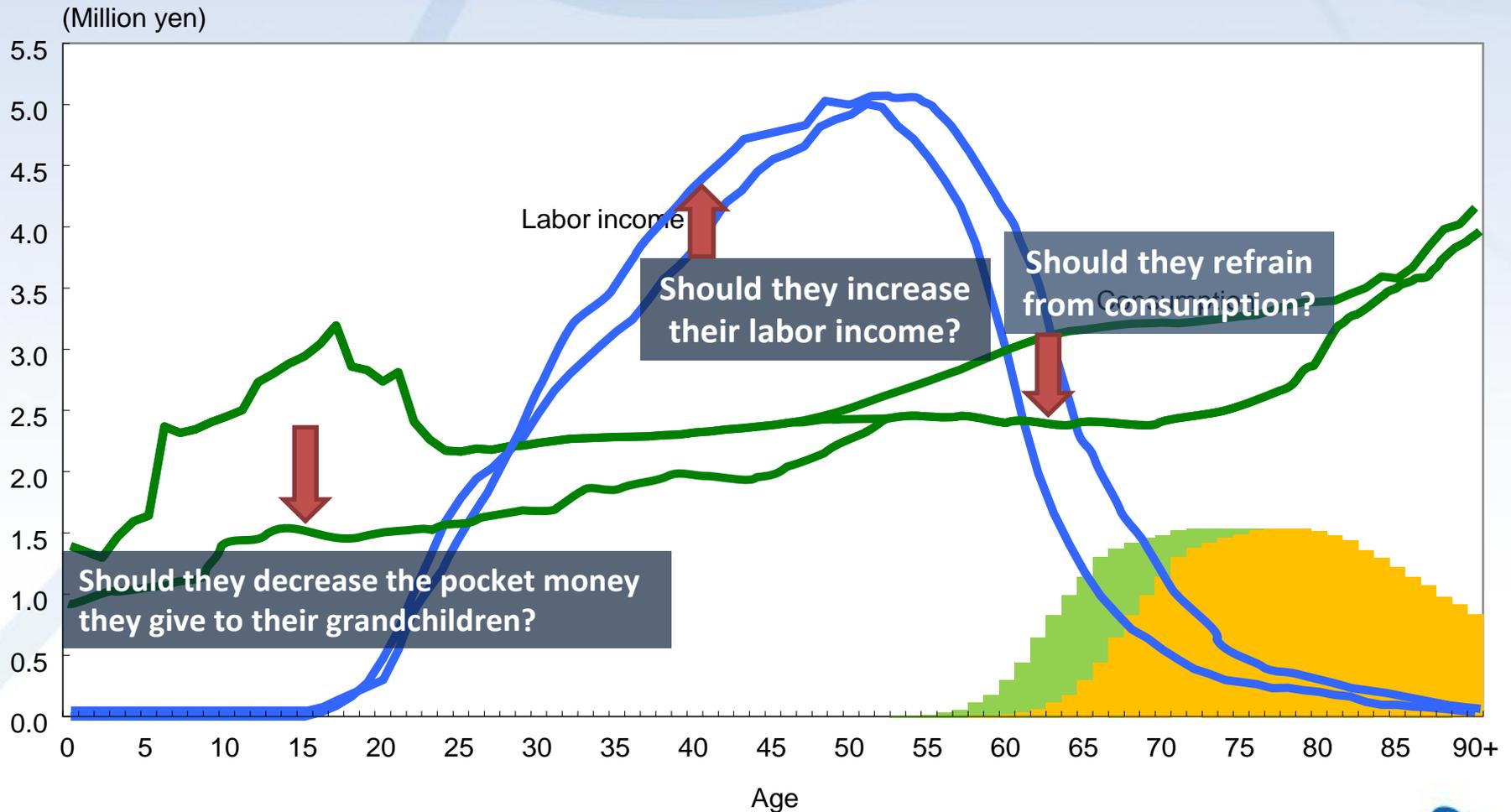
An example of policy evaluation :

Raising the pension eligibility age for two years

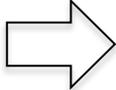
- Whether expenditure on social security can be saved depends on how big the proportion of people who start to receive pension early is.
 - On **the saving policy** depends how many people's living circumstances will worsen.
- Reduction in consumption \Rightarrow Reduction in tax revenue (and increasing discontent)
- Increase in labor supply \Rightarrow Increase in tax revenue (and an increase in discontent)
- (Decrease in the amount of pocket money given to grandchildren \Rightarrow somewhat unhappy grandchildren)
- Reduction in discontent among future generations (the grandchildren's generation included)

Realistic assessment of policy effects:

The impact of raising the age at which pension benefits begin to be received



The Importance of the Model

- Even if all the people affected by a policy are of the same age, **the extent of the effect of the policy will differ depending on their situation.**
 - The kind of work they do, their attitude to work
 - Their own health status, and their family's health status
 - The assets they possess, etc.
- **By using a model we can assess the discrepancies caused by the changes in policies**  **That means that the model is important**

Two approaches to modelling

- **Micro empirical analysis**
 - Empirical analysis is conducted to ensure the congruence between the model and the data by using household- and company-level data.
- **Approaches using macro-economic modelling**
 - Behavior models designate the most plausible scenario and accordingly calculate its implications
 - Models of how wages and interest rates values, for example, are determined are made (whereas in micro empirical analysis such values are treated as given from outside the model)

The present issues

- The micro empirical analysis does not allow us to analyze the impact of policy changes on values
- The approach that relies on modelling the entire economy tends to yield results that are not in accordance with the actual data, and
- The model is too simplistic and does not allow us to evaluate the health and nursing care systems.

The approach taken in our research

- We estimate a **more realistic model** based on the **household and company data**
- The estimation is conducted by introducing constraints so as to achieve **consistency with the GNP stats**.
- By incorporating those into the Overlapping Generations Model, we also model how the value of **wages, interest rates, etc.** are determined.

The reasons why such approach has not been taken until now

- Different sets of skill are necessary for conducting micro empirical analyses and using **macro models such as** the Overlapping Generations Model
- The concept of introducing constraints so as to achieve consistency with the GNP stats was absent
- Calculations in more realistic models are difficult

The reasons why the calculations are so difficult

- In the case of a typical model of consumption, savings and labor, **the following variables are included:**
 - Age (The range of 80 years of life, calculated at one-year intervals, from age 20 to 100)
 - Assets (50 different types, divided in two-percent classes up to the top 2 percent of the population)
 - Workers' productivity: divided into 5 types
 - Pension assets: (Population divided into 10 different ten-percent-wide categories)

$80 \times 50 \times 5 \times 10 =$ Analysis of 200,000 possible different patterns

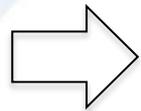
- It only takes a day to get the calculations done with a computer of average capability.

The amount to be calculated in a more realistic model

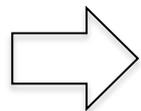
In addition to the previously mentioned:

- Educational background - 4 types
- Marital status – 3 types
- (Non-) Possession of children and living distance from them: 5 types
- Health status: 10 kinds, the bequests sum: 10 categories
- Whether parents are still alive or not and whether they require nursing care: 10 categories
- Situation regarding labor demand: 5 types

That is **60 billion** different patterns, 300,000 times more than in a typical, less realistic model!



That requires using super computers,



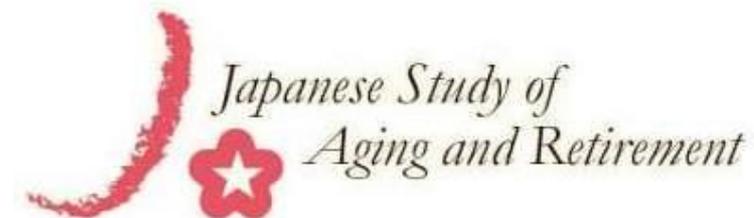
as well as **the development of a new calculation method**

Directing our attention from the “average person” to “individual variability”

Individual responses to these policy changes vary considerably, depending on his/her characteristics such as health, education, wealth, family organization, etc.

Also, their responses change over time, as a reaction to further changes in policy.

To address these issues, we are now trying to incorporate into the NTA framework, a **panel data** set called “JSTAR (Japanese Study of Aging and Retirement)”.





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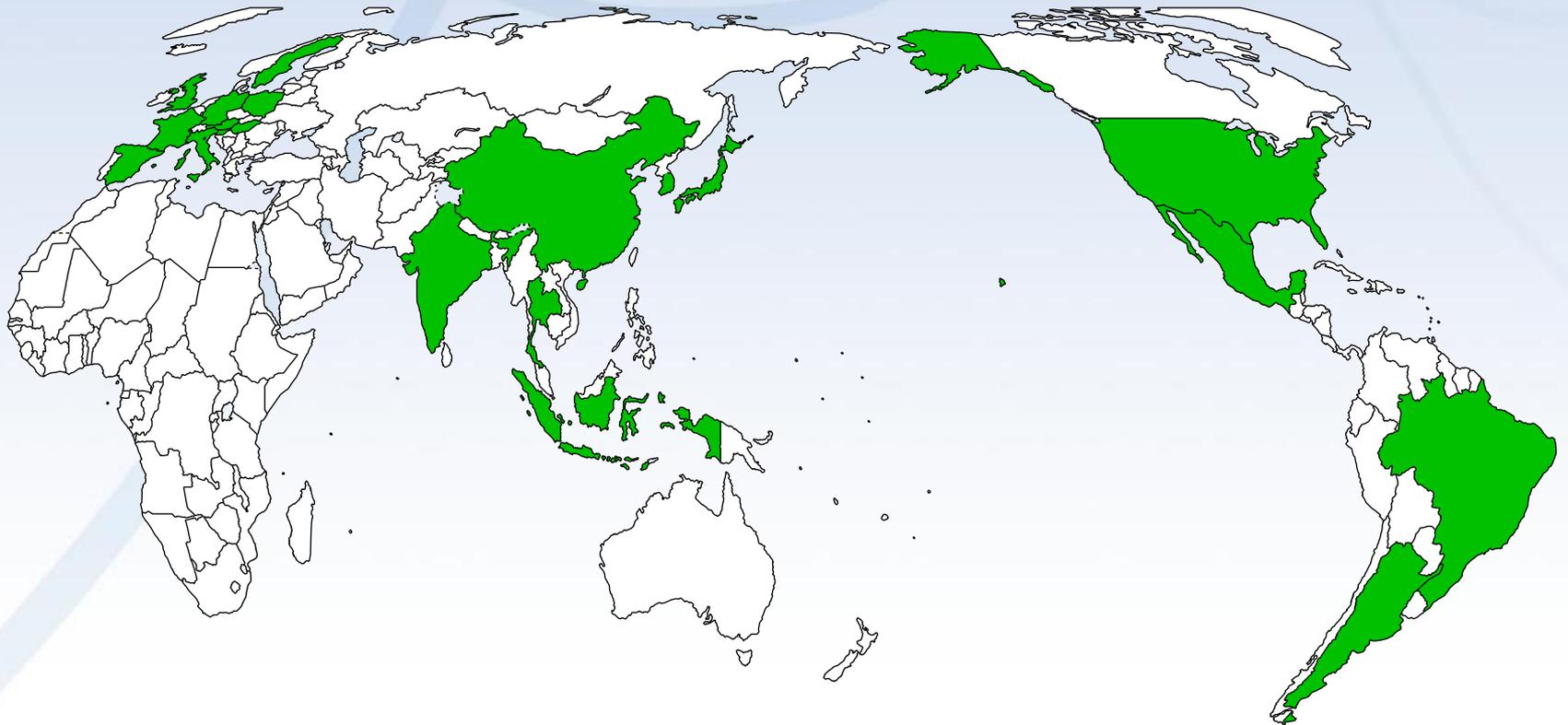
Browse Studies

Use this section to browse through our studies and drill down to individual study waves, modules, and survey items. Each publication contains comparative study overview information.

title	full name
RH Studies	RAND Harmonized Studies - RAND HRS, RH ELSA, RH SHARE and RH KLoSA
CHARLS	China Health and Retirement Longitudinal Study
ELSA	English Longitudinal Study of Ageing
HRS	Health and Retirement Study
IFLS	Indonesia Family Life Survey
JSTAR	Japanese Study on Aging and Retirement
KLoSA	Korean Longitudinal Study of Aging
LASI	Longitudinal Aging Study in India
MHAS	Mexican Health and Aging Study
SAGE	Study on Global Ageing and Adult Health
SHARE	Survey of Health, Ageing and Retirement in Europe
TILDA	The Irish Longitudinal Study on Ageing

NTA and HRS

20 countries



Thank you