Hands-on aging populations

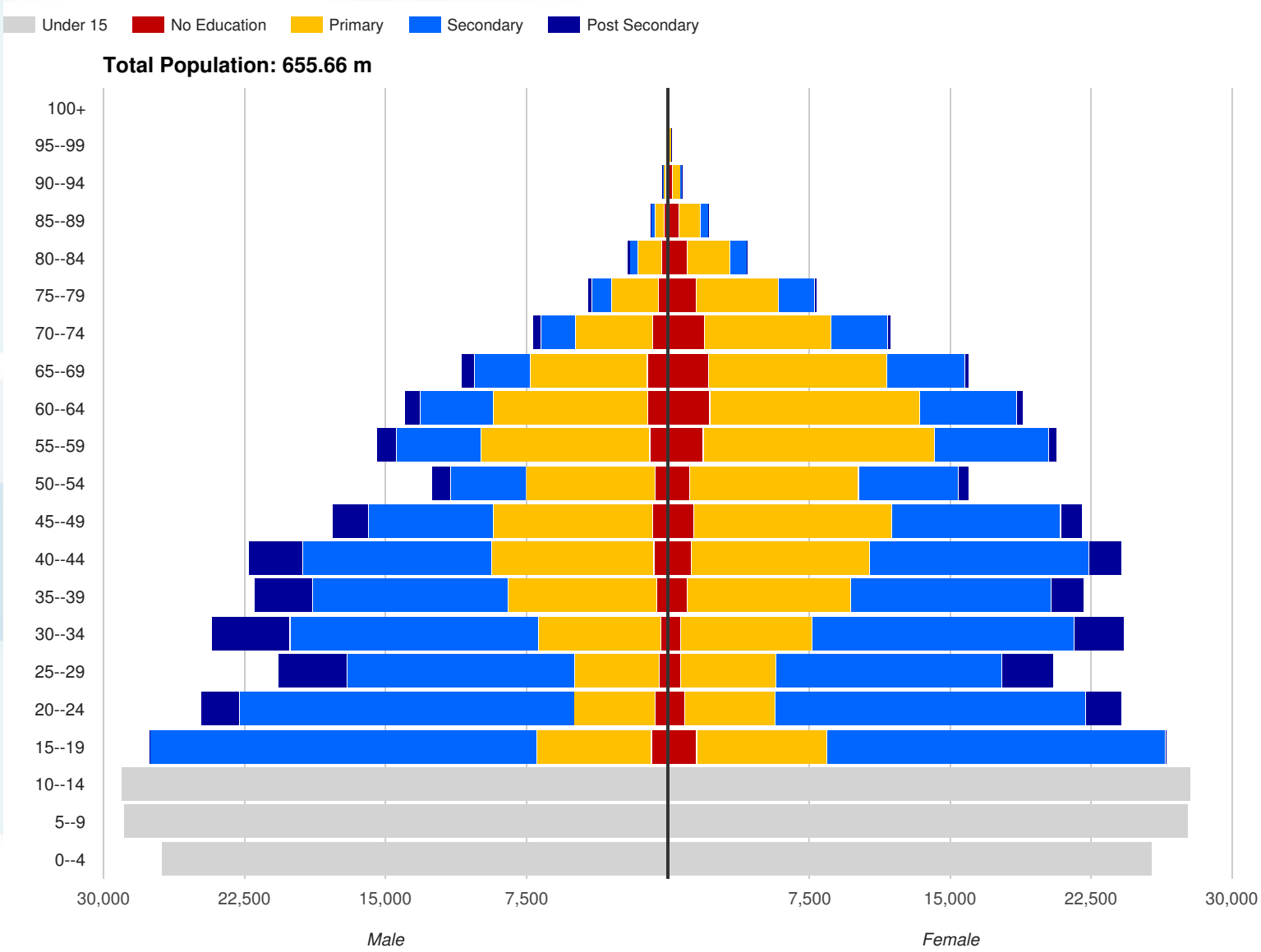
Daniela Weber

WIC Summer School, June 14th, 2016

International Institute for
Applied Systems Analysis
IIASA www.iiasa.ac.at

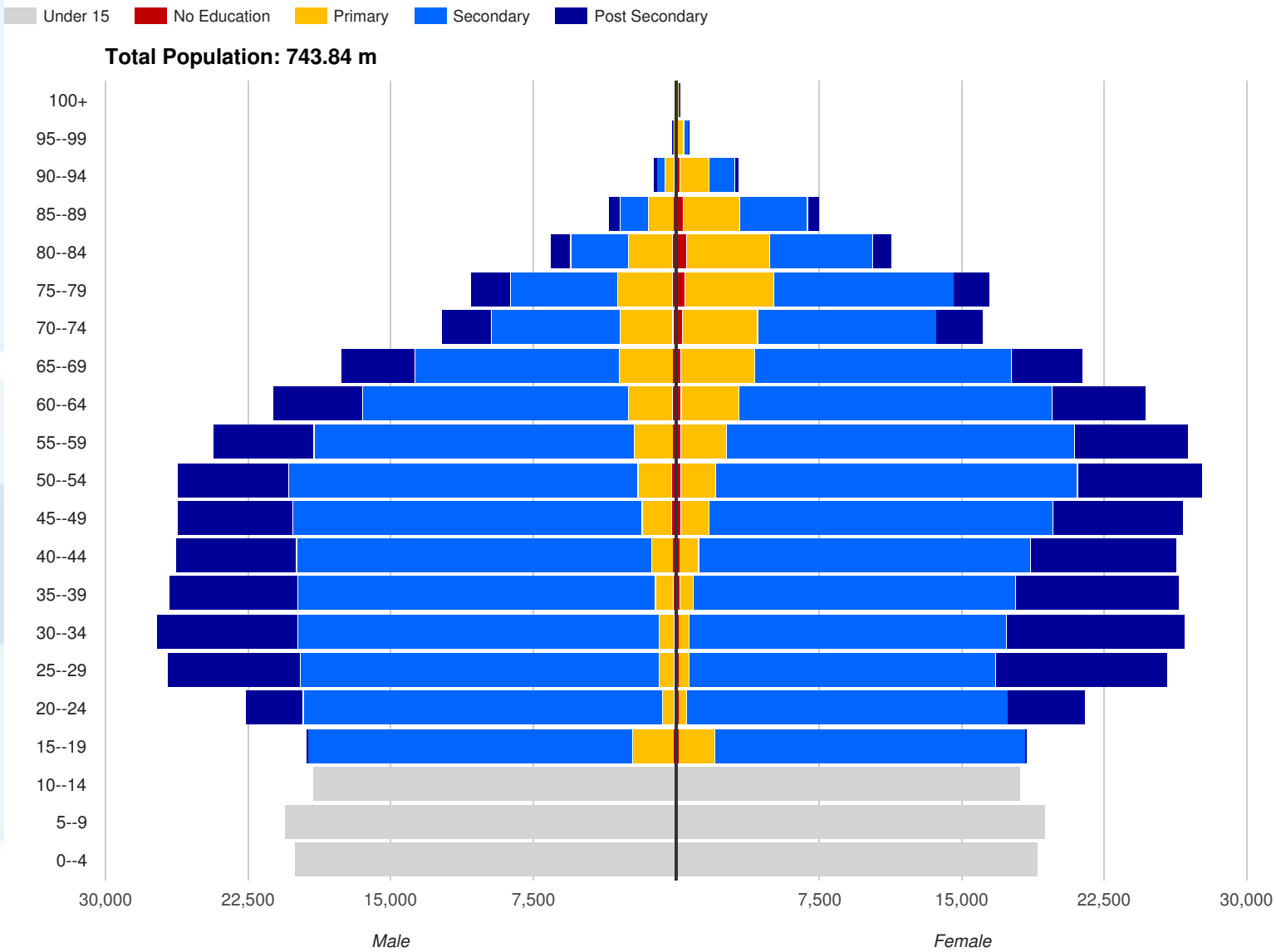
Wittgenstein Centre
FOR DEMOGRAPHY AND
GLOBAL HUMAN CAPITAL
A COLLABORATION OF IIASA, VID/ÖAW, WU

Motivation - European Population in 1970



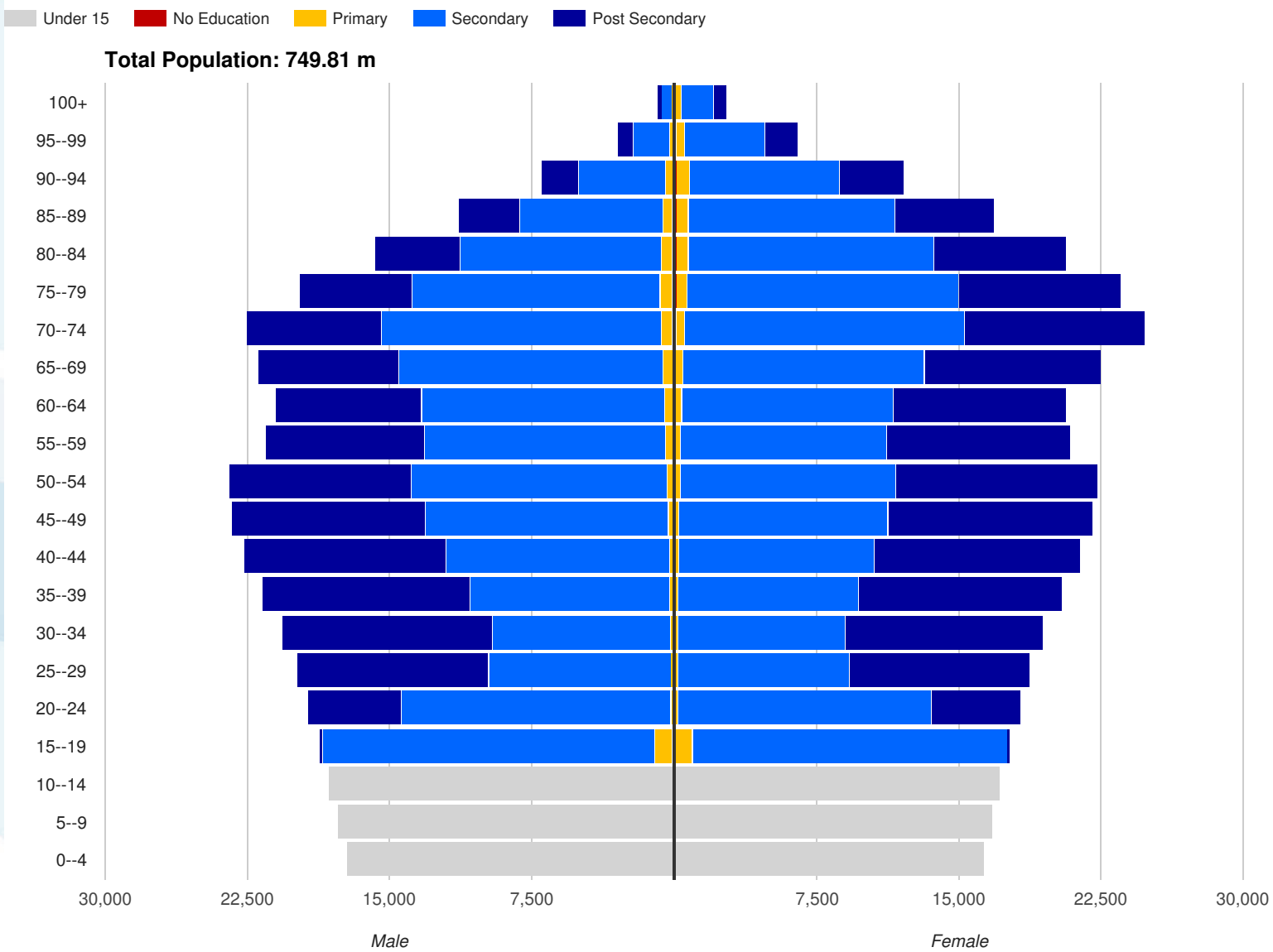
Source: Wittgenstein Centre Data Explorer Version 1.2.

Motivation - European Population in 2015



Source: Wittgenstein Centre Data Explorer Version 1.2.

Motivation - European Population in 2060



Source: Wittgenstein Centre Data Explorer Version 1.2.

Motivation - Aging of Population

influences on population aging:

- increasing life-expectancy
- decreasing fertility
- migration

Motivation - Aging of Population

influences on population aging:

- increasing life-expectancy
- decreasing fertility
- migration

Population Ageing

- an opportunity,
- a challenge,
- a burden?

Measures of Aging I

standard measures:

- **median age:**
  half of the population younger & half of the population is older
- **old-age dependency ratio (OADR):**
  ratio of the older population (dependent population, 65+) to the working-age population (20-64)

Are these sufficient measures?
? 50 year olds today = 50 year olds in 1970

Measures of Aging II

Sullivan method on aggregate level:

- healthy life years (HLY):
  limited in activities people usually do; self-reported health status (see lectures by Hayward, Jagger, and Yasuhiko)
- disability free life expectancy (DFLE):
  - functional limitation-free life expectancy
  - activity restriction-free life expectancy
- disease free life expectancy: without chronic

ratios on aggregate level:

- prospective old age dependency ratio (see lecture by Scherbov)
- cognition adjusted dependency ratio

Sullivan indicators

data sources:

- life-tables by age group (and sex)
- prevalence rates by age group (and sex)

Sullivan indicators

data sources:

- life-tables by age group (and sex)
- prevalence rates by age group (and sex)

life-tables

- l_i number of survivors of age x_i
- L_i number of person years lived in the age group i
- π_i prevalence of particular health state for age group i

Sullivan indicators

data sources:

- life-tables by age group (and sex)
- prevalence rates by age group (and sex)

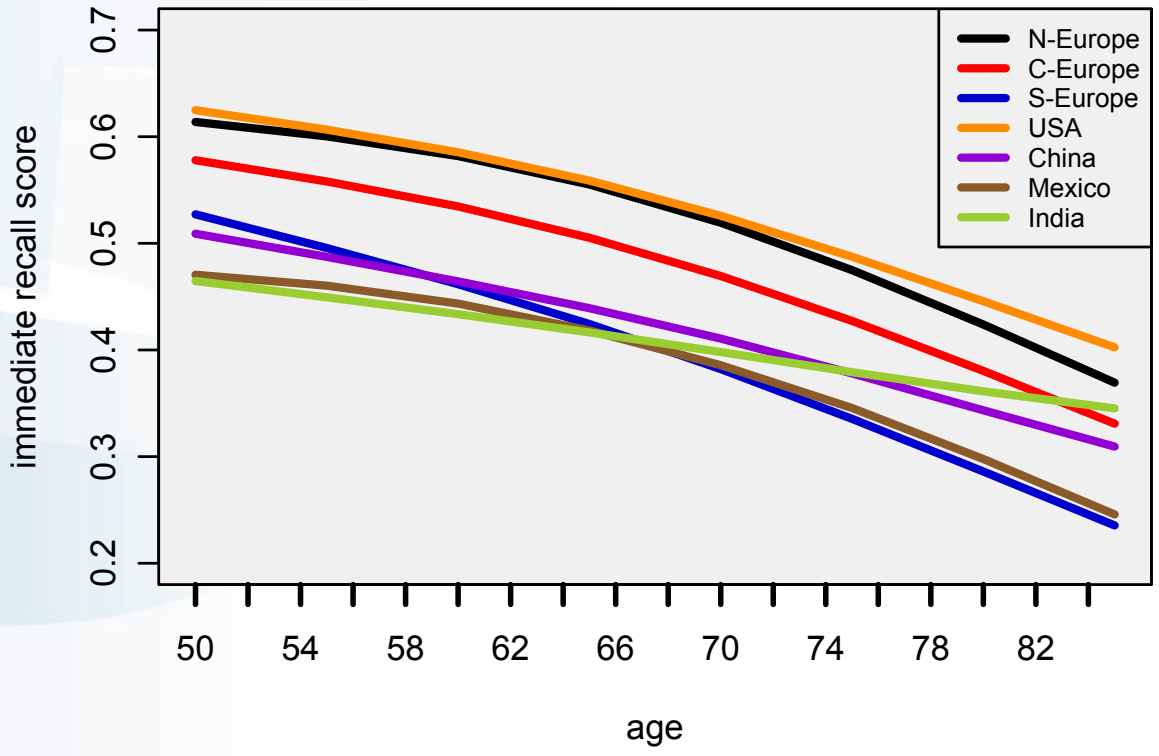
life-tables

- l_i number of survivors of age x_i
- L_i number of person years lived in the age group i
- π_i prevalence of particular health state for age group i

$$e_x = \frac{1}{l_x} \sum_{i=x}^{W} \pi_i L_i$$

Cognition Adjusted Dependency Ratio I

episodic memory performance in 2006/07 using ELSA, HRS, SAGE, and SHARE



conclusion: big variation in immediate recall performance across countries within same age groups

Source: Skirbekk, Loichinger & Weber, PNAS, 109(3), 2012

Cognition Adjusted Dependency Ratio II

new ratio: Cognition adjusted Dependency Ratio (CADR)

$$CADR = \frac{|\{x \in P \mid (m_x < 0.5) \wedge (age_x \geq 50)\}|}{|\{x \in P \mid (15 \leq age_x < 50\} \cup \{m_x \geq 0.5) \wedge (age_x \geq 50)\}|}$$

numerator: individuals aged at least 50 years with bad cognitive capacity
denominator: working age population and individuals older than 50 with good cognitive capacity

advantages:

- no fixed age threshold for dependency
- include cognitive capacity

Cognition Adjusted Dependency Ratio III

comparison of OADR and CADR

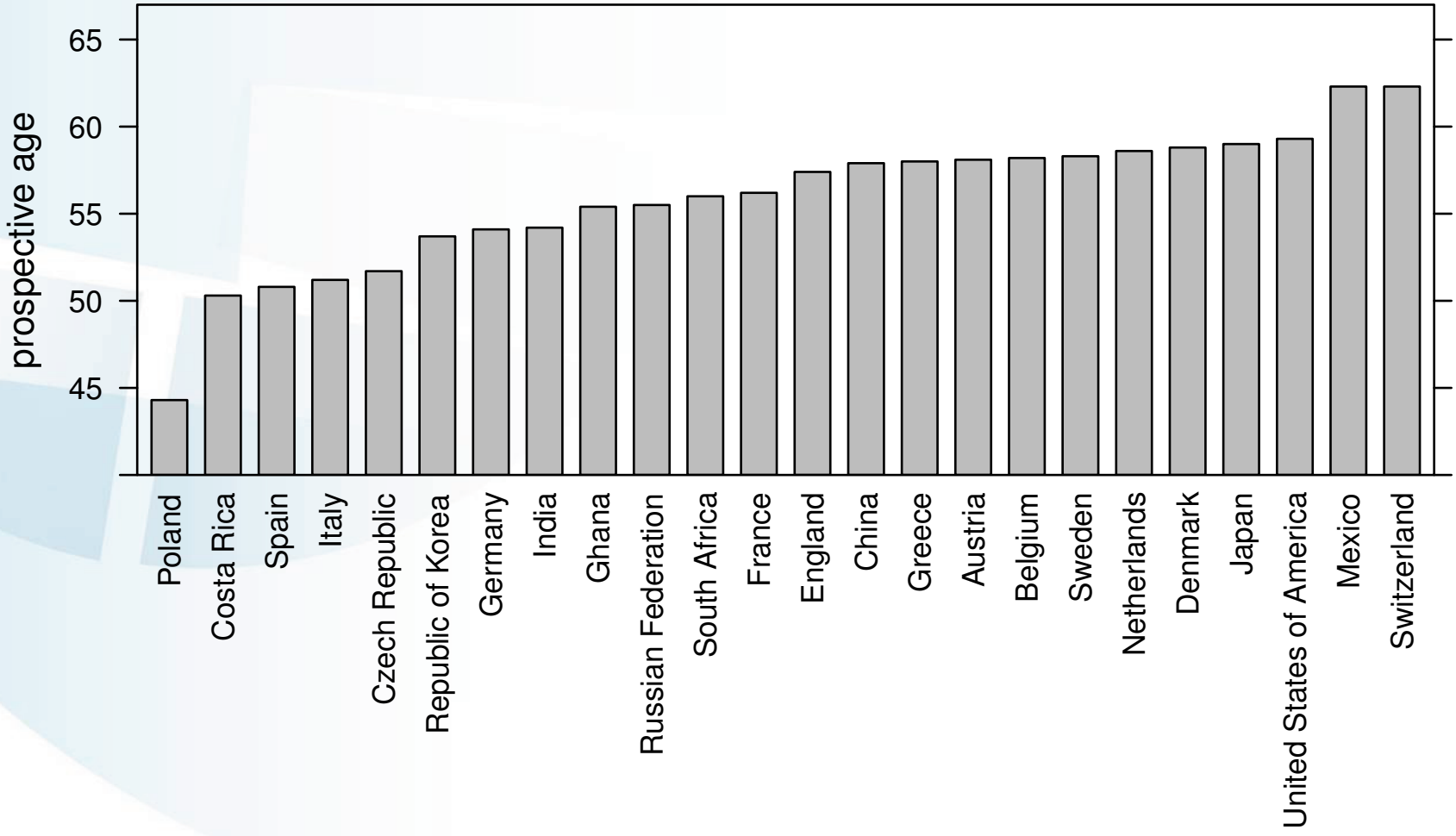
- data sources: ELSA, HRS, SAGE, and SHARE

country/region	CADR	OADR
United States	1 (0.10)	4 (0.19)
Northern Europe	2 (0.12)	5 (0.24)
India	3 (0.14)	1 (0.07)
Mexico	3 (0.14)	2 (0.09)
China	5 (0.15)	3 (0.12)
Continental Europe	6 (0.18)	6 (0.25)
Southern Europe	7 (0.32)	7 (0.27)

- CADR reflects cognitive capacity: older adults in Northern Europe and United States lead the CADR ranking

Prospective age I

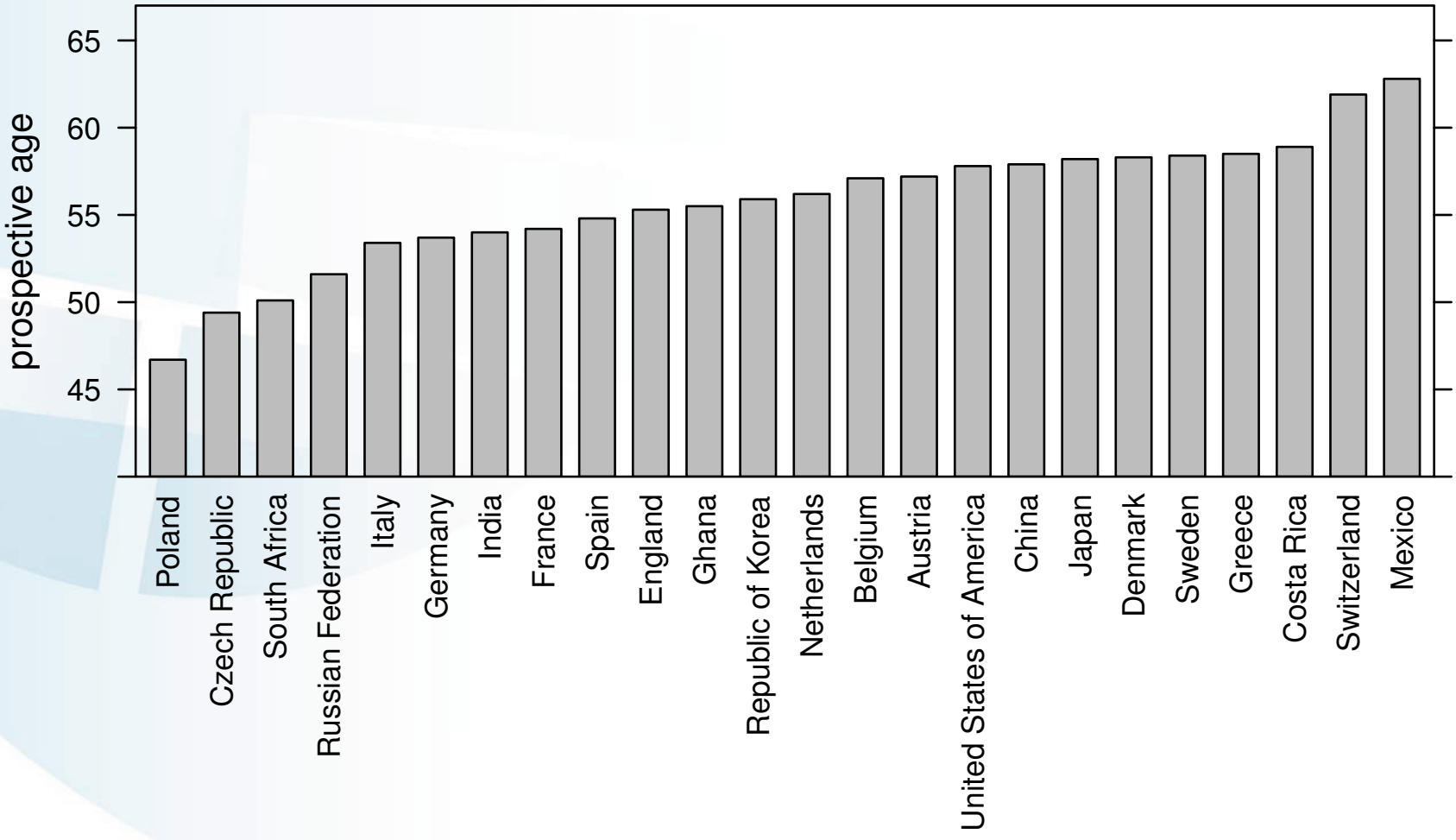
women's prospective age (good self-reported health)



Source: own calculation; Weber 2015

Prospective age II

men's prospective age (good self-reported health)



Source: own calculation; Weber 2015

Better understanding of aging

- How do populations age?
- How do individuals age?
- Who deals better with aging?
- What are main determinants of healthy aging?

Some data sources

- for economical investigations:
  NTA Data
- several dependency ratios:
  Re-aging tables
- Wittgenstein database for population indicators:
  WIC Data Explorer

Time for questions . . .

contact: weberd@iiasa.ac.at