Hands-on aging populations

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Motivation - European Population in 1970

Total Population: 655.66 m

Source: Wittgenstein Centre Data Explorer Version 1.2.
Motivation - European Population in 2015

Total Population: 743.84 m

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

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Population Ageing

- an opportunity,
- a challenge,
- a burden?
Measures of Aging 1

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

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life-tables

- $l_i$: number of survivors of age $x_i$
- $L_i$: number of person years lived in the age group $i$
- $\pi_i$: prevalence of particular health state for age group $i$
Sullivan indicators

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life-tables

- $l_i$ number of survivors of age $x_i$
- $L_i$ number of person years lived in the age group $i$
- $\pi_i$ 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

new ratio: Cognition adjusted Dependency Ratio (CADR)

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

**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

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

- 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 . . .

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