Theme group
Ageing & Longevity

• MAIN RESULTS
• PLANS FOR THE FUTURE

Joop de Beer, Govert Bijwaard, Michaël Boissonneault, Nicole van der Gaag, Fanny Janssen, Ilya Kashnitsky

Brown Bag Seminar
15 October 2015
Theme group Ageing & Longevity examines and projects changes and differences in mortality and health and its consequences for ageing.
### THEME GROUP AGEING & LONGEVITY

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<th>Ageing</th>
<th>Longevity</th>
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<tr>
<td>Joop de Beer</td>
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<td>Govert Bijwaard</td>
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<td>Michaël Boissonneault</td>
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<td>Arun Chandran</td>
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<td>Ilya Kashnitsky</td>
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AGEING & LONGEVITY: WHAT DO WE KNOW?

- Longer and healthier life
  - Delay of mortality to old age
  - Delay of severe limitations to old age
- Longer active
  - Ability to work > labour force participation
- Later old
  - Ageing starts at higher age
- But not for everyone
  - Differences by education
  - Differences across countries and regions
AGEING & LONGEVITY: PLANS FOR RESEARCH

- Longer and healthier life
  - Limit to increase in life expectancy?
  - Will smoking and obesity have a downward effect?
- Longer active
  - How long can we work?
- Later old
  - How can we measure ageing better?
- But not for everyone
  - What causes educational differences?
  - Do differences across countries become smaller?
LONGEVITY

• Joop:
  • shape and shift of distribution of age at death
• Govert:
  • educational differences caused by education?
  • conditions in early life
• Fanny:
  • impact of smoking, obesity and alcohol on mortality
AGEING

• Michaël:
  • does ability to work allow a rise in age at retirement?
• Ilya:
  • convergence in ageing across EU regions?
• Nicole:
  • ageing and sustainability: beyond GDP
• Arun:
  • new ageing indicators: not only age
Joop de Beer:
Longevity: delay or compression?
Increase in life expectancy: is there a limit?

Two views:
1. Limit to improvement at oldest ages: compression of mortality
2. Continuation of (linear) trend
LONGEVITY

Japanese women:

high life expectancy: 86.8 years
increase 2.5 years per decade

If increase continues:

in 2060 life expectancy will be 100 years
LIFE TABLE: JAPANESE WOMEN

Death probability

Distribution of age at death

1980 2010
PROJECTION OF DEATH PROBABILITY

Japanese women 1980 and 2010
PROJECTION OF DEATH PROBABILITY

Japanese women 1980 and 2010
2060: Lee- Carter projection
LIFE EXPECTANCY AT BIRTH

Japanese women, 1980-2010

Graph showing life expectancy trends from 1980 to 2060.
LIFE EXPECTANCY AT BIRTH

Japanese women, 1980-2010 - 2060
Projection: Lee Carter
DISTRIBUTION OF AGE AT DEATH

Japanese women 1980 and 2010
DISTRIBUTION OF AGE AT DEATH

Japanese women 1950 and 2010
Linear increase in modal age at death
DISTRIBUTION OF AGE AT DEATH

Japanese women 1980 and 2010
DISTRIBUTION OF AGE AT DEATH

Japanese women 1980 and 2010
2060: projection based on delay
DISTRIBUTION OF AGE AT DEATH

Japanese women 1980 and 2010
2060: projection based on delay
2060: projection based on Lee-Carter
PROJECTION OF DEATH PROBABILITY

Japanese women 1980 and 2010
2060: Lee- Carter projection
PROJECTION OF DEATH PROBABILITY

Japanese women 1980 and 2010
2060: Lee- Carter projection
2060: projection based on delay
LIFE EXPECTANCY AT BIRTH

Japanese women, 1980-2010
LIFE EXPECTANCY AT BIRTH

Japanese women, 1980-2010 - 2060
Projection: Lee Carter

Life expectancy

LIFE EXPECTANCY AT BIRTH

Japanese women, 1980-2010 - 2060
Projection: Lee Carter vs delay scenario
LONGEVITY

Fanny Janssen:
Impact of smoking on life expectancy
DUTCH MEN - MODAL AGE AT DYING

![Graph showing the modal age at dying for all cause and non-smokers in Netherlands from 1950 to 2010. The graph indicates an increase in the modal age for both all cause and non-smokers over time.]
DUTCH MEN – MODAL AGE AT DYING

![Graph showing the modal age at dying for Dutch men, with different trends for all cause, non-smokers, and smokers over time.](image_url)
LONGEVITY

Projection life expectancy, Dutch men

Assume: delay, no compression
FUTURE PLANS

1) Assess impact of smoking, alcohol and obesity on mortality (VIDI)
2) Improve mortality projections by including lifestyle-related mortality (VIDI)
3) To examine socio-economic differences in the impact of lifestyle on mortality
4) To extend to developing countries
Govert Bijwaard: 
Impact of education on life expectancy
EDUCATIONAL GAINS IN LIFE-EXPECTANCY

Gain in life expectancy 18-66 (months)

Source: Dutch military conscription data (born 1944-1947)
DECREASE OF PROBABILITY TO DIE WITHIN ONE YEAR AFTER HOSPITALIZATION

DOES INTELLIGENCE EXPLAIN EFFECT OF INCREASING EDUCATION?

Without intelligence

With intelligence

Source: Brabant data
EDUCATIONAL GAINS AND CAUSE OF DEATH

Source: Swedish conscription data (born 1951)
EARLY LIFE AND IMPACT ON LATER LIFE OUTCOMES

- Impact of famine on height, weight (bmi), education and intelligence (FAMINE-2)

- Impact of famine on socio-economic outcomes

- Home care use (together with RUG- FEB)

- Medication use
COHORT EFFECT FAMINE ON HEIGHT

Source: Dutch military conscription data (born 1944-1947)
Michaël Boissonneault: Impact of health on work
WILL OLDER PEOPLE BE HEALTHY ENOUGH TO HAVE LONGER ACTIVE LIVES?

We aim at modelling participation taking into account:

- Changes in retirement behaviour (as induced by policy)
- The fact that older people more often have adverse health conditions that prevent them from working
CHANGE IN LABOUR FORCE PARTICIPATION

BASELINE

Baseline workforce

Age

50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74
CHANGE IN LABOUR FORCE PARTICIPATION

LOST TO WORK DISABILITY: HOW MANY?

Baseline workforce
Extra workforce
Lost to work disability

Age

0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00
THE MODEL

Simple two terms model:

\[ L_x = A_x P_x \]

\( A_x \): Ability to work

- The proportion of people who are able to work

\( P_x \): Propensity to work

- The proportion of people who actually work inside the population that is able to work
HOW TO ESTIMATE VALUES FOR THE FORMULA’S TERMS

\( A_x \): Ability to work is estimated based on retirement on grounds of poor health

\( P_x \): Propensity to work is based on all non-health related retirements

Surveys contain information about why people retired (SHARE, HRS, different LFS’s)
ESTIMATED VALUES

Ability to work

- Source: HRS waves 2002-2012

Propensity: Baseline and Postponement
ESTIMATED VALUES

Ability to work

Propensity: Baseline and Postponement

Source: HRS waves 2002-2012
ESTIMATED VALUES

Ability to work

Propensity: Baseline and Postponement

Source: HRS waves 2002-2012
RESULTS: THE DECREASE WITH AGE IN ABILITY DOES NOT HAVE A BIG IMPACT ON POSTPONEMENT OF PARTICIPATION

Source: HRS waves 2002-2012
ABILITY AND PROPENSITY: FITTED AND OBSERVED VALUES

Disability: fit and observed values

Propensity: fit and observed values

Source: HRS waves 2002-2012
Ilya Kashnitsky:
Regional differences in ageing
WHY CONVERGENCE IN AGEING?
WHY CONVERGENCE IN AGEING?

Cohesion Policy (*success story?*)
WHY CONVERGENCE IN AGEING?

Cohesion Policy (*success story* ?)

Ageing has a **downwards effect** on economic output
WHY CONVERGENCE IN AGEING?

Cohesion Policy (*success story?*)

Ageing has a **downwards effect** on economic output

Measure variable is Working Ratio

(*working-to-non-working-age ratio*, inverse of Dependency Ratio)
WHY CONVERGENCE IN AGEING?

Cohesion Policy (success story ?)

Ageing has a downwards effect on economic output

Measure variable is Working Ratio (working-to-non-working-age ratio, inverse of Dependency Ratio)

Sigma-convergence VS beta-convergence
NO SIGMA CONVERGENCE

2003

Mean: 2.02
SD: 0.208
CV: 0.103

Mean: 1.95
SD: 0.224
CV: 0.115
BETA CONVERGENCE

\[ B = -0.14 \quad *** \]

- **Eastern Europe** (45)
- **Northern Europe** (21)
- **Western Europe** (132)
- **Southern Europe** (59)

**EASTERN**
- \[ B = -0.41 \]
- \[ B = -0.16 \]

**NORTHERN**
- \[ B = -0.31 \]
- \[ B = -0.29 \]

**SOUTHERN**

**WESTERN**
## CLUB CONVERGENCE

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<td>( Intercept)</td>
<td>0.20 (0.08)*</td>
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<tr>
<td>Initial WR</td>
<td>-0.14 (0.04)***</td>
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<tr>
<td>Eastern</td>
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<tr>
<td>Northern</td>
<td>-0.04 (0.03)</td>
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<td>Southern</td>
<td>-0.02 (0.02)</td>
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***p < 0.001, **p < 0.01, *p < 0.05; standard errors in parenthesis
LONGER PERSPECTIVE
Nicole van der Gaag: Ageing and sustainability
AGEING AND POPULATION PROJECTIONS

COUNTING PEOPLE
THE POWER OF POPULATION PROJECTIONS

Ageing

Sustainability

Beyond GDP

Supra-national
EU wide
All regions

Profit
Planet
People

Targets
Indicators
Europe2020 / SDG

NETHERLANDS INTERDISCIPLINARY DEMOGRAPHIC INSTITUTE
SUSTAINABLE POPULATION DISTRIBUTION?

Minister Plasterk (Ministry of the Interior and Kingdom relations)

Netherlands: One polycentric city
SUSTAINABLE POPULATION DISTRIBUTION?

Minister Plasterk (Ministry of the Interior and Kingdom relations)

Netherlands:
One polycentric city

Frank van Oort (Economic geographer) and Zef Hemel (Spatial planner)

Amsterdam:
2 million inhabitants
SUSTAINABLE POPULATION DISTRIBUTION?

Minister Plasterk (Ministry of the Interior and Kingdom relations)

Netherlands: One polycentric city

Frank van Oort (Economic geographer) and Zef Hemel (Spatial planner)

Amsterdam: 2 million inhabitants

Heleen Mees (Economist/Legal expert)

Northern provinces: Move to the Randstad
THE POWER OF POPULATION PROJECTIONS:
How can demographic futures shape the progress towards sustainability goals?

Ageing & Migration  →  Well-being  ←  Inequality

This research may fit into the RUG Research Priority Sustainable Society and may be linked to the tWIST Programme (Towards Wellbeing, Innovation and Spatial Transformation)
thank you

Joop de Beer
Fanny Janssen
Govert Bijwaard
Michaël Boissonneault
Ilya Kashnitsky
Nicole van der Gaag

NIDI is an institute of the Royal Netherlands Academy of Arts and Sciences KNAW and is affiliated to the University of Groningen
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