Microsimulations on the effects of ageing-related policy measures

Jan-Maarten van Sonsbeek
(VU University / Ministry of Social Affairs and Employment)
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System characteristics

1\textsuperscript{st} pillar (state) pension:
- PAYG, contributions (2/3) + taxes (1/3)
- Fixed retirement age 65
- Basic income level, no income/means tests
  - singles 70% MW (€ 12,700) / couples 50% MW (€ 8,700)
  - Addition: partner allowance (<65 yrs) <= 50% MW
  - Subtraction: -2% for each year (15-65) not lived in NL

2\textsuperscript{nd} pillar (company) pension:
- Fully funded (final wage $\rightarrow$ career average, aim 70%)

3\textsuperscript{rd} pillar (individual) pension

Microsimulations on the effects of ageing-related policy measures - Background
Ageing in the Netherlands

- Population forecast (CBS, 2008)
  - Nr. of 65+: 2.5 mln. (2009) → 4.5 mln. (2040)
  - Grey pressure: 25% (2009) → 49% (2040)

- Sustainability gap projections
  - CPB 2007: 2.2% GDP
  - CPB 2010: ± 6% GDP (= € 35 bln.)
Assessment of policy measures

- Main policy directions in case of unsustainability
  - Increase government revenues
  - Reduce government expenses
  - Increase labour participation

- Considerations
  - Budgetary effects
  - Participation effects
  - Redistributive effects → Political viability

- SADNAP model provides integral analysis
Data sources

- Micro data
  - State pension payments (SVB, 2.6 mln. – 2006)
  - State pension entitlements (CBS, 11.0 mln. – 2005)
  - Private pension entitlements (CBS, 5.8 mln. – 2005)
- Macro data (alignment)
  - Population forecast (CBS, 2009-2050)
  - Household forecast (CBS, 2009-2050)
  - Participation forecast (CPB, 2009-2050)
Participation by Age 2005

Microsimulations on the effects of ageing-related policy measures - Data
The SADNAP Model

- SAS-based
- Demographic model:
  - Births, Deaths, Immigration, Emigration
  - Differentiation of mortality rates
  - Household formation (0/1)
  - Participation (0/1) until age 59
- Behavioural model:
  - Retirement decision from age 60 onwards
  - Stock & Wise option value model
The demographic model

Microsimulations on the effects of ageing-related policy measures - Model
The simulated database

Microsimulations on the effects of ageing-related policy measures - Model
Option value model - 1

- Option value (Stock & Wise, 1990)
  - \( R^* = R \) that maximizes lifetime utility from labour and retirement income:
    
    \[
    V_t(R) = \sum_{s=t}^{R-1} \left( \beta^{s-t} \cdot p(s|t) \cdot (Y_s)^y \right) + \sum_{s=R}^{T} \left( \beta^{s-t} \cdot p(s|t) \cdot k \cdot B_s(R)^y \right)
    \]

- Wage equation:
  
  \[
  (Y_{t+1}) = (1 - \tau) \left( (1 - p(d|t) - p(u|t))Y_t + (p(d|t) + p(u|t))0.7Y_t \right)
  \]

- Generic age- and gender specific rates for mortality \((p(s|t))\), disability \((p(d|t))\) and unemployment \((p(u|t))\)
Option value model - 2

- Parameter estimates vary widely in literature
  - Stock & Wise (1990): \( \rho = 0.22; k = 1.25; \gamma = 0.63 \)
  - E.g. Börsch-Supan (2004): \( \rho = 0.03; k = 2.8; \gamma = 1.0 \)
- Individual heterogeneity in key option value parameters
  - Time preference (\( \rho \)) ~ U(0; 0-0.05; 0.05-0.1; 0.1-0.2; 0.2-1)
    - Samwick (1998)
    - Gustman and Steinmeier (2005)
  - Leisure preference (\( k \)) ~ U(1-3)
  - Risk aversion (\( \gamma \)) ~ U(0.5-0.9)
  - Expected wage decrease (\( \tau \)) ~ U(0-0.09)
Wage and pension by age 2005

Microsimulations on the effects of ageing-related policy measures - Model
Baseline budgetary effects

- Macro forecast based on 2006 population projection: €49.3 bln. (8.6% of GDP)
- Micro forecast based on 2008 population projection: €50.3 bln. (8.8% of GDP)
  - 2006→2008 population forecast: + €2.6 bln. (0.5% GDP)
  - Cost per person decrease: - €1.6 bln. (0.3% GDP)
    - More immigrants (reduced state pensions)
    - Rising labour participation of women
    - More singles (but in the short run more cohabitants)
Baseline redistribution

% Lifetime state pension income / % pensioners

Microsimulations on the effects of ageing-related policy measures - Results
Baseline retirement age pattern

Microsimulations on the effects of ageing-related policy measures - Results
Policy Measures

- Abolishment partner allowance
  - Decided 1996, in force 2015

- Raising retirement age 65 → 67 (2020/2025)
  - Decided 2009, not yet in force (new gov’t!)

- Abolishment tax exemption for pensioners
  - Proposed 2006 by most left-wing parties and SEC

- Individualization of state pensions: 50% for all
  - Proposed 1987, very controversial

- Retirement window 65-70
  - Accrual: neutral (5%) or reward later retirement (8%)
Effect on government budget

Microsimulations on the effects of ageing-related policy measures - Results
## Effect on retirement age

<table>
<thead>
<tr>
<th>Retirement age</th>
<th>Generous ERS</th>
<th>Baseline</th>
<th>Partner allowance</th>
<th>Retirement age 67</th>
<th>Pension singles 50%</th>
<th>Ret. window accrual 8%</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 – 64</td>
<td>39%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>At 65</td>
<td>7%</td>
<td>22%</td>
<td>19%</td>
<td>5%</td>
<td>21%</td>
<td>19%</td>
</tr>
<tr>
<td>Past 65</td>
<td>11%</td>
<td>20%</td>
<td>23%</td>
<td>37%</td>
<td>21%</td>
<td>24%</td>
</tr>
<tr>
<td>Average</td>
<td>62.8</td>
<td>65.2</td>
<td>65.3</td>
<td>65.8</td>
<td>65.3</td>
<td>65.5</td>
</tr>
</tbody>
</table>
Effect on redistribution

- **Generic measure:** Gini coefficient
- **Specific measure:** % Lifetime pension income / % pensioners

Microsimulations on the effects of ageing-related policy measures - Results
## Overall assessment

<table>
<thead>
<tr>
<th>Measure</th>
<th>Partner allowance</th>
<th>Retirement age 67</th>
<th>Abolishing tax exemption</th>
<th>Pension singles 50%</th>
<th>Ret. Window accrual 8%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budgetary effect (Δ % of GDP)</td>
<td>-0.2</td>
<td>-0.5</td>
<td>-0.9</td>
<td>-1.0</td>
<td>+0.2</td>
</tr>
<tr>
<td>Behavioural effect (Δ ret. age, months)</td>
<td>+1</td>
<td>+7</td>
<td>0</td>
<td>+1</td>
<td>+3</td>
</tr>
<tr>
<td>Redistributive effect (Δ Gini coefficient)</td>
<td>+0.002</td>
<td>0</td>
<td>-0.023</td>
<td>+0.015</td>
<td>+0.006</td>
</tr>
<tr>
<td>Effect on actuarial fairness</td>
<td>+</td>
<td>0</td>
<td>-</td>
<td>+</td>
<td>0</td>
</tr>
</tbody>
</table>

Microsimulations on the effects of ageing-related policy measures - Results
Conclusion

- Microsimulation model
  - Added value in policy evaluation
  - Plausible retirement patterns with option value model
- Baseline
  - Upwards pressure from population forecast
  - Mitigated by decreasing cost per person
- Policy alternatives
  - Individualization state pensions and abolishment tax exemption have largest budgetary effect
  - Raising retirement age best for labour participation
  - High accrual good for labour participation but costly