Ageing-driven pension reforms

Jan Bonenkamp
Lex Meijdam
Eduard Ponds
Ed Westerhout

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Two worldwide trends: are they connected?

- Population ageing
- (Types of) Pension reform
- Are the two connected?
  - Can pension reform be explained from ageing of the population?
Structure of presentation

• Population ageing
• Pension reform
• A 2-period OLG model
  • Applied to PAYG pensions
  • Applied to funded pensions
Population ageing

- Bron: CBS
Pension reform

<table>
<thead>
<tr>
<th>Finance Plan feature</th>
<th>Unfunded (paygo)</th>
<th>Funded</th>
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</thead>
<tbody>
<tr>
<td><strong>DB</strong></td>
<td>[1] Payg DB (PDB)</td>
<td>[2] Funded DB (FDB)</td>
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<td>[5] Collective DC (CDC)</td>
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- = Parametric reform
= Plan reset
A 2-period OLG model

- Assume the population consists of two generations:
  - One is old
  - The other is young
- Absent a pension scheme,
  - the young consume their wage income
  - the old consume their income from private saving
- Assume two risk factors:
  - The rate of return on saving
  - Life expectancy
A 2-period OLG model

- Define social welfare as a function of consumption by the young and consumption by the old
- Generation size affects the social welfare function:
  - The bigger a generation, the larger its weight in the social welfare function
- The pension scheme organizes transfers from the young to the old
  - They allow for higher consumption by the old
  - They reduce consumption by the young
- The pension scheme chooses the transfer function such that it maximizes social welfare
PAYG pensions

• Pension income of the old consists of two components:
  • The gross return on their private saving
  • Income provided through the PAYG scheme

• Both components loose value upon an unexpected increase in life expectancy

• The transfer function distributes part $\phi$ of the income loss as regards the PAYG scheme to the young generation
  • $\phi = 0$: the old generation bears the full burden of the life expectancy shock
  • $\phi = 1$: the life expectancy shock is completely shifted to the young generation
  • $0 < \phi < 1$: the young and old generation share the burden of the life expectancy shock
Results

• In case of a zero or small correlation between the shock in the return on saving and the longevity shock, the optimal $\phi$ is strictly between zero and one
  • Both the old and the young generation absorb part of the shock
• The optimal $\phi$ relates to the wage rate (+), the replacement rate (-) and the weight given to the old in the social welfare function (+)
• The optimal $\phi$ relates negatively to $E(\mu)$, the expected old-age dependency ratio
Results

- Empirical evidence indicates that the correlation between the return on saving and longevity may be zero or negative.
- Negative correlation between the two shocks increases optimal risk sharing.
- Negative correlation does not affect the reduction in $\phi$ upon an increase in $E(\mu)$ in relative terms.
Funded pensions

• Transfer function distributes a part $\phi$ of a shock to the young generation
  • $\phi = 0$: the old generation bears the full burden of the shock
  • $\phi = 1$: the shock is completely shifted to the young generation
  • $0 < \phi < 1$: the young and old generation share the burden of the shock

• Unlike the PAYG case, the shock can be in the rate of return on saving or in life expectancy
Results

• The optimal $\phi$ is strictly between zero and one
  • Both the old and the young generation absorb part of the shock
• The optimal $\phi$ relates to the wage rate (+), the replacement rate (-) and the weight given to the old in the social welfare function (+)
• The optimal $\phi$ relates negatively to $E(\mu)$, the expected old-age dependency ratio
• Unlike the case of PAYG pensions, the degree of correlation between the shock in the rate of return on savings and in life expectancy does not play a role
Take home message

• Across the world, pensions are being reformed, reducing intergenerational risk sharing between the young and the old
• This can be seen as a welfare-best response to population ageing
• Our result is general and should apply both when governments are left-wing or when they are right-wing
• This may help to explain the universality of the connection between pension reform and population ageing