Fair Pension Systems and Differential Mortality

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Workshop: Longevity Heterogeneity and Pension Design, Louvain-la-Neuve, Belgium, Jan 28th, 2020

*The content of these slides reflects the views of the authors and not necessarily those of the OeNB.

First Demographic Challenge

Increase in average life expectancy

- From 1960 to 2015: 68.7 → 81.1. ▸ Picture
- Forecasts: Until 2060 an increase to 87.
- Widespread policy recommendation: link the retirement age to the increase in life expectancy ("Pensionsautomatik").

Second Demographic Challenge

Socio-economic differences in life expectancy ("differential mortality")

- Life expectancy and socio-economic status (measured by income, wealth or education) are positively correlated.
- Evidence for a large number of countries and time-periods:

Germany, 2007, US, 2007, US, 2016

Sustainability and Fairness

- Crucial task of pension systems:
  - Two demographic challenges
    - Increase in average life expectancy (intertemporal)
    - Socio-economic differences in life expectancy (interpersonal)
  - Two goals
    - Financial stability
    - Fair and widely accepted rules
- I present a proposal how this could be done, based on:
  - income-dependent replacement rates (interpersonal differentiation) and
  - time-dependent reference values (intertemporal variation).

The Austrian Pension Account System — Basics 1

- A harmonized PAYG system (covers $> 90\%$ of labor force).
- Contribution rate: 22.8% (employer: 10.25%, employee: 12.55%) up to the maximum contribution basis of €5,370.
- Target benefit level is expressed by the formula 45-65-80: After 45 years of insurance and retirement at the age of 65, the system provides an initial pension that corresponds to 80% of average lifetime income (i.e. insured earnings).
- The target is implemented by means of an accrual rate ("Kontoprozentsatz").
  Every year 1.78% of total earnings (up to the ceiling) are credited to the account.
  (Note that $1.78 \times 45 = 80.1$).

The Austrian Pension Account System — Basics 2

- Past credits are revalued by the growth rate of the average contribution base.
- Existing pensions are (typically) adjusted for the rate of inflation.
- For early or late retirement within an age corridor between 62 and 68 there are annual deductions (supplements) of 5.1% (4.2%).
- There exist additional provisions for early retirement (e.g. according to “hard labour”).

Stability and Fairness of the Austrian Pension System

- Is the Austrian pension account system financially stable?
  - For constant life expectancy: yes
  - For increasing life expectancy: no

    ▸ forecasts
- Is the Austrian pension account system fair?
  - Lies in the eye of the beholder (more on this later)
    - Arguments based on: actuarial fairness, budgetary fairnes, concepts of justice
  - The differences in life expectancy certainly violate the "principle of equivalence" (aka proportionality aka distributive neutrality) .
    - "A social security system satisfies distributive neutrality if the ratio between total benefits and total contributions does not vary systematically with average annual earnings" (Breyer and Hupfeld, 2009).

Interpersonal Differences in Life Expectancy

- The principle of "distributive neutrality" (total benefits=total contributions) requires that:

$$\boxed{\hat{q}_t^i = \hat{q}_t \frac{\overline{D}_t - \hat{R}_t}{D_t^i - \hat{R}_t}.}$$

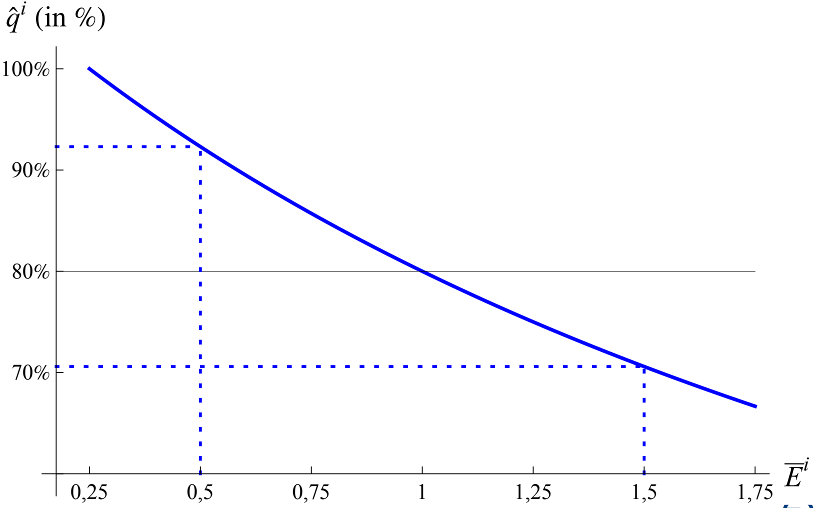
  - D_t^i ... Life expectancy of group i
  - $\hat{q}_t^i$ ... Reference replacement rate of group i
  - $\overline{D}_t$ ... average life expectancy of the cohort born in year t
  - $\hat{q}_t$ ... cohort-specific reference value (today: $\hat{q}_t = 0,8$)
  - $\hat{R}_t$ ... reference retirement age (today: $\hat{R}_t = 65$).

Differentiated Replacement Rates

- How can the difference in life expectancy be taken into account?
- By using the well-documented correlation between life expectancy and socio-economic indicators like lifetime-income.
- Estimation (Breyer and Hupfeld, 2009): $\boxed{D^i = 76 + 4 \times \overline{E}^i}$, where $\overline{E}^i$ denotes average lifetime earnings points (that reflect the individual relative lifetime income level).
- Following Chetty et al. (2016) the effect would be even stronger: about 5.5 years (males) or 3.5 years (females).
- This leads to:

$$\boxed{\hat{q}^i = 0.8 \frac{80 - 65}{76 + 4 \times \overline{E}^i - 65}}$$

Differentiated Replacement Rates



Intertemporal Adjustment

- Adjustment with respect to the increase in average life expectancy $\overline{D}_t$.
- The reference values (average replacement rate 80%, retirement age 65, contribution periods 45) are changed in such a manner as to guarantee stability.

Two Variants of Intertemporal Adjustment

- Two variants:
  - Adjustment of the reference replacement rate $\hat{q}_t$ ($\hat{R}$ and $\hat{B}$ constant):

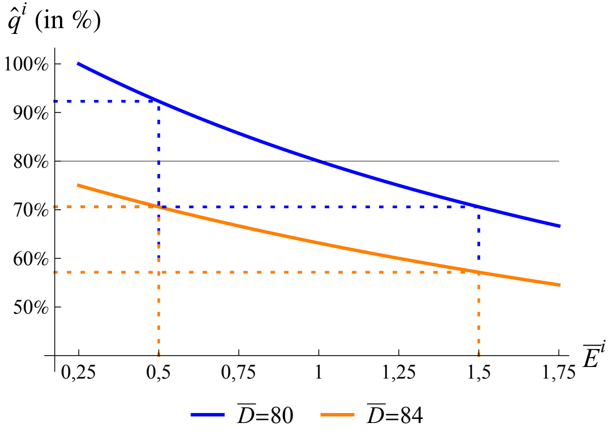
$$\boxed{\hat{q}_t = \hat{q}\frac{\overline{D}_0 - \hat{R}}{\overline{D}_t - \hat{R}}.}$$

  - Adjustment of the reference retirement age and the reference contribution years ($\hat{q}$ constant):

$$\boxed{\hat{R}_t = \hat{A} + \left(\hat{R} - \hat{A}\right)\frac{\overline{D}_t - \hat{A}}{\overline{D}_0 - \hat{A}}.}$$

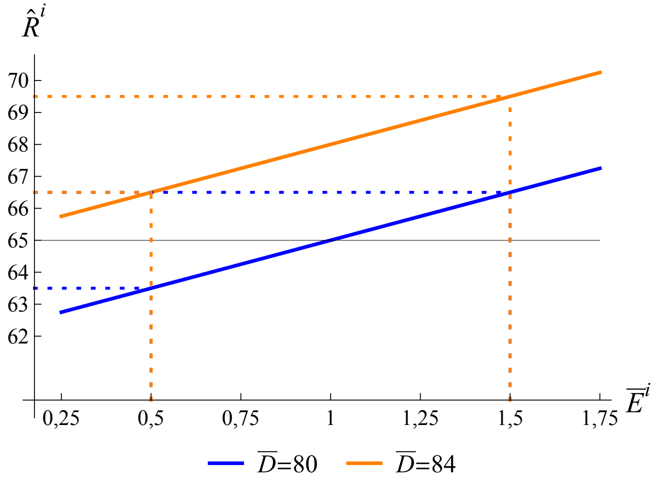
- The individually differentiated replacement rates $\hat{q}_t^i$ are defined as specified above only with the time-varying reference parameters $\hat{q}_t$ and $\hat{R}_t$.

Differentiated Replacement Rates



- At the end of the increase in life expectancy the replacement rate of the low earner is where the high earner started.

Differentiated Retirement Ages



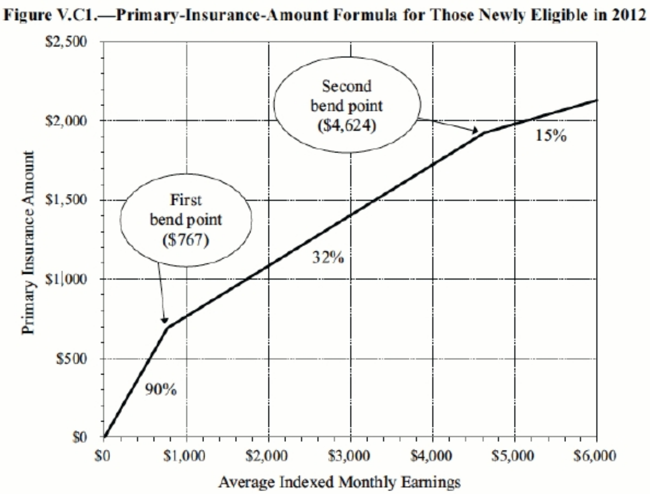
Implementation and Communication

- Besides differentiated replacement rates one could also use differentiated contributions or differentiated subsidies (continuous government matches, Geanakoplos and Zeldes [2009]).
- Implementation: Exact formula or bend-points?
- Introduction only pro futuro?: The statutory retirement age is only increased for high earners.
- Communication: Year-to-year adjustments to changes in average relative lifetime earnings. Higher accrual rates for entrants in the labor market, low incomes and marginally employed.

Bend-Points

- In the US the PIA (primary insurance amount) is based on AIME (average indexed monthly earnings) via a three-part formula (values for 2020):
  - 90% of the AIME up to the first bend-point (\$960)
  - 32% between the first and the second bend-point (\$5,785)
  - 15% above the second bend-point

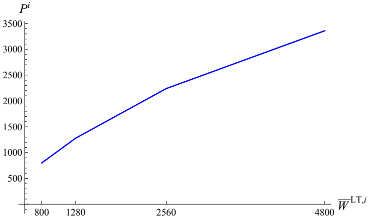
Bend-Points in the US Social Security (2012)



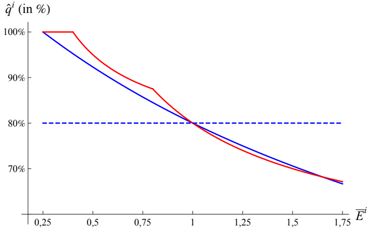
Bend-points for Austria

- $\hat{q} = 100\%$ for average earnings points up to 0.4 ($\approx$ €1,280).
- $\hat{q} = 75\%$ between 0.4 and 0.8 ($\approx$ €2,560).
- $\hat{q} = 50\%$ between 0.8 and 1.5 ($\approx$ €4,800).

Bend-points for Austria



Bend-points



Average repl. rate

Fair Rules

- Is it fair/unfair to consider differential mortality for the design of a pension system?
- The ABC of arguments:
  - **A**ctuarial fairness
  - **B**udgetary fairness
  - **C**oncepts of justice

Actuarial Fairness

- In the insurance industry "fair" is used almost synonymously with "actuarial fair".
  "Premiums paid by policyholders should match as closely as possible their risk exposure" (Landes, 2015).
- A uniform system is actuarial unfair (expected benefits $<$ contributions) for short-lived, low-income individuals.
- A system with differentiated replacement rates would be actuarially fair.
- Main arguments:
  - Is seen as almost self-evident.
    "Actuarial fairness is the guiding principle of the insurance industry. [...] The fundamental idea is that 'fairness means equal treatment for equal risks"' (Landes, 2015).
  - Needed to prevent adverse selection.
    "Risk classification [...] to achieve the narrowest possible definition of a risk pool" (Porrini, 2015).

Counterarguments

Arguments against the use of individual life expectancies in pension formulas:

- Admissibility: "Some variables with predictive power may be socially, legally, or morally inadmissible for use in constructing risk classes "(Abraham, 1985).
- Imperfect observability: Individual life expectancy is not observable. There are many correlates. Using all of them leads to an intransparent, chaotic system.
- Behavioral responses: For a mandatory system adverse selection as an argument for risk classification is inapplicable. On the contrary, risk classification might lead to moral hazard.

Arguments for Income-Based Formulas

- Good reasons to only use indicators that are:
  - (i) statistically significant, quantitatively important and intertemporally stable,
  - (ii) measurable in a cost-effective and non-manipulable manner,
  - (iii) not causing sizable behavioral effects.
- The use of life-style variables are often problematic (unstable over time, many cross correlations etc.).
- Income-related variables look promising.

Budgetary Fairness

- Counterargument against the argument that each insurance contract redistributes ex-post. In the case of longevity from the short-lived to the long-lived.
- Most PAYG systems are not lump-sum but are based on life-time incomes. If the correlation with life expectancy is neglected this leads to deficits that have to be covered from the general budget.
- Subsidies to the system are primarily benefiting long-lived individuals with high incomes and high pensions.

Concepts of Justice

- Theories developed in welfare economics and political philosophy:
  - Rawls, Dworkin, Fleurbaey etc.
  - Utilitarian and egalitarian approaches.
  - Important criteria: responsibility/control, luck/effort, preferences/resources, compensation/reward, ex-ante/ex-post.
- Utilitarianism problematic:
  "Short-lived people are penalized twice: once by nature and once by Bentham" (Leroux and Ponthiére, 2013).
- Life expectancy: Caused by luck or responsible behavior?
  - Responsibility: life-style etc. → no compensation
  - Luck: Genetic disposition etc. → compensation
  - Often the distinction is not clear-cut.
- Based on "responsibility-sensitive egalitarianism" (M. Fleurbaey) it can be argued that an equivalence between individual contributions and pension payments is a "minimal requirement" for a fair system.

Summary

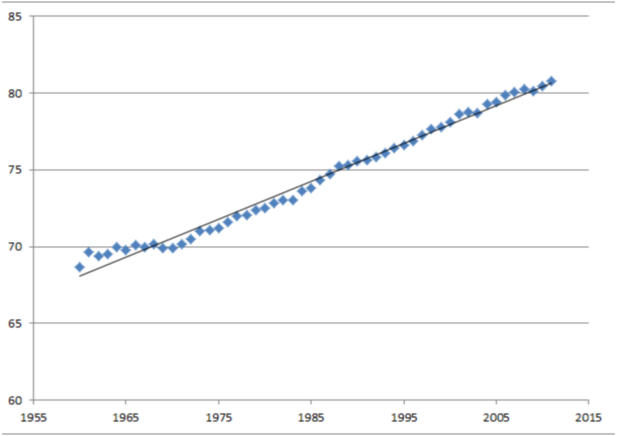
- A sustainable and fair pension system has to deal with two demographic phenomena: increasing average life expectancy and differential mortality.
- A pension account with variable replacement rates could be used to implement interpersonal as well as intertemporal changes.
- This model would be similar to the current pension system and it would not need a radical reorganization.
- In the future such a system might be more easily adaptable to changing circumstances.

Open Questions

- The proposed model is only a rough drafting.
- Many details have to be resolved: the concept of income, the potential inclusion of wealth and/or partner income, the possible consideration of additional individual information in order to increase accuracy.
- Furthermore, differentiated replacement rates would only be the core element of a new pension account system and they would only substitute for the current core—the pension formula 45-65-80.
- The total system would also need additional rules concerning: survivor pensions, invalidity pensions, minimum pensions, non-contributory periods etc.
- I have only talked about the *reference* values. Also the deductions/supplements for early/late retirement should be determined in a fair manner.

Appendix

Development of Life Expectancy in Austria



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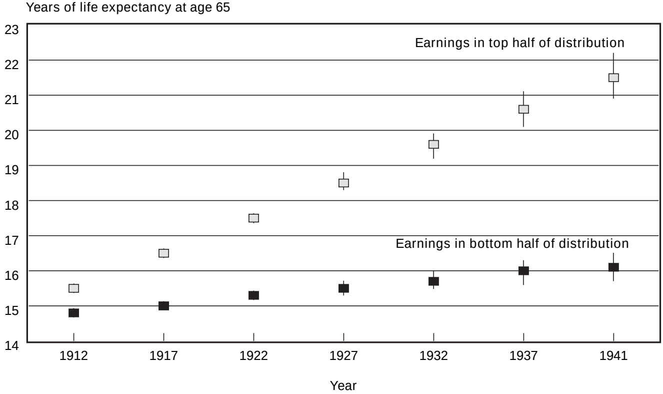
Waldron (2007) for the US

Chart 3.
Cohort life expectancy at age 65 (and 95 percent confidence intervals)
for male Social Security–covered workers, by selected birth years and earnings group



SOURCE: Author's calculations using a matched 2001 Continuous Work History Sample.

Source: Waldron, 2007

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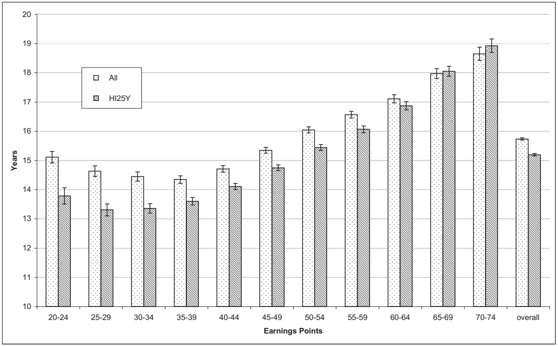
Gaudecker and Scholz (2007) for Germany

Figure 2: Remaining life expectancy at age 65 in years by EP^{pers}



Note: Comparison of all pensioners with the respective amount of EP^{pers} and those who are mandatorily insured in the public health insurance scheme with at least 25 years of pension-relevant insurance periods (HI25Y). The vertical bars indicate 99 percent confidence intervals

Source: Gaudecker and Scholz, 2007

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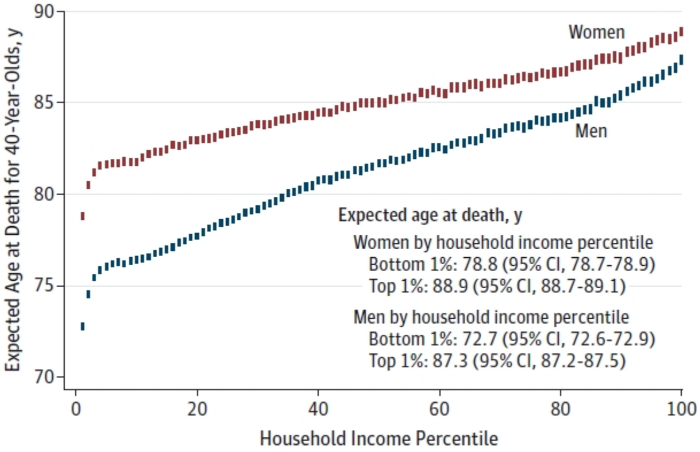
Chetty et al. (2016) for the US



Source: Chetty et al., *Journal of the American Medical Association*, 2016

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Long-term forecasts

- Ageing Report (EU, 2015):
  - Pension expenditures: 13.9% of GDP (2013) → 14.4% (2060).
  - EU Average: 11.3% → 11.1%.
  - Expenditures for civil servants will decrease, while they will increase for the rest
- Pension commission (2014)
  - Expenditures (excluding civil servants): 11.4% (2014) → 14.1% (2060)
  - "Government subsidy": 2.5% of GDP (2014) → 4.8% (2060)

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