THE IMPLICATIONS OF LONGEVITY FOR RISK-SHARING IN PUBLIC AND PRIVATE PENSION SCHEMES

Chris Daykin, UK Government Actuary
Chairman, PBSS Section of IAA
Helsinki, 21 May 2007
Expectation of life at birth for females, 1950-2020

- UK
- USA
- Germany
- France
- Italy
- Finland
- Sweden
- Japan
- Russia
Dependency ratios, 1970-2030 (nos. 65 and over per 1000 aged 15-64)

- UK
- USA
- Germany
- France
- Italy
- Finland
- Sweden
- Japan
- Russia

The graph shows the dependency ratios for the years 1960 to 2030 for various countries, indicating the number of people aged 65 and over per 1000 people aged 15 to 64.
Expectation of life at age 65 on cohort basis, E&W
Pensioner support ratio (i.e. no of people at working ages per person over pension age)
Risk structure of defined benefit social security

- no (or little) investment risk
- longevity risk is measured by change in dependency ratio
- increased longevity is met by:
  - increasing contributions from workers and/or employers
  - contribution (or increased contribution) from national budget
  - increase in retirement age for current workers
  - worsening of indexation provisions for existing pensioners
  - pension reform leading to benefit reductions, especially for future
Risk structure of notional defined contribution

- no (or little) investment risk
- longevity risk is measured by automatic balance mechanism
- increasing longevity is met by
  - increasing ‘annuity’ cost at retirement
  - increase in retirement age needed to maintain value of pension
  - automatic balance mechanism adjustment to accrued rights
  - no additional financial inputs
Risk structure of defined benefit occupational plans

- investment risk is carried by sponsor
- longevity risk is measured by annuity value at retirement
- increased longevity is met by:
  - increased contributions from sponsoring employer (and members?)
  - adjustments to discretionary benefits
  - reducing benefits for future accrual for existing workers
  - increasing retirement age for future accrual for existing workers
  - closing the plan to new entrants
- insolvency risk of employer is carried by active members
- …and, to a much lesser extent, by pensioners
Risk structure of defined contribution occupational plans

- investment risk is carried by individuals
  - apart from any guarantees provided by pension institution
- longevity risk is measured by annuity value at retirement
- increased longevity is met by:
  - reduced pension benefits for those reaching retirement
  - or the need to increase retirement age to offset the effect
- insolvency of sponsor only affects future accrual
What are the imperatives of social security reform?

- to recognise the impact of longevity
- to ensure sustainability of structure and financing
- to reduce potential increases in public expenditure/tax
- to apportion risk more fairly between the stakeholders
- to improve retirement incentive structures
- to reduce intergenerational subsidies
What are the imperatives for private pension reform?

- to recognise the impact of longevity
- to ensure sustainability of structure and financing
- to reduce potential financial burden on sponsors
- to apportion risk more fairly between the stakeholders
- to improve retirement incentive structures
- to improve incentive structures to save for retirement
- to reconcile the desire for security of pension rights with the cost of providing guarantees
Decline of defined benefit occupational plans

- increased costs arising from
  - greater longevity
  - lower interest rates
  - lower expected real rates of return on investments
  - increasing guarantees and benefits mandated by legislation
  - reduced tax advantages
- effect of accounting standards on reporting of pension cost
- volatility of results from mark to market asset valuation
- focus shifting from long-term to short-term
- plan closures have highlighted cost of buying out benefits
Options for sharing longevity risk

- closure of plans to new entrants or to further accrual
- reduce accrual rate for the future
- sharing of increased cost between sponsor and employees
- move from final average salary to career average salary
- index pension age at which unreduced benefits are paid
- flexibility of indexation to permit offset of longevity costs
- ensure early retirement reduction factors are actuarially fair
Sharing longevity risk through targeting cash benefit

> define benefit as capital sum at retirement…
> …and convert to pension using current annuity value
> cash balance plans with variable accumulation
> unit-linked individual accounts with guaranteed underpin
Sharing longevity risk through discretionary benefits

- define lower level of guaranteed benefits
- apportion emerging surplus to supplementary benefits
- make revaluation of average salary subject to conditions
- have no or low guaranteed post retirement increases…
- …and award increases as bonuses from surplus
Dutch risk-sharing plans

- mutualised industry-wide schemes
- insulate sponsor from risk of increased contributions
- increased costs from longevity (and other reasons)…
- …absorbed by flexible retirement age…
- …and flexible revaluation/indexation of benefits
Implications of risk-sharing for regulation

- more risk is inevitably passed to members
- regulatory structures designed to protect members’ rights
- weakening protection is politically sensitive
- but without changes workers may lose access to DB plans
- shift to DC alternative has more dramatic impact on risk
Risk to members in DC plans

> investment risk usually passed fully to members…
> …systemic investment risk and individual choice
> no insurance of longevity risk - primary benefit is lump sum
> each cohort bears longevity risk through cost of annuities
> direct exposure to career salary record
> employer is generally not at all on risk – fixed contributions
Risk-sharing in DC plans

- mitigation of investment risk by guaranteed returns…
- …cash balance with discretionary interest distributions
- …or guaranteed maturity value products through insurers
- traditional with profits contracts achieve shared risk
- …with insurer rather than employer bearing investment risk
- longevity risk mitigated by guaranteed annuity terms
Risk in the decumulation phase

- traditional annuities leave the longevity risk with insurers…
- …although some of the cost is passed on in annuity price
- insurers also carry investment risk unless assets matched
- …although cost of interest guarantee is in annuity price
- pensioners dislike cost and lack of investment flexibility
- insurers fear concentration of systemic longevity risk
- …and reinvestment risk when assets are too short
Risk-sharing in the decumulation phase

- programmed withdrawal and deferred annuitisation
- unit-linked annuities
- with-profits annuities
- annuitised fund
- successive temporary annuities

See my paper for the PBSS Colloquium in Sydney
Some alternative routes to reform national systems

- individual accounts
- notional defined contribution
- modification of defined benefit
Individual account reforms

- started in Chile in 1981
- by now includes most countries in Latin America…
- …also several countries in central and eastern Europe
- competitive private sector investment vehicles
- usually mandatory for formal sector workers
- compulsory purchase of annuities at retirement
  - or some form of programmed withdrawal
- promoted by World Bank in *Averting the Old-Age Crisis*
Individual account reforms - evaluation

> coverage is still a major problem…
> …individual accounts are not enough of an incentive
> transaction costs generally remain high…
> …competition does not bring down the charges
> churning and mis-selling have been an issue
> pension levels may not be adequate…
> …too many people will qualify for the minimum pension
Alternatives

> to achieve similar incentive effects to individual accounts
> …without high transaction costs or mis-selling problems
> …but maintaining fairness between generations
> …passing on to individuals the risk of greater longevity
> …and avoiding the cross-subsidies of defined benefit
Notional Defined Contribution

> structured as defined contribution…
> … but on a PAYG basis rather than funded
> clear link between contributions and benefits…
> … but not subject to investment risk
> targets lump sum at pension age…
> with ‘notional’ purchase of an annuity
> permits flexibility of retirement age
> passes on part of longevity risk
Swedish NDC

- DB state scheme replaced by NDC
- revalorisation of individual accounts by average wage
- automatic economic regulator of pensions increase
- annuity value responds to improving mortality
- automatic balancing mechanism to maintain in balance…
- …as otherwise both benefits and contributions are fixed
Automatic balancing mechanism (‘actuarial accounting’)  
Annual balance sheet for scheme:

Liabilities =
- present value of all future outlay for pensions in payment
- accumulated individual accounts for all persons not yet in receipt of a pension

Assets =
- real assets in buffer fund + value of future contributions

Value of future contributions =
- contribution rate x wage mass x expected turnover duration
Expected turnover duration

Steady state pension liability (in years of contributions)

Expected pension-capital-weighted average retirement age

Expected income-weighted age of income earners

Expected pension weighted age of pensioners

Pay-in duration + Pay-out duration = turnover duration 33 years

Age group

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95

1
Real individual accounts

- mandatory funded individual accounts (PPM)
- 2½% of earnings
- contributions collected with NDC contributions of 16%
- low administrative costs
- choice of more than 700 investment funds
- default arrangements if no funds selected
Overall evaluation

- hailed by many as a success
- PAYG system made sustainable
- cohort longevity risk passed on to individual members
- dependency ratio risk passed to members through ABM
- concern about expected fall in replacement ratios…
- …and arbitrary effect of automatic balancing mechanism
Dealing with demographic ageing

> objectives of recent reform of earnings-related scheme
  > to postpone average age of retirement by 2 to 3 years
  > to adapt the pension system to increased expectations of life
  > to reduce pressures for future increases in contributions

> average of last 10 years → career average revalued

> variable accrual rate
  > 1.5% a year from 18 to 52
  > 1.9% a year from 53 to 62
  > 4.5% a year from 63 to 68
Dealing with demographic ageing

> introduction of “life expectancy coefficient”

*Life expectancy coefficient* for year N (>2009) =

- cohort life expectancy for those reaching 62 in 2009
- cohort life expectancy for those reaching 62 in N

Multiply pensions of those reaching 62 in N by *life expectancy coefficient* for year N

Thus adjusting a DB pension benefit for improving life expectancy
Dealing with demographic ageing

> still has earnings revaluation rather than prices but…
> …revaluation is to net instead of gross wages
> higher retirement age
> reduced replacement rate at 65
> contribution rate not to exceed 22% in 2030
> “sustainability factor”
Pension adjustment

Change in pensions =
Change in average income, net of contributions
  \[ \times \text{sustainability factor} \]

Sustainability factor for year \( x \) = value for year \( x-1 \) of
Number of active contributors
  Number of pensioners

divided by corresponding value for year \( x-2 \)
Control based on steady state funding level

1. 1998 amendments to Canada Pension Plan
2. Contributions increased from 6% to 9.9% from 1997 to 2003
3. Small reduction in long-term benefit target
4. Excess contributions to be invested in markets…
5. …under control of CPP Investment Board
6. Three-yearly actuarial valuation…
7. …monitoring steady-state rate of contribution
Control based on steady state funding level

- If steady state rate is higher than 9.9%...
- …and if ministers cannot agree on what to do
- Then automatic adjustment mechanism is triggered:
  - Contribution rate is increased over 3 years by ½ of excess of steady state over 9.9% (subject to maximum increase of 0.2% a year)
  - Benefits are frozen (i.e. not indexed any more)
  - After 3 years, situation is reviewed following new actuarial valuation
Problem of adequacy rather than sustainability

- continuous pension reform for more than 30 years
- basic pension linked to retail price index (1980)
- cut back of earnings-related benefits (1988)
- more generous means-tested minimum pension…
  - …leading to a trend to more reliance on means-testing
- financially stable and sustainable…
  - …but reliant on low (and falling) level of benefits
Proposals now being enacted (May 2007)

> restore earnings link for basic pension (from 2012 or later)

> raise pension age to 68 by 2046
  > 65 → 66 between 2024 and 2026
  > 66 → 67 between 2034 and 2036
  > 67 → 68 between 2044 and 2046

> invested individual accounts with auto-enrolment
Sharing longevity risk

1. target lump sum at retirement…
   > …and convert to pension using current annuity value
   > …funded individual accounts or NDC
2. index retirement age based on cohort expectation of life…
   > …or maintain ratio between working and retired life periods
3. raise retirement age at intervals to offset rising cost
4. overall adjustment mechanism such as
   > life expectancy coefficient
   > sustainability factor
   > automatic balancing mechanism
5. risk-sharing between contributors and pensioners
SOME CONCLUSIONS

Wide range of solutions – defined contribution favoured

> each country has a different solution
> …but all are starting from different points
> DC widely favoured for its incentive structure…
> …but lacks basic characteristics of protection
> …unless in with-profits form or with strong underpin
> …exposes members to investment risk
> …and also collectively to longevity risk
> minimum pension or DB underpin reduces risk to individual
> …but care is needed to avoid this having a distorting effect
SOME CONCLUSIONS

Wide range of solutions – new defined benefit thinking

- DB trend towards career-average revalued…
- …which is equivalent to a type of DC
- NDC is really a DB structure dressed up as DC
- focus on fund at retirement facilitates longevity solutions
- indexing retirement age is also a possibility
- cash balance is another alternative DB/DC hybrid…
- …DC on a traditional insurance “with-profits” basis
- more flexible revaluation might facilitate risk-sharing
- members should share needed contribution increases
Some Conclusions

Wide range of solutions – encourage later retirement

- focus on balance between working life and retirement
- need stronger incentives to later retirement
- a reason for DC but possible also with DB designs
- higher pension age for unreduced pension forces trade-off
- target lump sum at retirement instead of pension
- alternative annuitisation possibilities
- need better risk-sharing in decumulation phase
Enjoy a long and prosperous life!

Toivotan teille pitkää ja antoisaa elämää