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Research Centre**

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The performance of a CDC pension scheme against alternative pension schemes

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The **'Minimising Longevity and Investment Risk while Optimising Future Pension Plans'** research programme is being funded by the Actuarial Research Centre.

9 December 2022

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Today's presentation

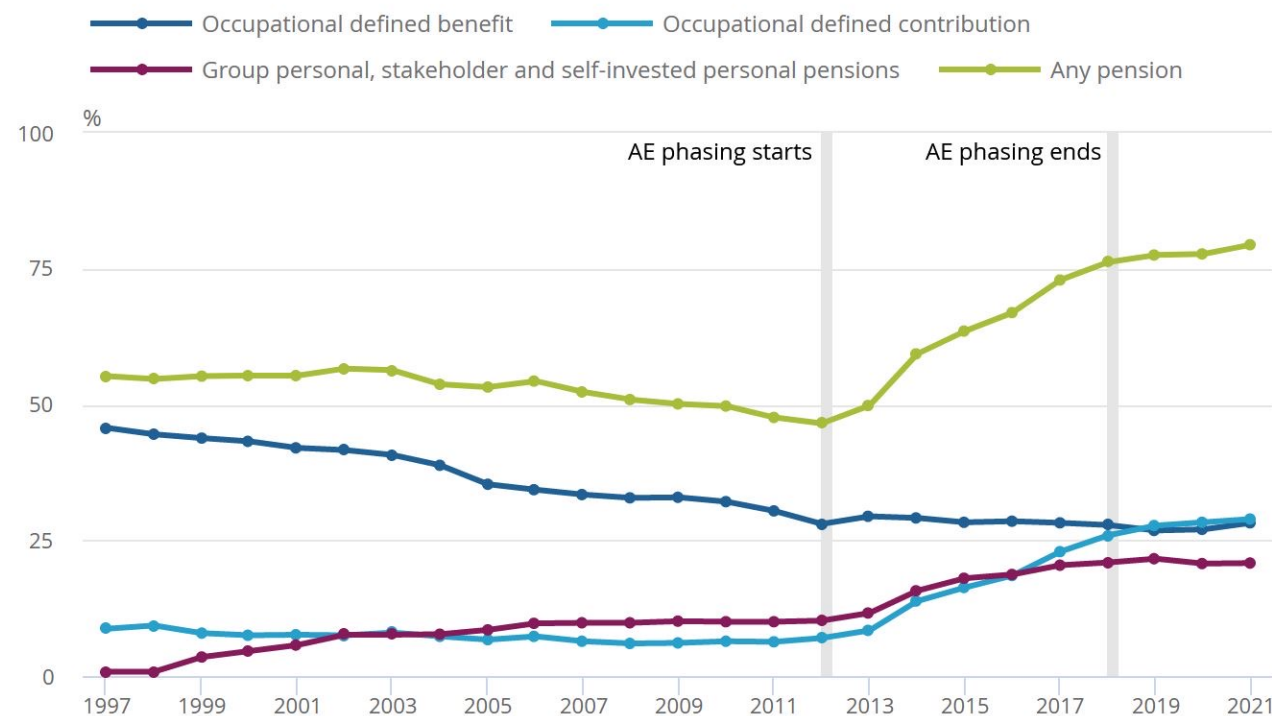
- Looking at the income paid at retirement from a specific CDC scheme, as the generation increases:
 - Standard deviation of the income increases.
 - Median income decreases – entirely due to constant benefit accrual.
- CDC scheme needs to take more investment risk to outperform alternative offerings on a median income basis...
- ...But higher investment risk means higher standard deviation of CDC income...
- No free lunch with respect to risk.



Current situation – ONS data

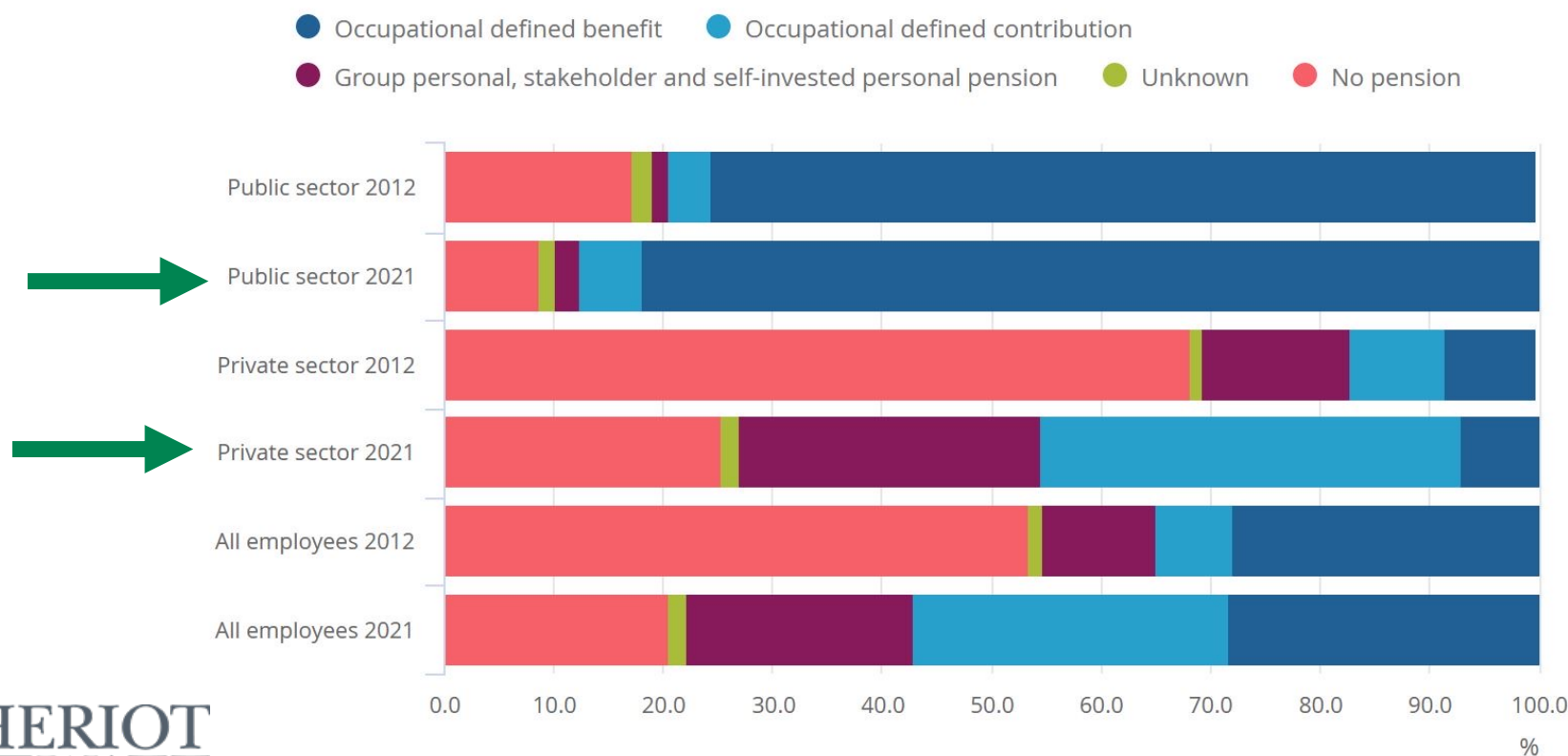
- 22.6 million workers saving into work-place pension.

Proportion of employees with workplace pension by type of pension, UK, 1997 to 2021



Proportion of employees with workplace pension (ONS data)

Proportion of employees with workplace pension by type of pension and sector, UK, 2012 and 2021



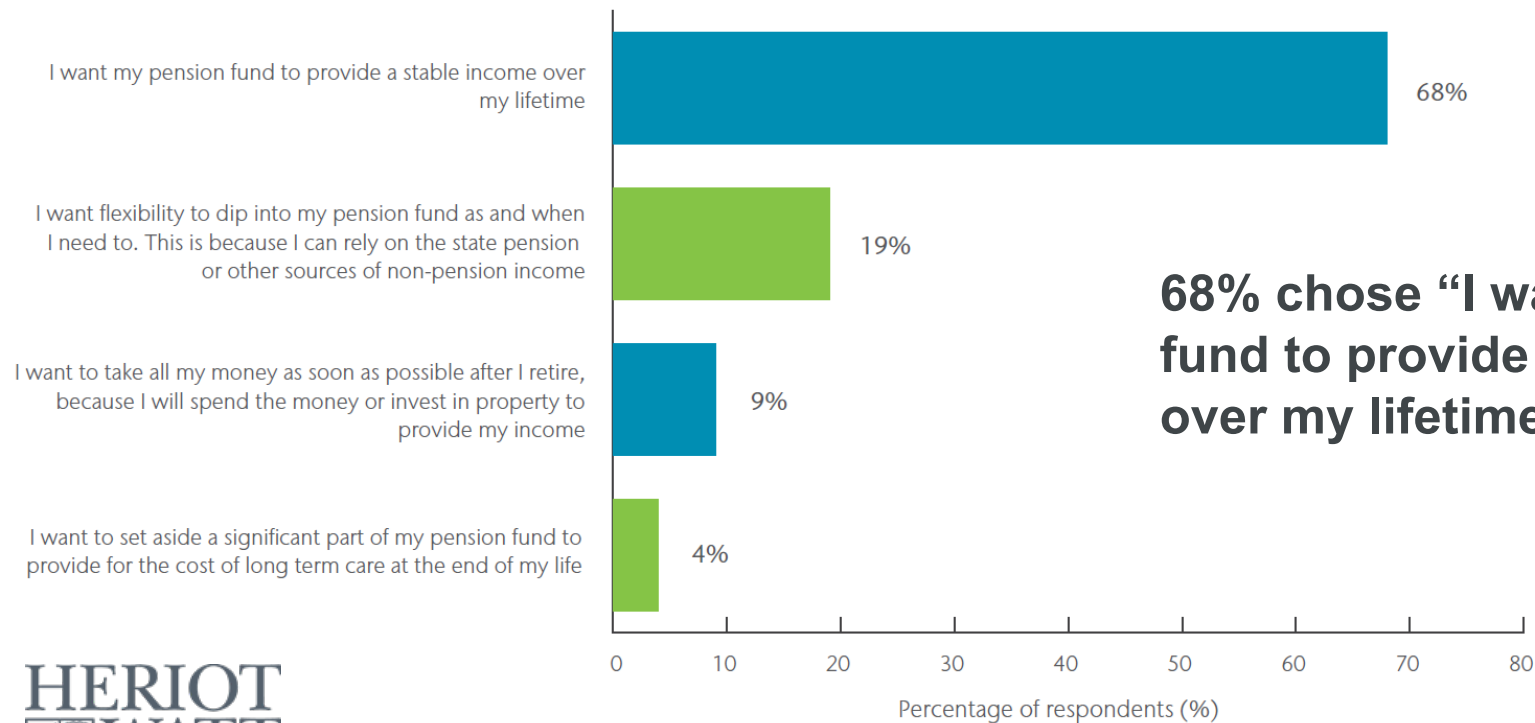
Value of pension pots not yet in payment (ONS data)

Percentile	DC pension savings	DB pension savings
25% - All ages - Age 55-64	£2,500 £7,500	£21,800 £68,400
50% - All ages - Age 55-64	£11,100 £35,000	£70,800 £186,600
75% - All ages - Age 55-64	£48,000 £110,000	£209,200 £441,900

What do people want financially in retirement?

Chart 9 – Using retirement savings

Which of the following statements best describes your attitude towards how you might spend your pension fund?



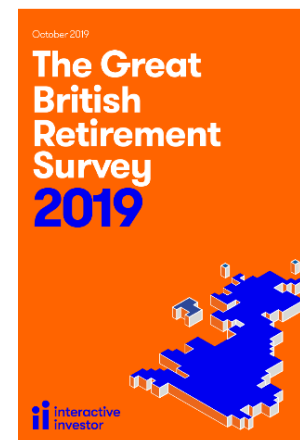
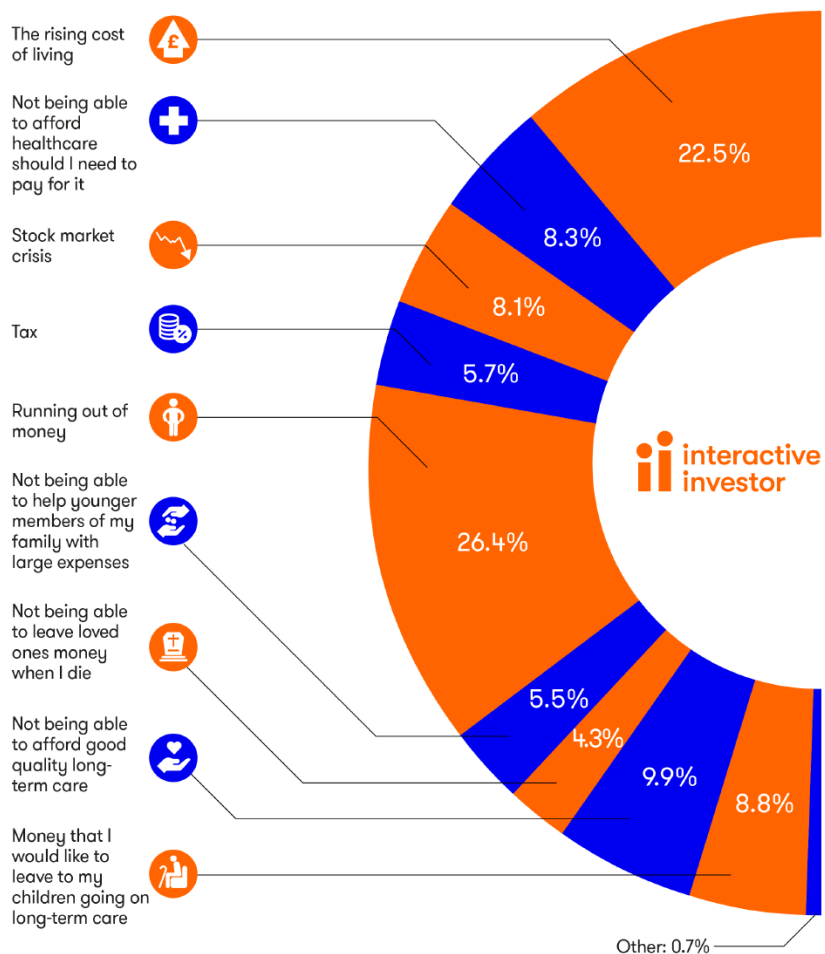
In a brave new pensions world what will DC members really want?

Aon DC Member Survey

Aon Hewitt and Cass Business School
London, December 2014

What do people want financially in retirement?

What are your biggest financial concerns? (Non-retired)



Biggest financial concerns

26.4% - Running out of money

22.5% - The rising cost of living



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Summary of data

- Typical DC pension saver:
 - Works in the private sector.
 - Has a small amount of DC pension savings.
- How to:
 - Offer them an income for life?
 - Increase contributions? Current workplace pension contribution rate is 8%.
 - Give them value-for-money?

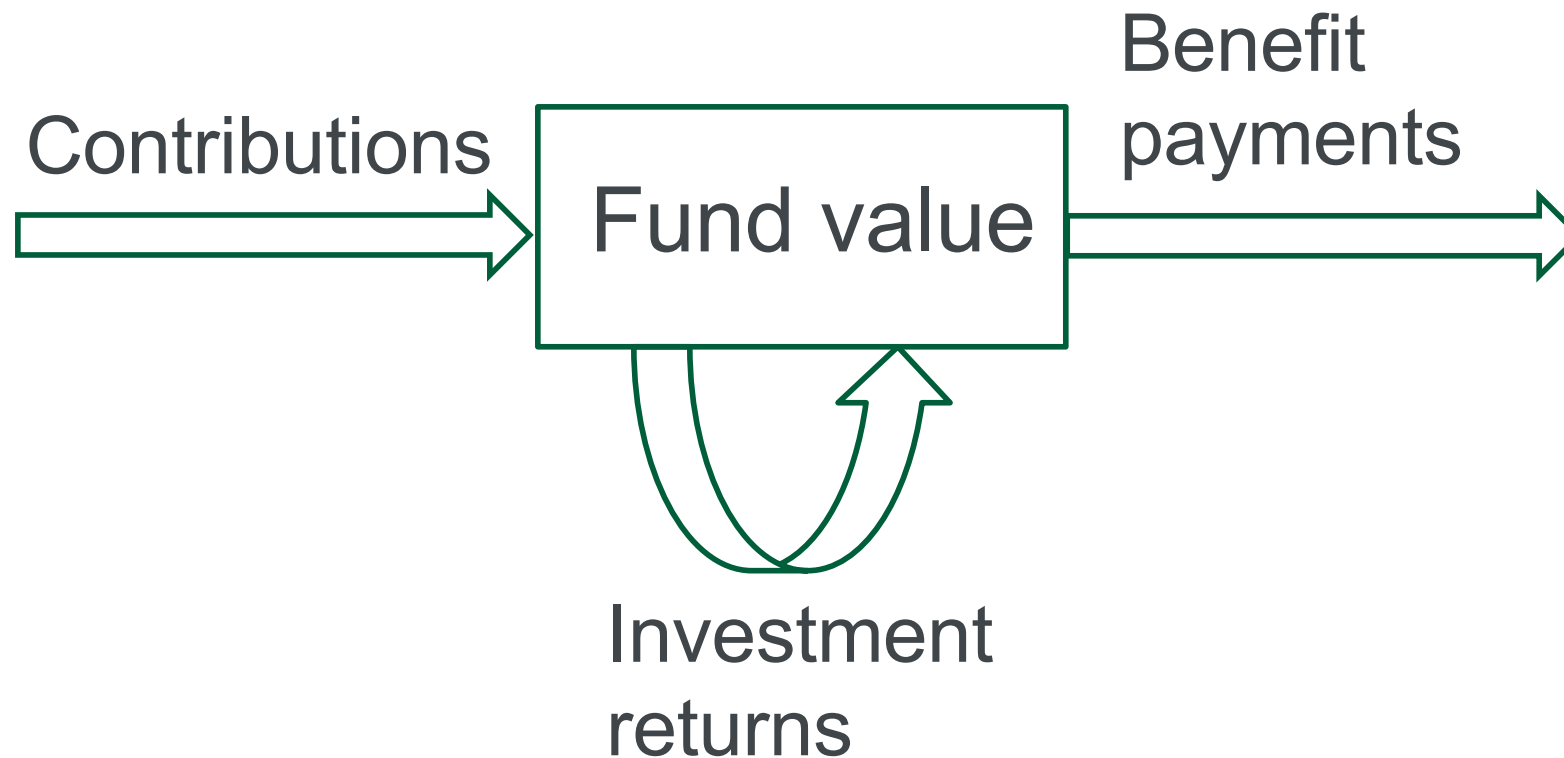
Are CDC schemes the answer?

- CDC schemes aim to provide an income for life by sharing:
 - Investment risk, and/or
 - Longevity risk.
- They can be:
 - Whole-life (contribute to them while working, paid a pension from them in retirement), or
 - Decumulation/Post-retirement only (join at retirement with lump-sum contribution, paid a pension from them in retirement)

Comparison vs typical UK pension plans

Scheme type	Contribution levels	Benefit levels	Who bears the risk?	Who decides the level of risk?
Defined contribution (DC)	Fixed	Vary	Members	Whoever chooses the default fund
Collective Defined Contribution (CDC)	Fixed	Vary	Members	Trustees (and members?)
Defined Benefit (DB)	Vary	Fixed	Employers	Employers and trustees

CDC plan schematic



Analyse one particular CDC scheme

- DB-like CDC pension scheme structure:
 - Whole-life scheme: members contribute for 40 years, retire at age 65 years.
 - Constant rate of benefit accrual, e.g. 1/80ths of salary per year.
 - Constant contribution rate as percentage of salary.
 - Benefit is a single-life pension paid from age 65.
- Benefits adjusted every year so that:

Total asset value = Total discounted value of projected
accrued benefits



How is collective risk-sharing done in the modelled CDC plan?

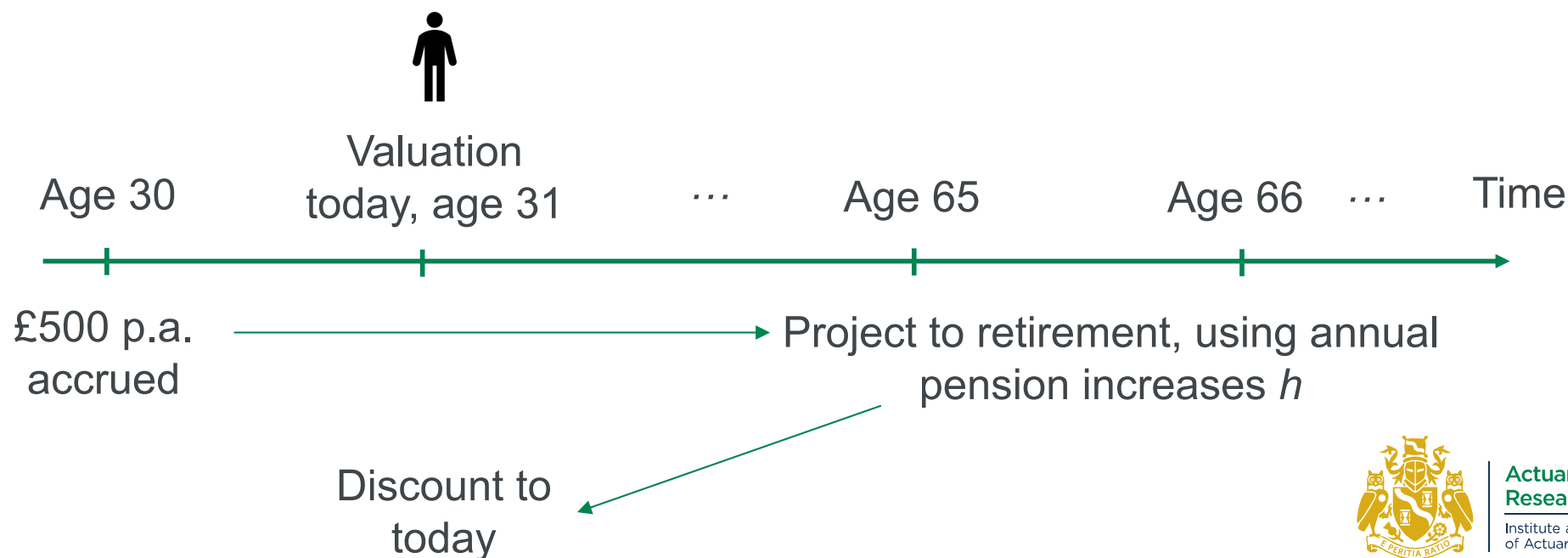
- Every year, determine the annual constant pension increase such that

Total asset value = Total discounted value of projected accrued benefits.

- Each member gets the same annual pension increase on their accrued benefits.
 - This is how risk-sharing is done in this CDC plan.

Collective pension increases

- Determine the annual pension increase h such that
 - Total asset value = Total discounted value of projected accrued benefits
 - e.g. for one member,



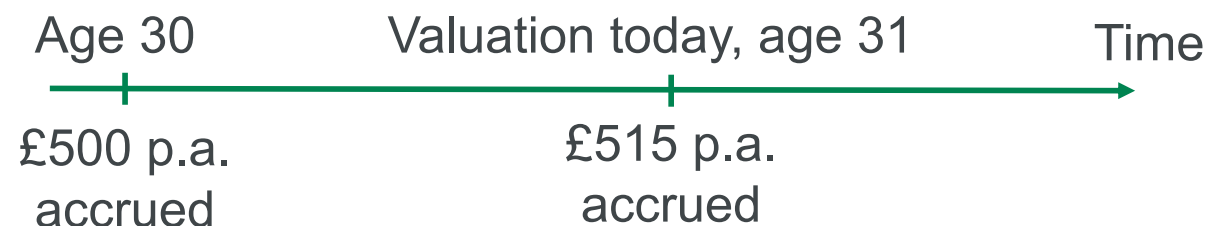
Collective pension increases

- Today's revalued accrued pension
= $(1+h^*) \times$ Last year's accrued pension.
- e.g. $h^*=3\%$



Pension increases reflect the past and the future

- Today's annual pension increase reflects
 - Today's predictions of future investment returns and mortality, and today's membership profile,
 - Past years' predictions of investment returns and mortality, and past years' membership profile (through previous pension increases, e.g. as expressed in the amount £500 p.a, and the asset value), and
 - Past investment returns (through previous pension increases and today's asset value).



Previous relevant research for this DB-like CDC scheme (our previous webinar)

- Higher pension for the first generations to join the scheme, due to a constant rate of benefit accrual.
- Each generation enters and bears the cost of historical scheme experience being different to its predicted values.

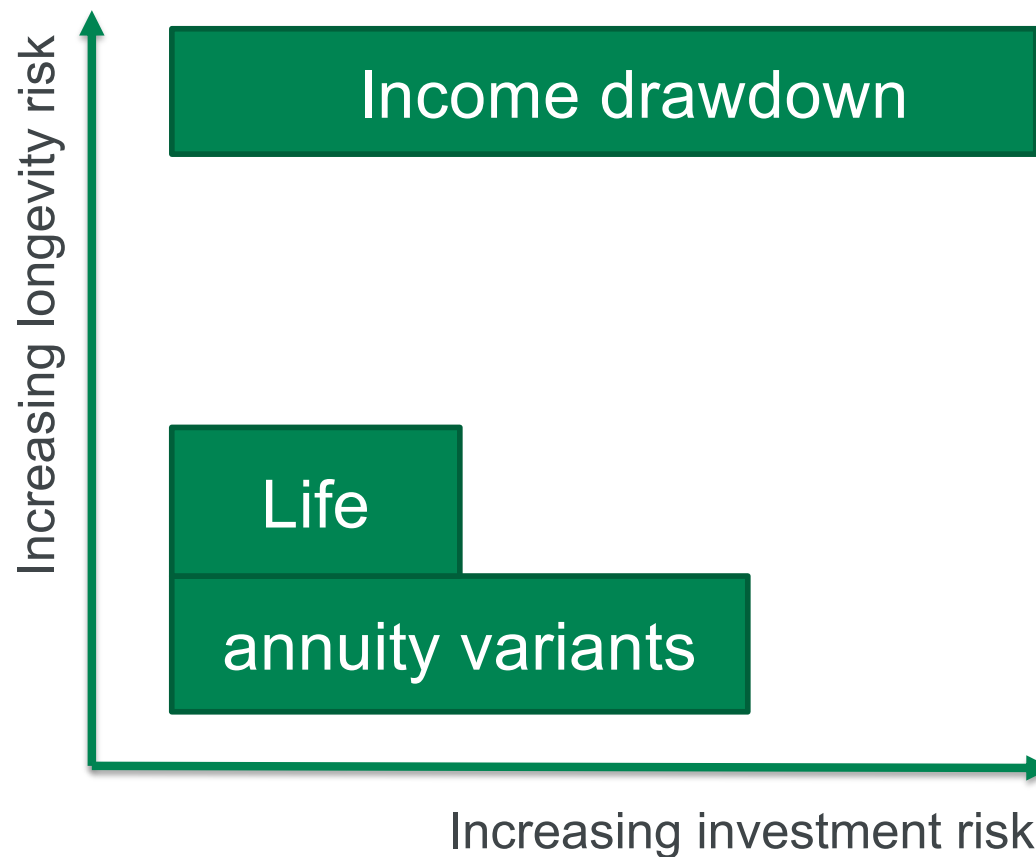
Outline

- How does the DB-like CDC pension scheme compare to alternative pension schemes?
- Goal is an inflation-linked income for life.

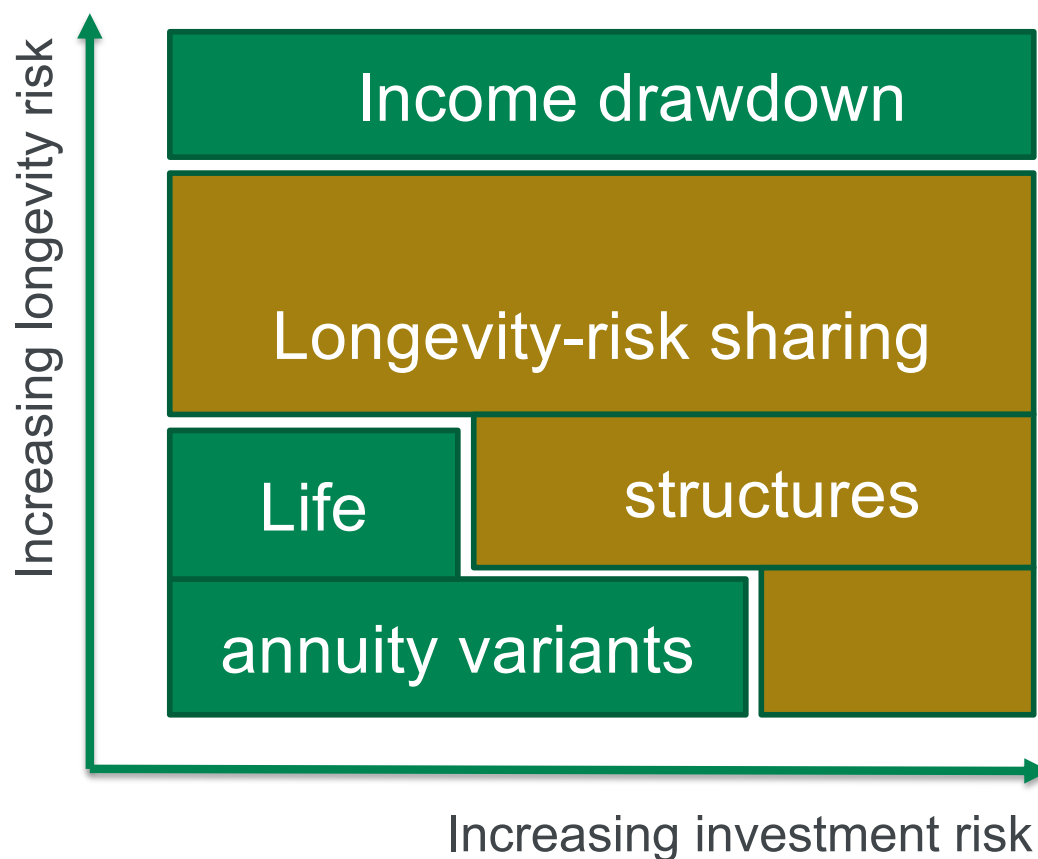
Slight detour: What is a pooled annuity fund?

- A life annuity without the investment and mortality guarantees.
- Structure to pool longevity risk.
- Everyone becomes the beneficiary of each other.
- Why?
 - To get a higher and life-long income, compared to income drawdown.
 - To get a higher expected income, compared to a life annuity.

Decumulation options



Pooled annuity fund: a longevity risk-sharing structure



Alternative pension schemes

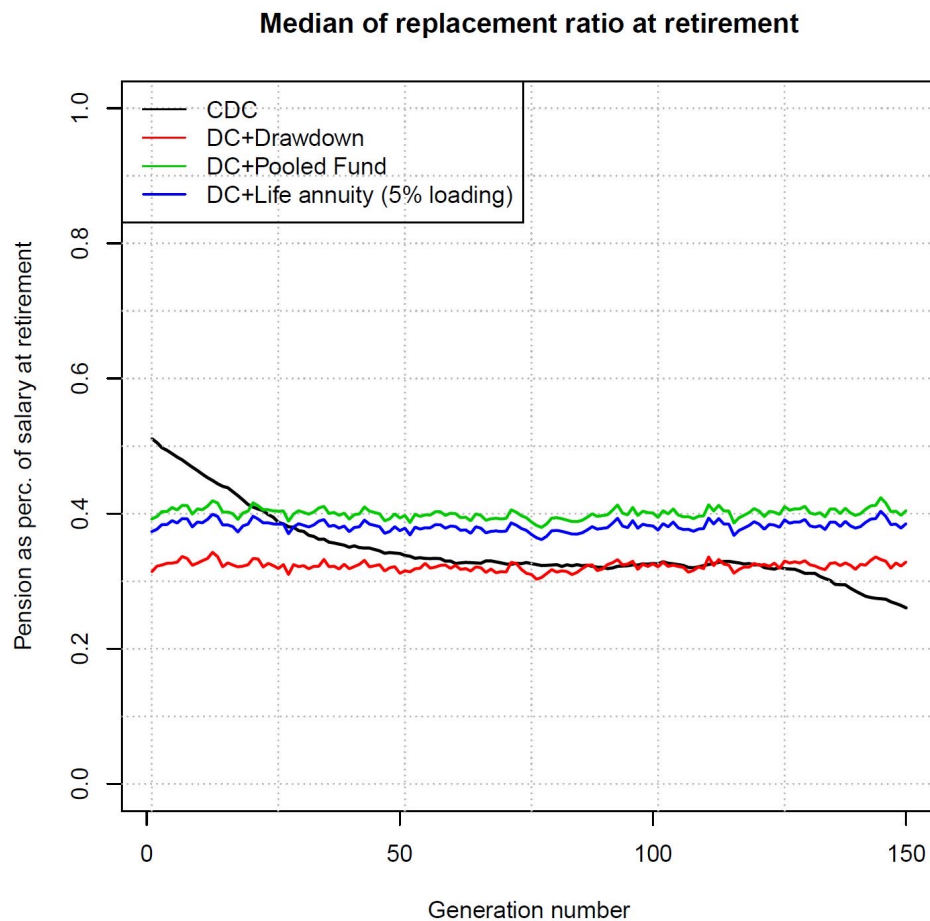
Pension scheme	Pre-retirement	Post-retirement
DB-like CDC scheme	CDC scheme	CDC scheme
DC + Life annuity	DC scheme	Life annuity purchase at age 65 years
DC + Pooled annuity fund	DC scheme	Join a pooled annuity fund at age 65 years
DC + Income drawdown	DC scheme	Income drawdown to age 90 years (5% survival chance under S1PMA)

Comparison of CDC with alternatives

- Target income increasing with price inflation.
- Compare under Wilkie model (mean-reverting model), started at long-term mean values, fitted to 1923-2009 data (Wilkie et al 2010).
- Everyone survives to age 65 then follows life table S1PMA.
- Lots of people in the scheme, so idiosyncratic longevity risk matters only for last generations.
- Ignore systematic longevity risk.



Under 100% investment in equities



- Higher median income for first CDC generations due to constant benefit accrual...
- ..Paid for by later generations
- Mitigate by age-related benefit accrual

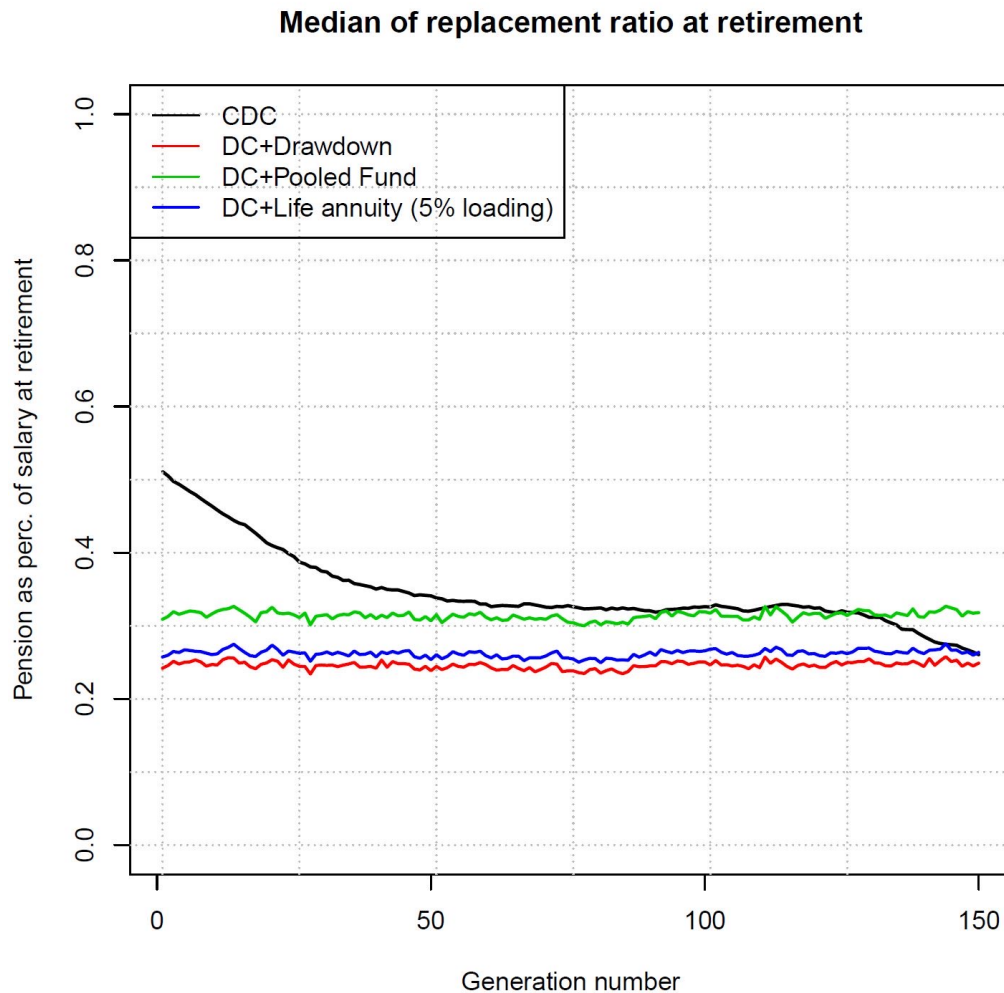


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More realistic investment strategies

Pension scheme	Pre-retirement investment strategy	Post-retirement investment strategy
DB-like CDC scheme	100% equities	100% equities
DC + Life annuity	100% equities until age 55, then step down to 100% bonds by age 65	100% bonds
DC + Pooled annuity fund	100% equities until age 55, then step down to 30% equities / 70% bonds by age 65	30% equities / 70% bonds
DC + Income drawdown	100% equities until age 55, then step down to 30% equities / 70% bonds by age 65	30% equities / 70% bonds

Under more realistic strategies

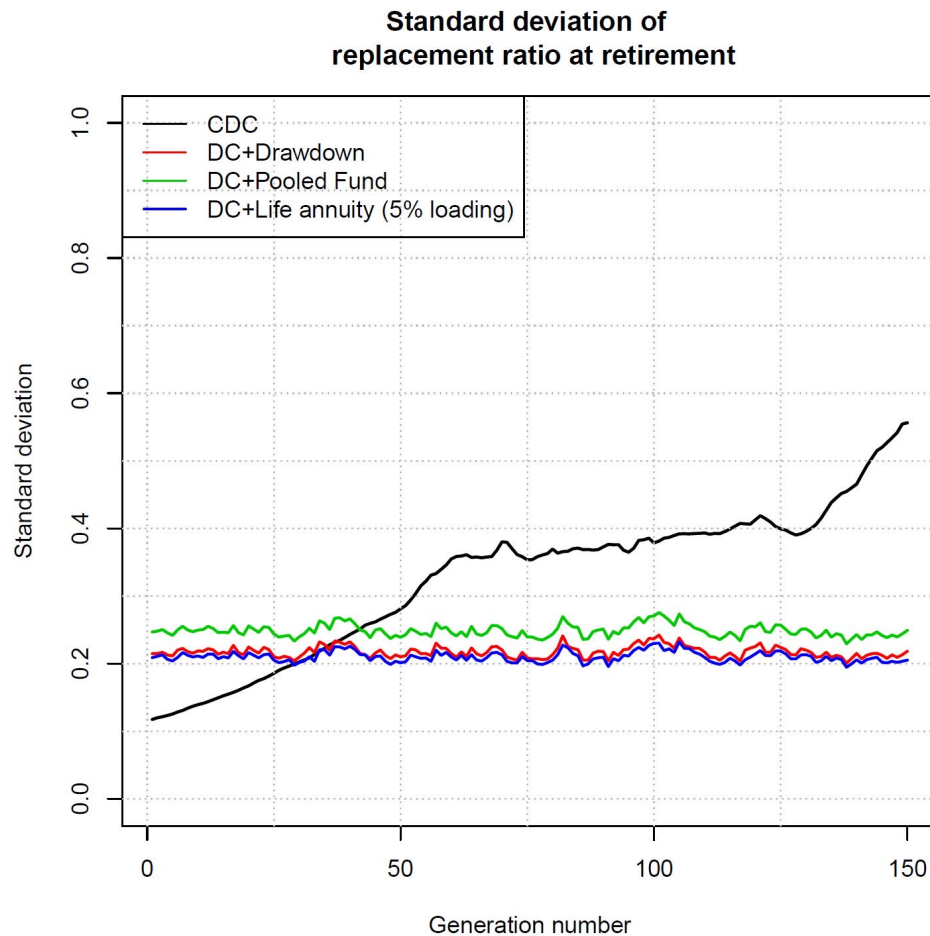


- CDC scheme takes more investment risk...
- ...Results in higher median income, for most generations



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Under more realistic strategies

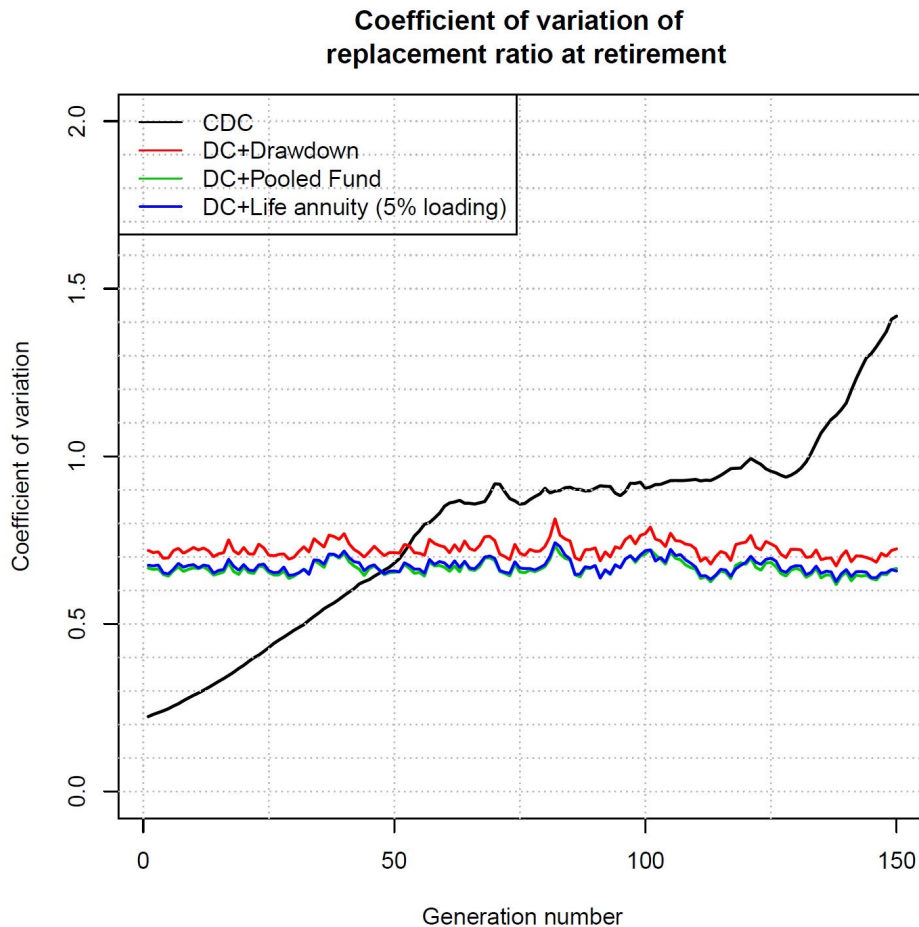


- Standard deviation of income lowest for first generations of CDC scheme...
- ...Due to softening effect of predicted returns against actual returns...
- But cumulative effect of intergenerational cross-subsidies causes increase in CDC standard deviation over time.



Under more realistic strategies

Coefficient of variation = Standard deviation/Mean



- Median income generally highest for CDC, but also...
- ...Income risk highest in CDC scheme.
- Cumulative effect of intergenerational cross-subsidies causes increase in CDC standard deviation over time.



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Bibliography

- Barajas-Paz, A. and Donnelly, C. (2022). “An attribution analysis of investment risk-sharing in collective defined contribution schemes”. *Submitted*.
- Donnelly, C. (2022). “Inter-generational cross-subsidies in the UK's first CDC pension scheme”. *Submitted*.
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Questions

Comments



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