

The Actuarial Profession

making financial sense of the future

# Reinventing Annuities

## Options for distribution

Presented by  
Mike Wadsworth  
mike.wadsworth@watsonwyatt.com  
September 2005

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### Annuitisation - key questions

- Is it useful at any age?
- What is the right age to annuitise - retirement/ other?
- What is the right structure for annuitisation?

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### Annuitisation - what do we mean?

- Pooling of survival risk
- What does 'pooling' mean - example:

100 identical lives/expectation of life 10 years/fund 1,000 each/pay 100 per year. 1 person in 20 will die in year and expectation at end of year is 9.5 years (current estimate)

Fund at start year	=	100,000
Income paid (spread over year)	=	9,750
Fund at end year	=	90,250
Fund required to continue paying 100 per year to 95 survivors for 9.5 years	=	90,250

NB: without pooling, individual future income =  $(1,000-100)/9.5 = 94.7$

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## Annuitisation - what do we mean (cont)?

- 'Real world' becomes more complicated because:
  - include investment returns
  - survival rates expected  $\neq$  survival rates experienced
  - investment rates expected  $\neq$  investment rates achieved
- For ' $\neq$ ' who should bear risk?

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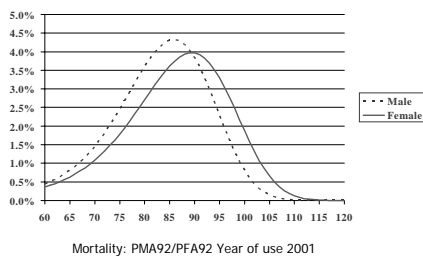
## Annuitisation - is it useful at any age?

- Survival is uncertain
- Lifespan is a distribution not an expectation unless survival risk pooled

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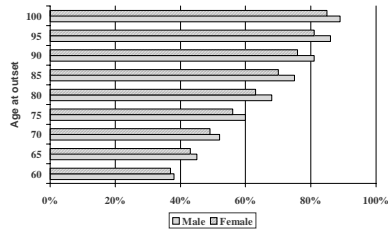
## Distribution of deaths Retirement at age 60



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## Standard deviation of deaths, as a proportion of life expectancy

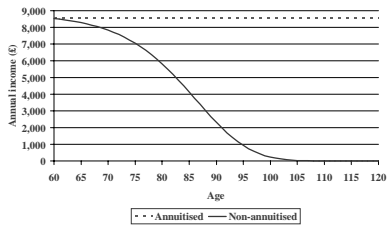


Mortality: PMA92/PFA92 Year of use 2001

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## Progression of income - annuitised fund versus non-annuitised fund

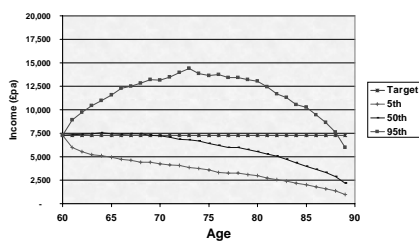


Male aged 60 at outset  
Mortality: PMA92 Year of use 2001

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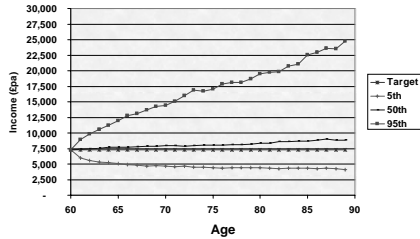
## 75% equities, 25% bonds, annual reviews, fund paid on death



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75% equities, 25% bonds, annual reviews, annuitised



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## Whether to annuitise - conclusions

- Not annuitising →
  - high risk of inadequate income
  - difficult to plan finances at older ages
- Change in asset allocation ≠ solution

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## When to annuitise

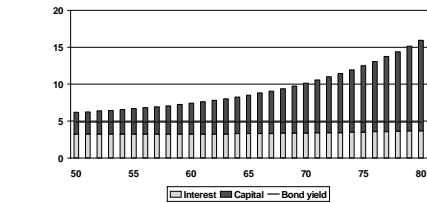
- Retirement age?
- Later?

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# Annuity versus bond yield

Income taken monthly in advance; interest rate 5% pa  
Annuity income broken down into capital element and the balance (ie interest element)



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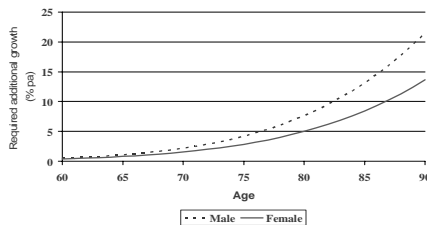
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# Opportunity cost of not annuitising: as a result of loss of mortality cross-subsidy



Mortality: PMA92/PFA92 Calendar Year 2001

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# Key to annuities Extra return for annuitising - update

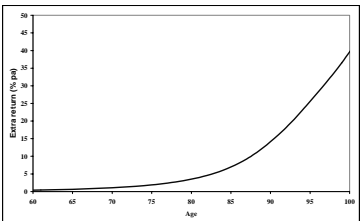


Table: PMA92 (mc) u2005

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When to annuitise - conclusions

- Retirement age not usually optimum
- Retirement income period = withdrawal first phase + annuitisation second phase
- Phases may overlap, eg to achieve balance between income and bequest preferences

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What is the right structure for annuitisation?

- Investment
  - asset allocation/choice of funds or managers?
  - guarantees?
- Survival
  - extent and nature of pooling?  
(differentiate by gender, health, social group, etc?)
  - guarantees (vs reviewability)?
- Flexibility
  - change including income, funds, guarantees?

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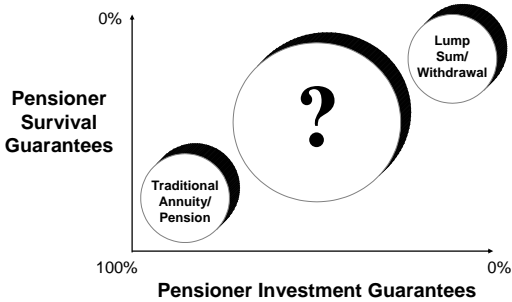
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Options for retirement income



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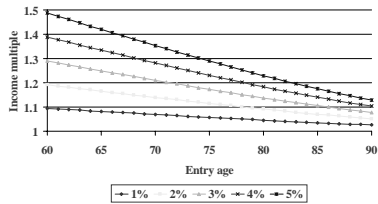
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## Effect of investment growth on supportable income - males

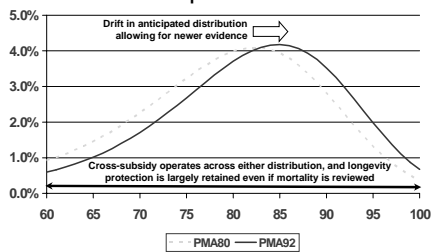


Base income supportable calculated at 5%.  
Income multiple = income supportable assuming extra investment return resulting from equity investment of 1, 2, 3, 4 or 5% pa after charges, divided by base income.

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## Mortality drift - provider problem uncertain future improvements



Both charts show expected distribution of deaths for male aged 60 in 1992, allowing for future improvements. PMA92 represents the more recent estimate

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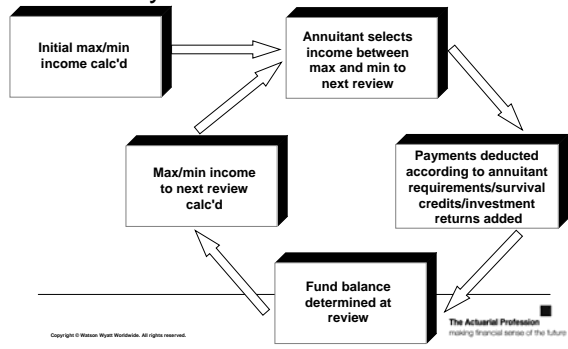
## Lifetime income model - benefit statement

	Units	Unit Price £	Value £
Start of Year	10,000	10.00	100,000
Annuity Payments	(975)		(10,000)
Survival Credit	295		3,000
Effect of Changes in Unit Price			4,860
End of Year	9,320	10.50	97,860
Target Income for Next Year			10,000

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## Lifetime income model - review cycle




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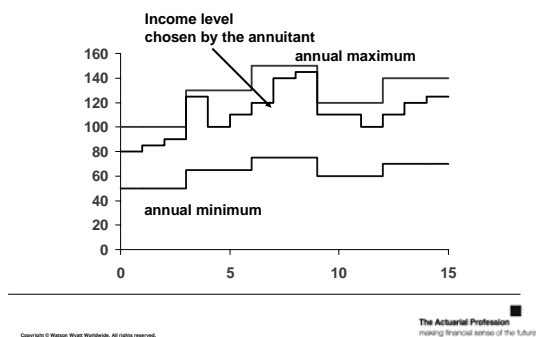
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## Flexible income The corridor




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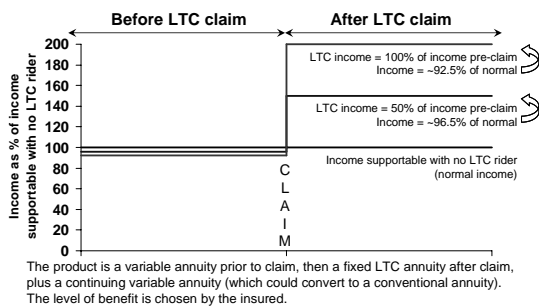
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## Effect of LTC rider on income




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Advantages of lifetime income model

- Pensioners
  - natural extension to DC/PP pension vehicle
  - choose and vary asset allocation
  - flexibility of income
  - optimise income relative to risk
- Insurers/fund managers
  - longevity risk manageable
  - potential segmentation of risks
  - not restricted by available bond (or other) investments
  - global multi market application
- Also financial planners/bond suppliers

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