

# 3rd Webinar on Pensions, Other Employee Benefits and Social Security

Institute of Actuaries India

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## Retirement System Payouts

William Price

CEO D3P Global



# Overview

- Focus on the payout phase for pensions
- Stress that until the payout phase specified you have no idea what your pension system is actually delivering
- Highlight the key challenges and risks
- Look at some good and bad ‘solutions’ with some international examples
- Consider better integration of public and private pensions as a solution
- Investigate in more depth a particularly promising approach based on variable life annuities (Value annuities)
- Illustrate potential benefits with modelling
- Discuss potential relevance to the Indian (and other) markets



# What do we want from the payout phase?



- Payout phase fundamental to pension outcomes but often an afterthought
- Partly because issue does not arise with Social Security – the payout is the policy
- Same with traditional DB pensions – where the payout is the pension
- Only in Defined Contribution pensions that accumulation and decumulation or payouts are different decisions – but this is a choice in itself
- ‘Simple’ aim for public policy on pensions is typically sufficient income until death so that public and private pensions prevent poverty or significant cuts in income in old age
- ‘Textbook’ answer of life annuities because they guarantee a payment until death
- Need to recognise it is a form of insurance - so can often seem ‘expensive’ if the insurance against dying in poverty is not understood
- But many annuities do have high fees including sales costs – and also the need for significant risk and regulatory capital to back the promise of future income
- Moreover, most countries do not have active annuity markets – often due to low customer demand but also due to under-developed capital markets

# The technical risks are exacerbated by behavioural, legal, governance and political risks



- Behavioural bias of consumers
- Low financial literacy
- Complex terminology used in confusing ways in different countries
- Legal provisions
- Taxation
- Political considerations including regular pressure for access to pension pots early – exacerbated now by terrible impacts of CV19
- Lots of focus in the literature on problems and products – not enough on mechanics of who delivers products and how members choose – or receive a good value payout product

Some risks, like longevity have a general and a specific component since your cohort but also your gender can lead to very different outcomes

Country	Gender Gap 2010	Change from 2000
Mexico	1.9	(0.0)
China	1.9	1.7
Israel*	2.2	(0.0)
United States	2.6	(0.4)
United Kingdom	2.6	(0.6)
Brazil	2.8	0.4
Chile	2.9	(0.4)
Canada	3.0	(0.5)
Germany	3.2	(0.6)
Switzerland	3.2	(0.5)
Netherlands	3.3	(0.6)
Spain	3.9	(0.1)
France	4.2	(0.4)
Korea	4.5	0.6
Japan	5.0	0.2

Source: Human Mortality Database (HMD) where available

\* The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

It is very challenging for an individual to tackle these risks alone – since investment risk without mortality pooling can lead to some very poor outcomes in certain time periods



**Figure 7.2** Variable returns of income drawdown for different historic cohorts

Member draws a nominal £3,000 per annum income from an initial pot of £50,000 invested in UK equities. Real returns before charges.



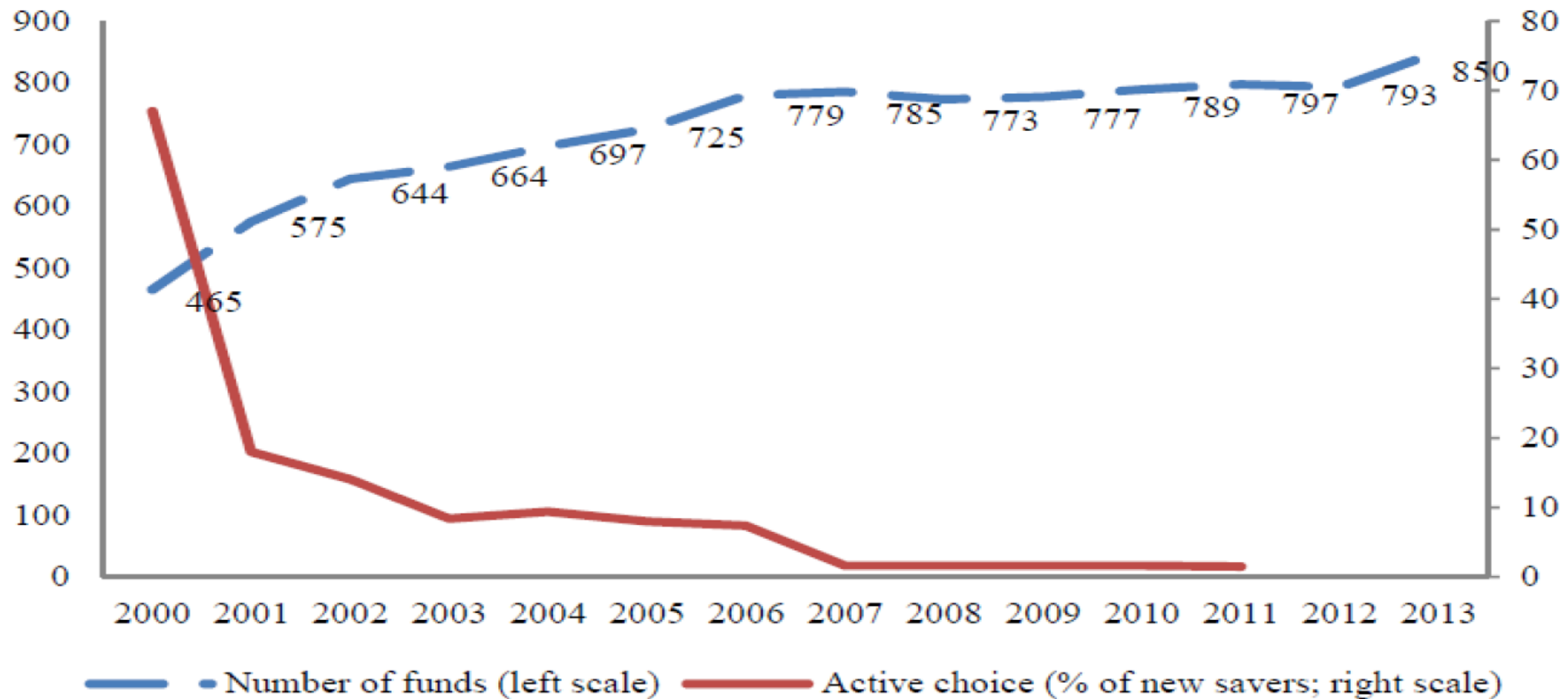
Source: Dimson, Marsh, Staunton and NEST 2014

One 'solution' is then to have lots of products that offer different combinations of risk protection – but this can rapidly become very complicated.



Retirement product	Protection offered			Benefits provided	
	Longevity risk	Investment risk	Inflation risk	Bequest	Liquidity
Fixed real-life annuities	Yes	Yes	Yes	Limited	No
Fixed nominal life annuities	Yes	Yes	No	Limited	No
Escalating real life annuities	Yes	Yes	Yes Plus	Limited	No
Escalating nominal life annuities	Yes	Yes	Partial	Limited	No
Variable life annuities, guaranteed benefits	Yes	Yes	Possible	Limited	No
Variable life annuities,	Shared	No	Via investment	Limited	No
Phased withdrawals	No	No	Possible	Yes	Possible
Lump sum/self-annuitization	No	Possible	Possible	Yes	Yes

But we know from the accumulation phase that consumers find too much choice baffling – hence the importance of good default options



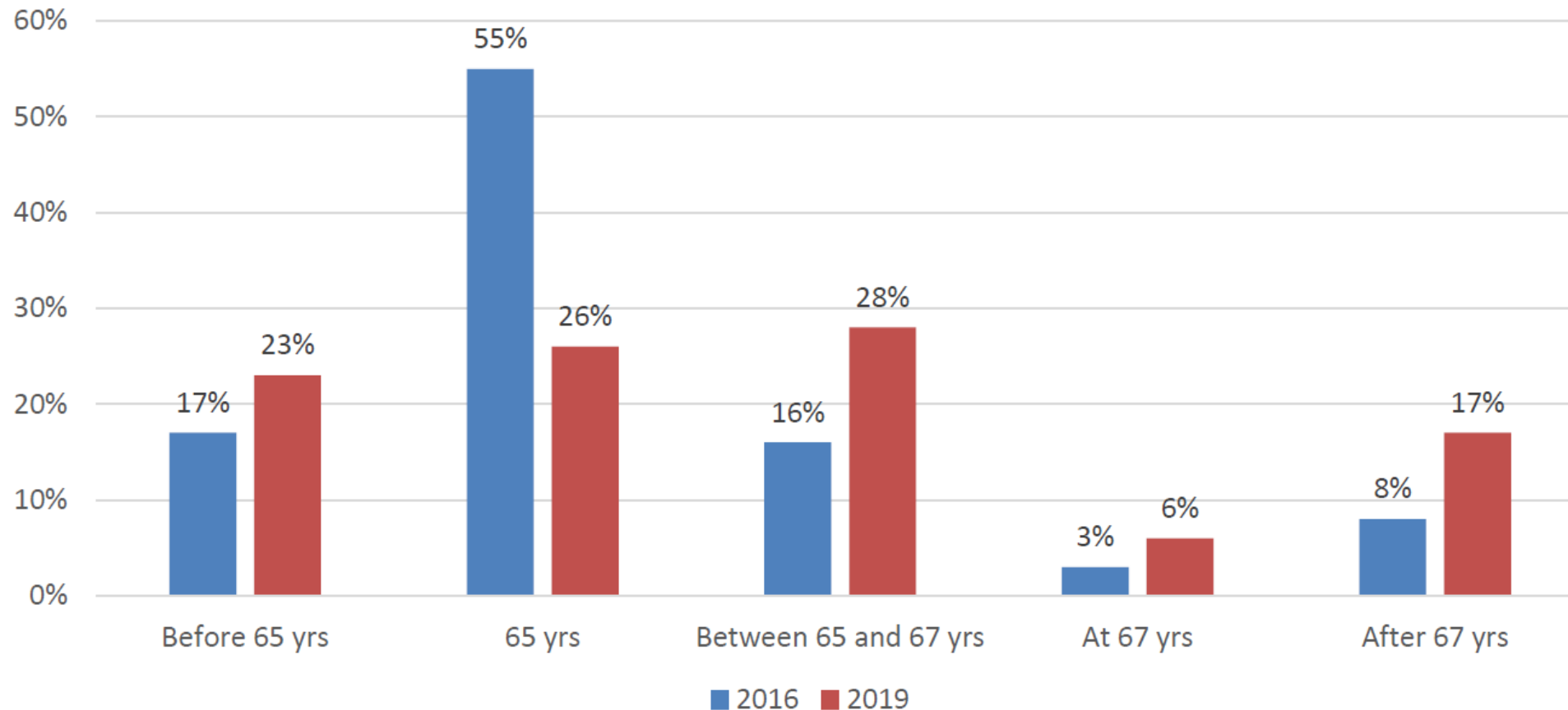


# Poll Question

UK ended effective compulsory annuitization in 2015. What percentage of people now choose an annuity payment as opposed to a 100% lump-sum or a phased withdrawal?

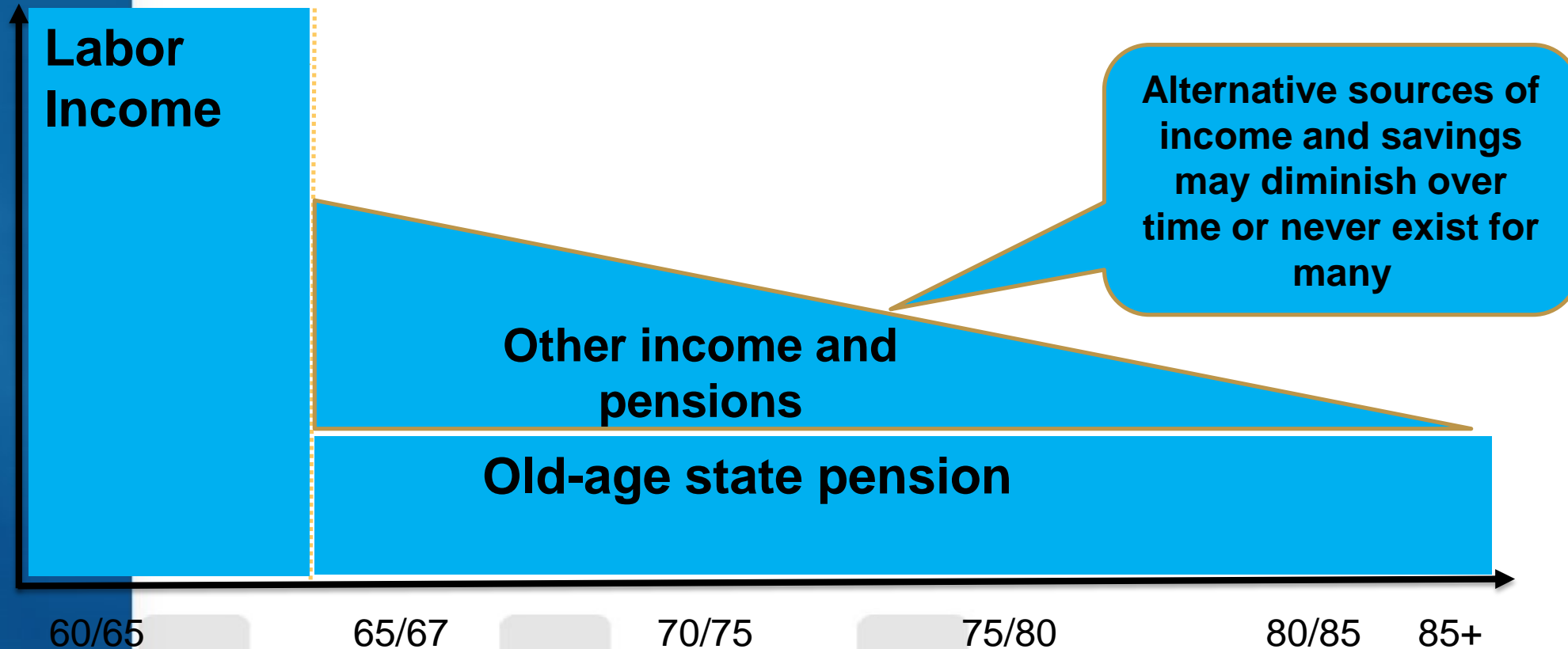
- A. 12%
- B. 34%
- C. 54%
- D. 71%
- E. 89%

Some solutions are well-known such as working longer and taking retirement income later – but not possible for all



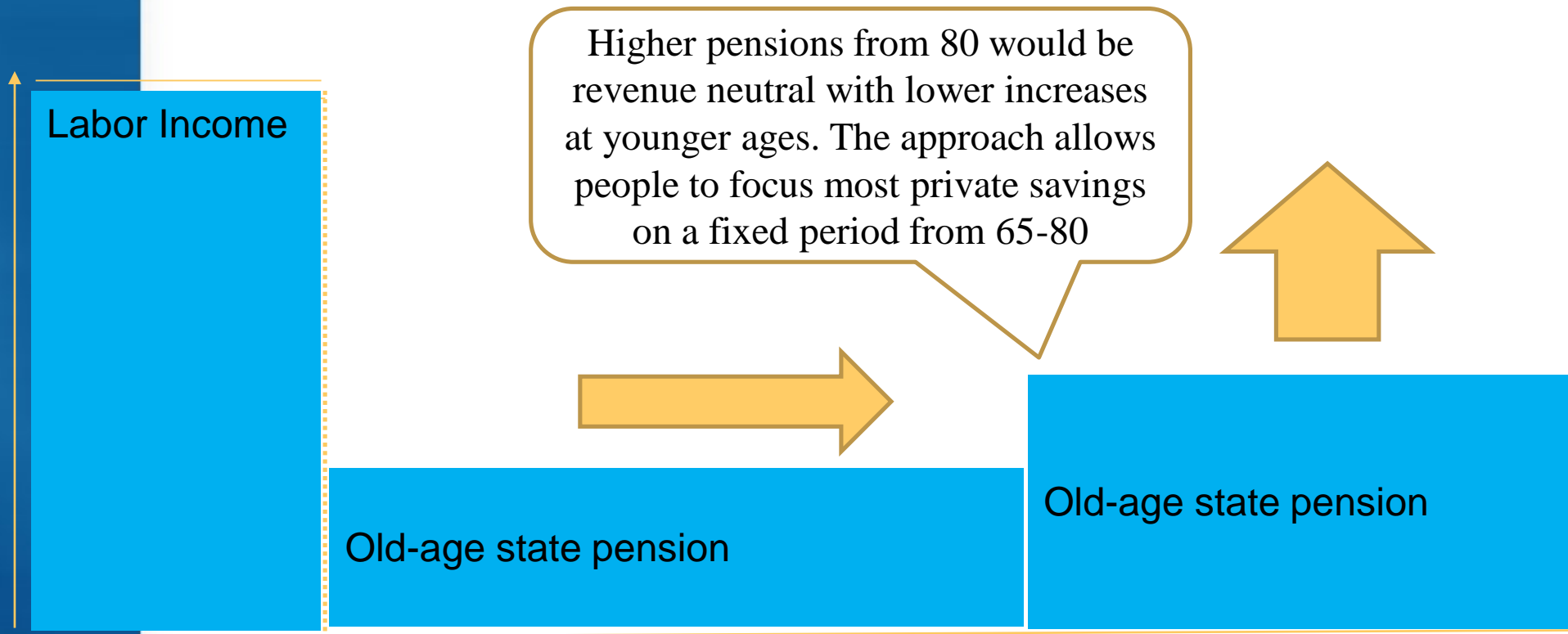
Working one more year increases the monthly pension by 6-11%

Another solution is to improve integration of public and private pensions so that private pensions can focus on filling a fixed gap and avoid the issues of guaranteeing income until death



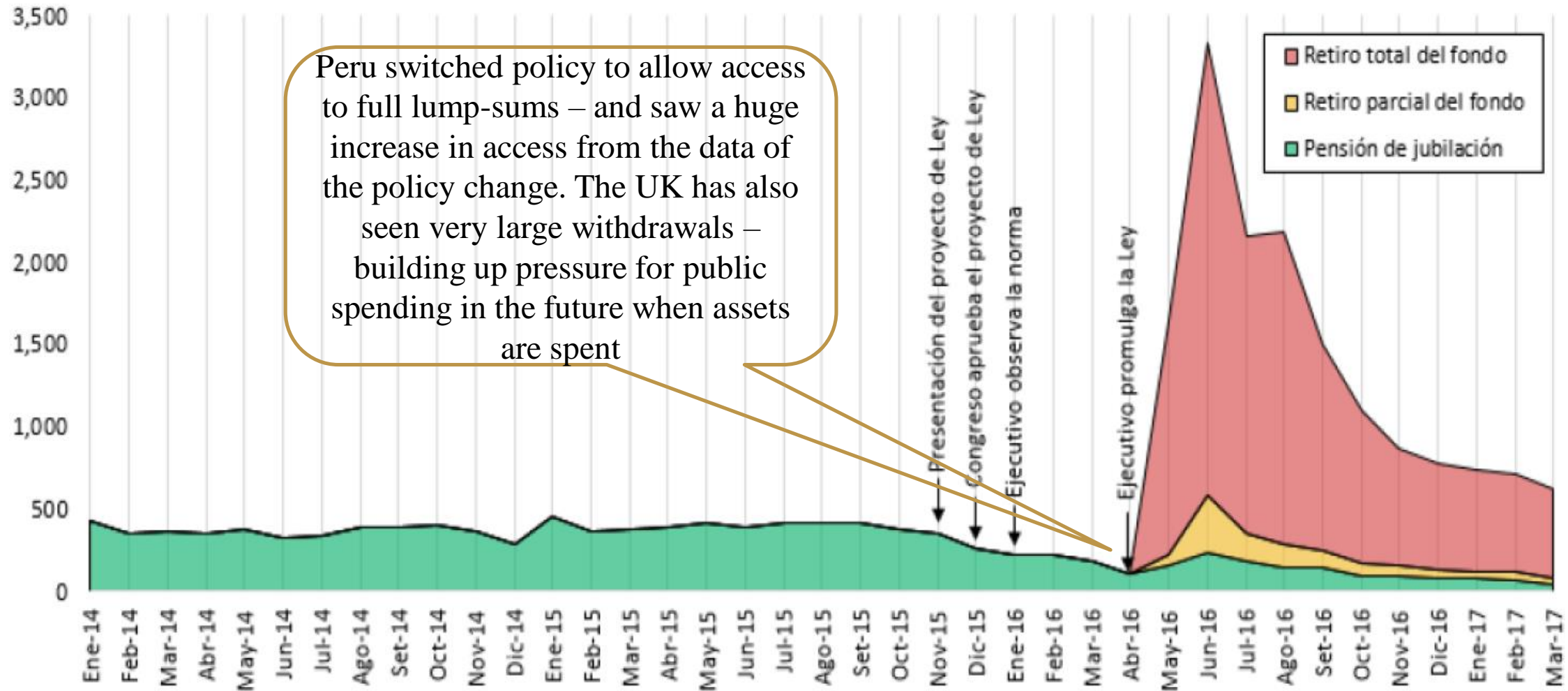
Source: Based on Price (2017)

If private pensions, savings and labour income focused on the 'early' old age period then public pensions could be 'tilted' towards later old age – with suitable taxation and means testing policy to ensure fairness



Source: Based on Price (2017)

A bad 'solution' is to give people access to all or a majority of the money as a lump-sum (unless they can demonstrate significant resources) because this risks rapid use of assets for many people

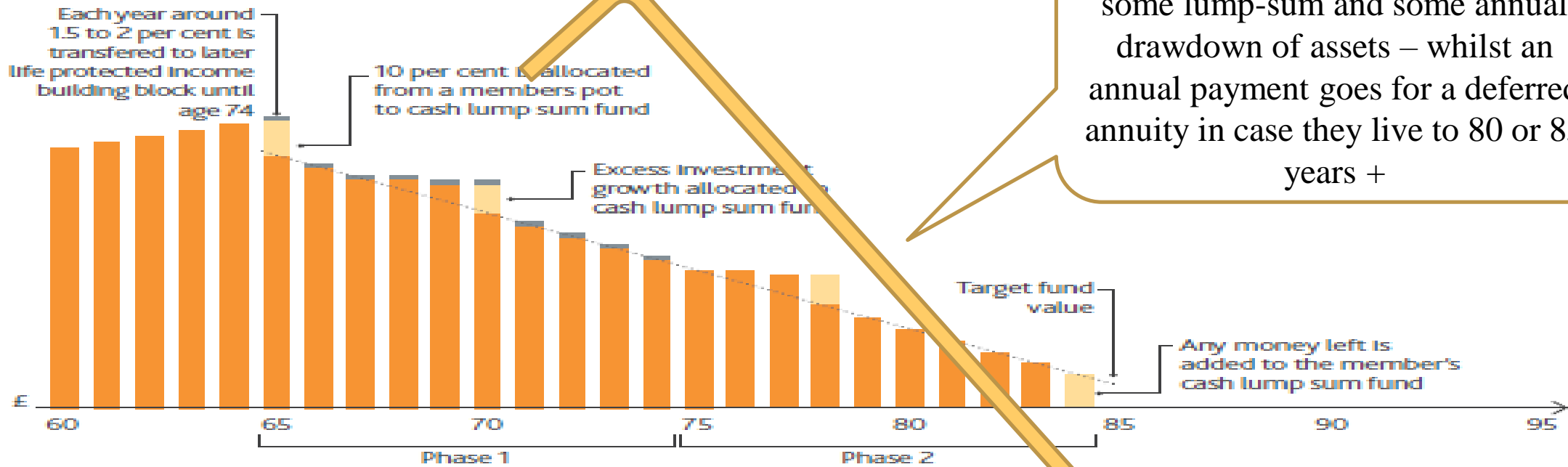


Source: SBS - number of people Pension Products Chosen by AFP members 2014-2017

But product design can respond to the fact people hate giving all their assets away in one chunk – to combine some access with insurance for very old age

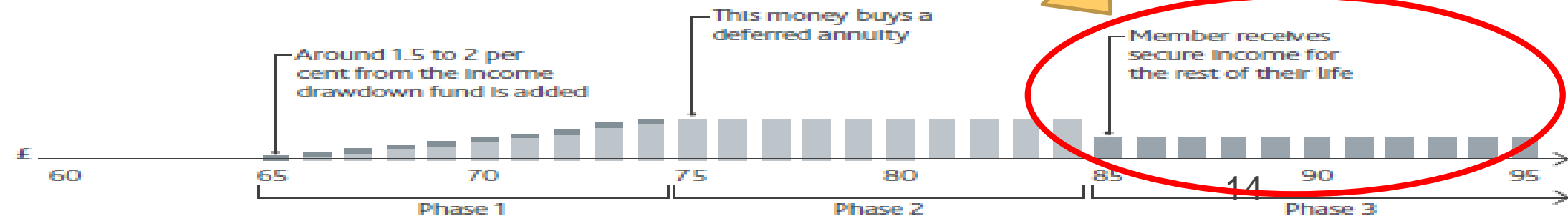
## How their income is generated

### Income drawdown fund



At retirement people have access to some lump-sum and some annual drawdown of assets – whilst an annual payment goes for a deferred annuity in case they live to 80 or 85 years +

### Later-life protected income fund



The Swedish mandatory DC pension pillar has a single payout option that is based on the variable life annuity that will be illustrated in more detail later in the presentation



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The formula essentially says that a given stock of assets will provide more income each year if interest rates are higher (and costs are lower) and mortality rates are lower.

$$D(x) = \int_0^{\infty} e^{-\delta t} \frac{l(x+t)}{l(x)} dt$$

$$\delta = \ln(1+r) - \epsilon$$

$$l(x) = \int_0^{\infty} e^{-\int_0^x \mu(t) dt}$$

The Swedish approach has an actuarial formula behind it – but no one needs to understand or choose to get the payout and it works very simply at low cost

$$\mu(x) = \begin{cases} a + be^{cx} & \text{for } x \leq 97 \\ \mu(97) + (x - 97) \cdot 0.001 & \text{for } x > 97 \end{cases}$$

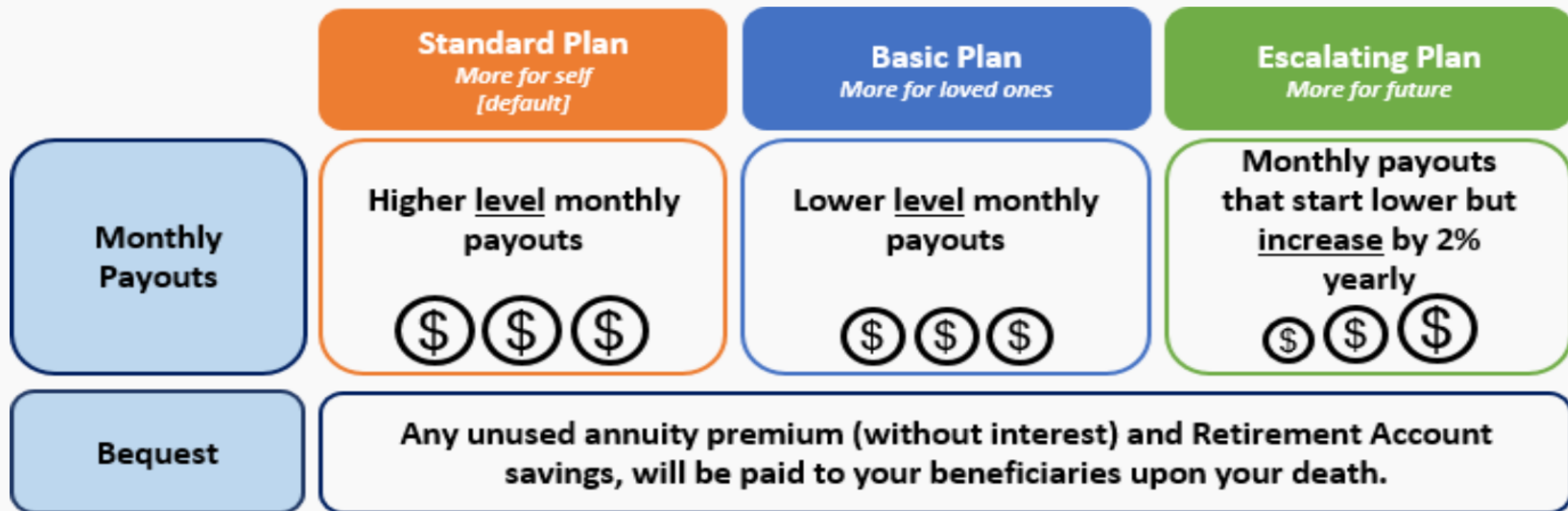
In Singapore's Central Provident Fund they have used some similar features but with a choice of three options (with a default) so people can express some core preferences but in an intelligible way



There are three CPF LIFE plans for you to choose from – the LIFE Standard Plan, the LIFE Basic Plan and the LIFE Escalating Plan.

The plans differ in terms of:

- the **monthly payout** you would receive; and
- the amount you would leave (i.e. **bequest**) to your beneficiaries.






Improving the delivery of payouts can also boost income without needing any more contributions or assets – as seen in Chile’s auction platform for annuity payouts



*“Overall, this paper finds that, after controlling for other regulatory changes and the main determinants of annuity rates, **the new quotation system raised annuity payments by 15 percent**” (Morales and Larrain, 2017)*



# India's payout interface from the NPS is an interesting example on which an auction-style model could be built

 **NSDL**  
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### Annuity Quotes

<b>Are you a:*</b>	<input type="radio"/> Government Sector Subscriber <input checked="" type="radio"/> Private Sector Subscriber
<b>Date of Birth:*</b>	<input type="text" value="01/01/1959"/> (DD/MM/YYYY) Your age: 60 years
<b>Gender:*</b>	<input type="radio"/> Male <input type="radio"/> Female <input type="radio"/> Others
<b>Marital Status:*</b>	<input type="radio"/> Single <input type="radio"/> Married
<b>J &amp; K Resident:*</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No
<b>NPS Corpus to be utilized for purchase of annuity: (in ₹)*</b>	<input type="radio"/> <input type="text" value="0"/>
<b>Annuity-Frequency*</b>	<input type="text" value="Monthly"/>
<b>Enter Captcha</b>	<input type="text" value="49 + 3 ="/>

**SUBMIT** **RESET**

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# **Retirement System Payouts**

**R. Evan Inglis, FSA, CFA**

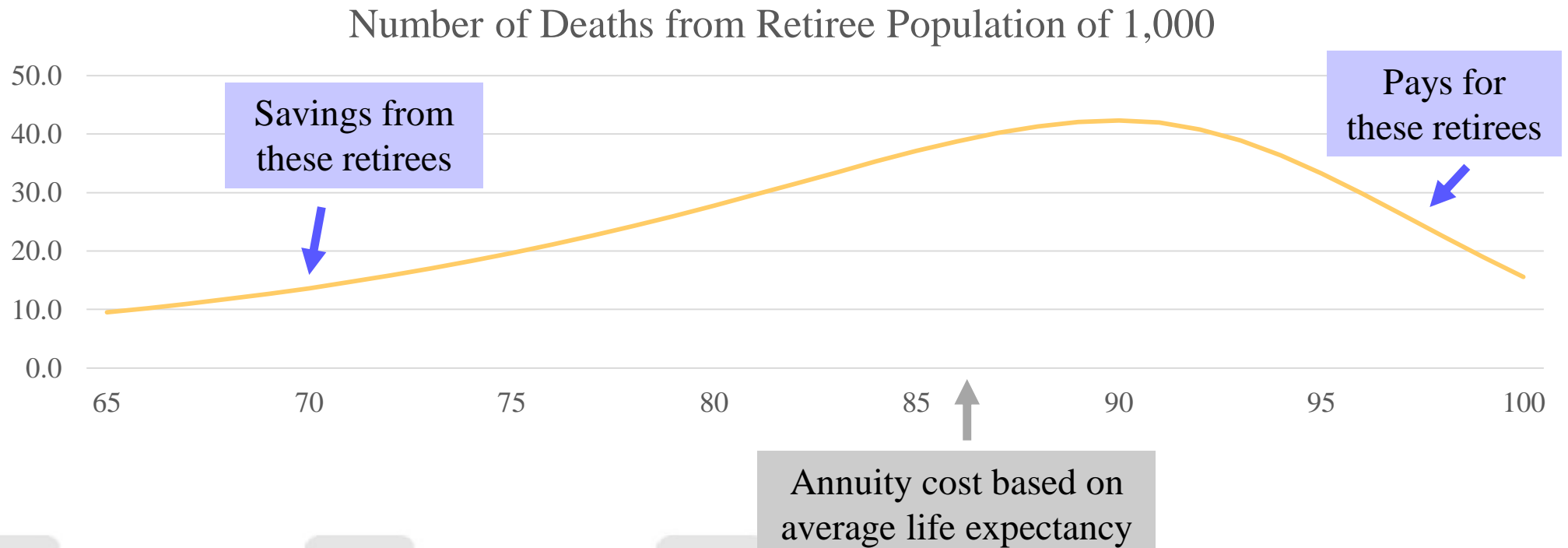


# Longevity Risk in Retirement Payouts



- Economic Value of Longevity Pooling
- Retirement Payout Comparison

# Pooling Longevity Risk



# Payout Analysis with Lifecycle Utility Model

$$\max_{c_t} E \left[ \sum_{t=0}^K e^{-\rho t} u(c_t) \right] \quad s. t. w_{t+1} = (w_t - c_t)e^r$$

$C$  = consumption

$w$  = wealth

$\rho$  = discount rate

$r$  = investment return

WHAT PAYOUT PATTERN PROVIDES MOST RETIREMENT SECURITY TO A RETIREE?

# Economic Utility Concept

**Utility** in economics is a measure of welfare, satisfaction, happiness, usefulness



# Payout Perspective



## Individual

What makes one person feel better during the rest of their lifetime?



Individuals usually value bequest

## Public policy

What enhances the objectives for society or plan sponsor?



Bequest has no value

How much more money is needed to provide the same retirement security without an annuity?



# Longevity Pooling Analysis Assumptions



- Retirement at age 65
- RP-2014 mortality (U.S. pension table)
- Fixed (real) investment return
- No other savings
- Zero utility value for bequest

# Polling Questions



How much additional savings is required to get the same retirement security from a single lump sum as from a fixed annuity?

- A. 5% - 10%
- B. 10% - 20%
- C. 20% - 30%
- D. 30% - 40%
- E. 40% +

# Economic Value of Longevity Pooling



How much more money is needed to provide the same retirement security without an annuity?

Male  
39.6%

Female  
34.4%

Couple  
32.1%

- Discount rate = investment earnings = 2.0% (real)
- Risk aversion parameter = 1.25
- No other annuity income

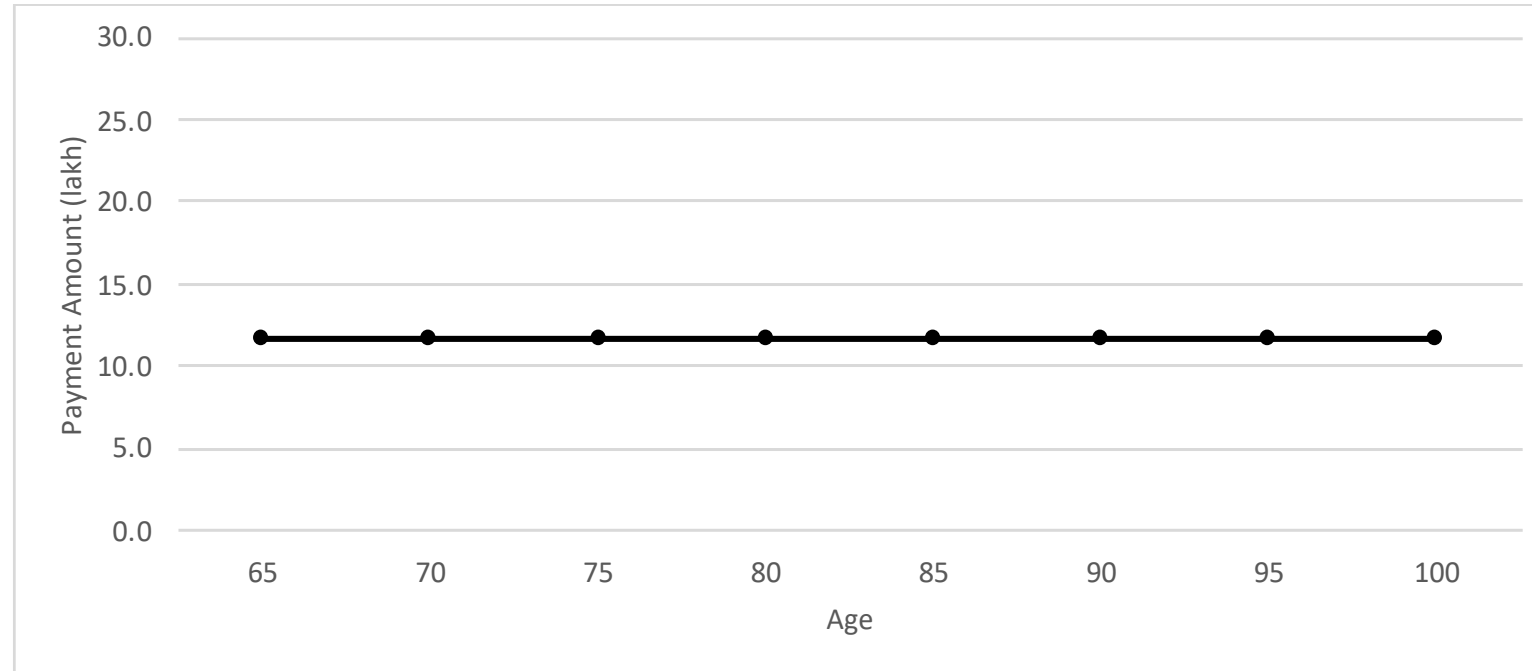
# Value of Longevity Pooling

<b>Mortality</b>	<b>Discount Rate</b>	<b>Risk Aversion</b>	<b>Male</b>	<b>Female</b>	<b>Joint</b>
GAM-83	2.0%	1.25	52.7%	37.4%	45.3%
RP-2014	2.0%	1.25	39.6%	34.4%	32.1%
RP-2014	2.0%	2.0	47.9%	41.7%	39.1%
RP-2014	3.0%	2.0	35.0%	30.0%	32.6%

# Four Payout Methods

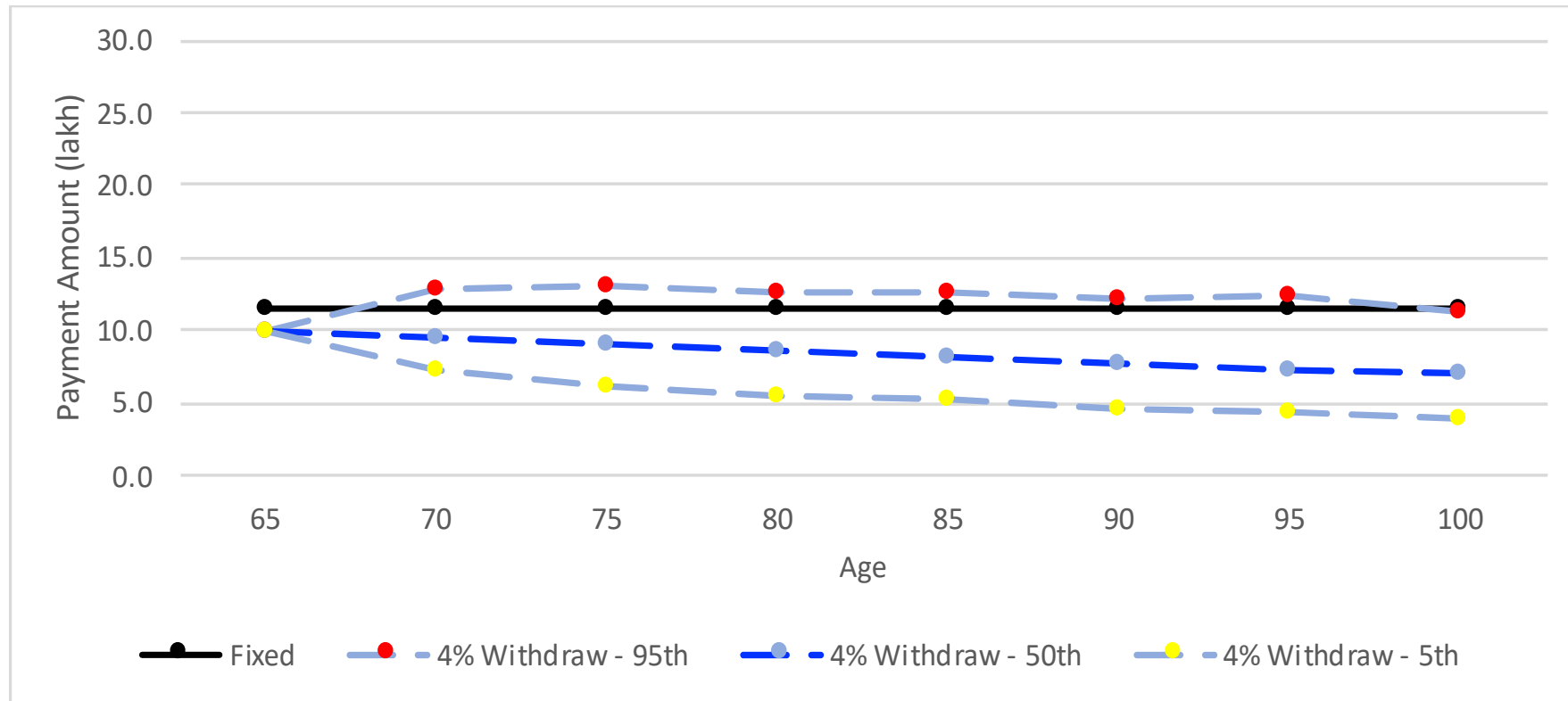
1. Immediate annuity - commercial
2. Fixed percentage withdrawal
  - 4% of savings withdrawn each year
3. Installment payments + deferred annuity
  - Installment =  $1/n \times \text{savings}$ 
    - $n$  = remaining years
4. Variable longevity pool – uninsured (VALUE)

# Fixed Annuity Payout



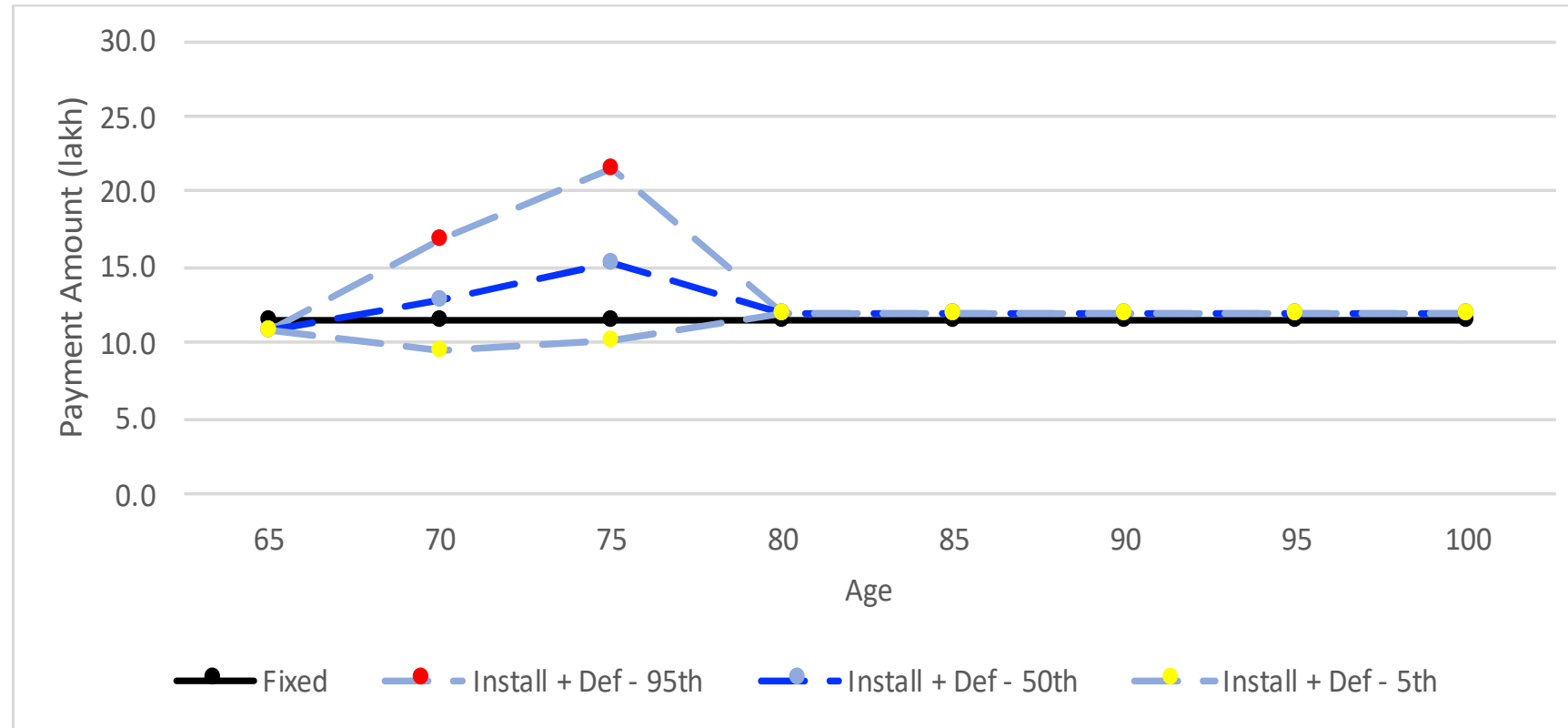
- Retirement age = 65
- Retirement savings = 250 lakh
- Fixed annuity amount = 11.4 lakh
- Real interest discount rate = 1.0%

# Fixed Percentage Withdrawal



- Withdrawal = 4% of remaining savings
- Withdrawal allows for bequest

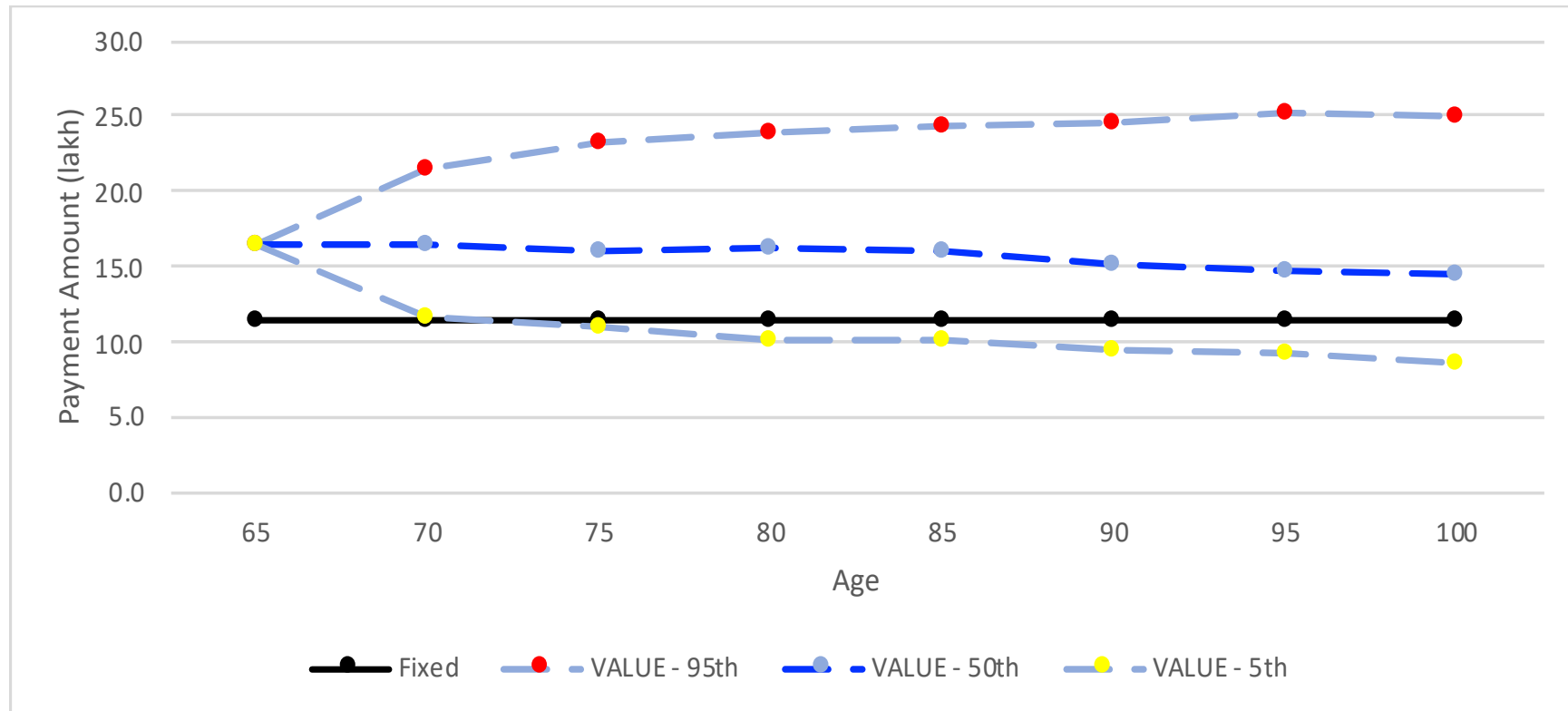
# Installment + Deferred Annuity



- Installments pay  $1/n \times$  remaining savings ( $n =$  remaining years)
- Installment payments allow for bequest



# Fixed Annuity v. VALUE



- VALUE has no profit load
- VALUE participants bear population longevity risk

# Payout Comparison Summary



	Initial Income at 65	Median			5th Percentile (Downside)			95th Percentile (Upside)		
		PV of Lifetime Payments	PV of Bequest	Max drop from initial income	PV of Lifetime Payments	PV of Bequest	Max drop from initial income	PV of Lifetime Payments	PV of Bequest	Max drop from initial income
Fixed Annuity	11.6	223	0	0%	223	0	0%	223	0	0%
Fixed 4.00% Withdrawal	10.0	171	112	48%	133	81	66%	224	154	20%
Installment + Defrd annuity at 80	10.8	253	18	2%	212	14	22%	301	22	0%
VALUE	16.4	314	0	33%	238	0	55%	409	0	0%

# Payout Comparison Assumptions



Scenarios	500	
Retirement Age	65	
Lump Sum Value	250	Retirement savings account balance at retirement age
Group size	500	Impacts the volatility of the VALUE option where longevity risk is shared by the group
Geometric portfolio real return	3.00%	Arithmetic return of 3.32% adjusted for volatility
Portfolio real return volatility	8.00%	Standard deviation of real returns for a diversified portfolio
Median volatility	8.06%	Median volatility in 500 scenarios (mean reversion assumed)
Fixed annuity discount rate	1.00%	Assumed to be fixed income, real return
Mortality	National Life Tables, England, 2014 – 2016 data, 0.75% annual improvement, unisex	
<u>Sales, admin, and profit charges</u>		
Fixed Annuity	12%	Sales 3%, admin 1%, risk & profit 8% of annuity premium
Installment + Defrd annuity at 80	12%	Sales 3%, admin 1%, risk & profit 8% of annuity premium
VALUE	1%	Education and admin

# Question and Answers

Moderated by Kulin Patel