Society of Actuaries in Ireland

A New Approach to Drawdown on Group DC Pensions

Colm Fagan

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Disclaimer

The views expressed in this presentation are those of the presenter and not necessarily of the Society of Actuaries in Ireland

Drawdown … where are we now?

High charges

Low returns

No security of income

Where are we now? High charges

- Trustees' duty to look after members' interests ceases on retirement
- Must leave scheme on retirement and lose group discounts
- High charges on individual arrangements

Where are we now? Low investment returns

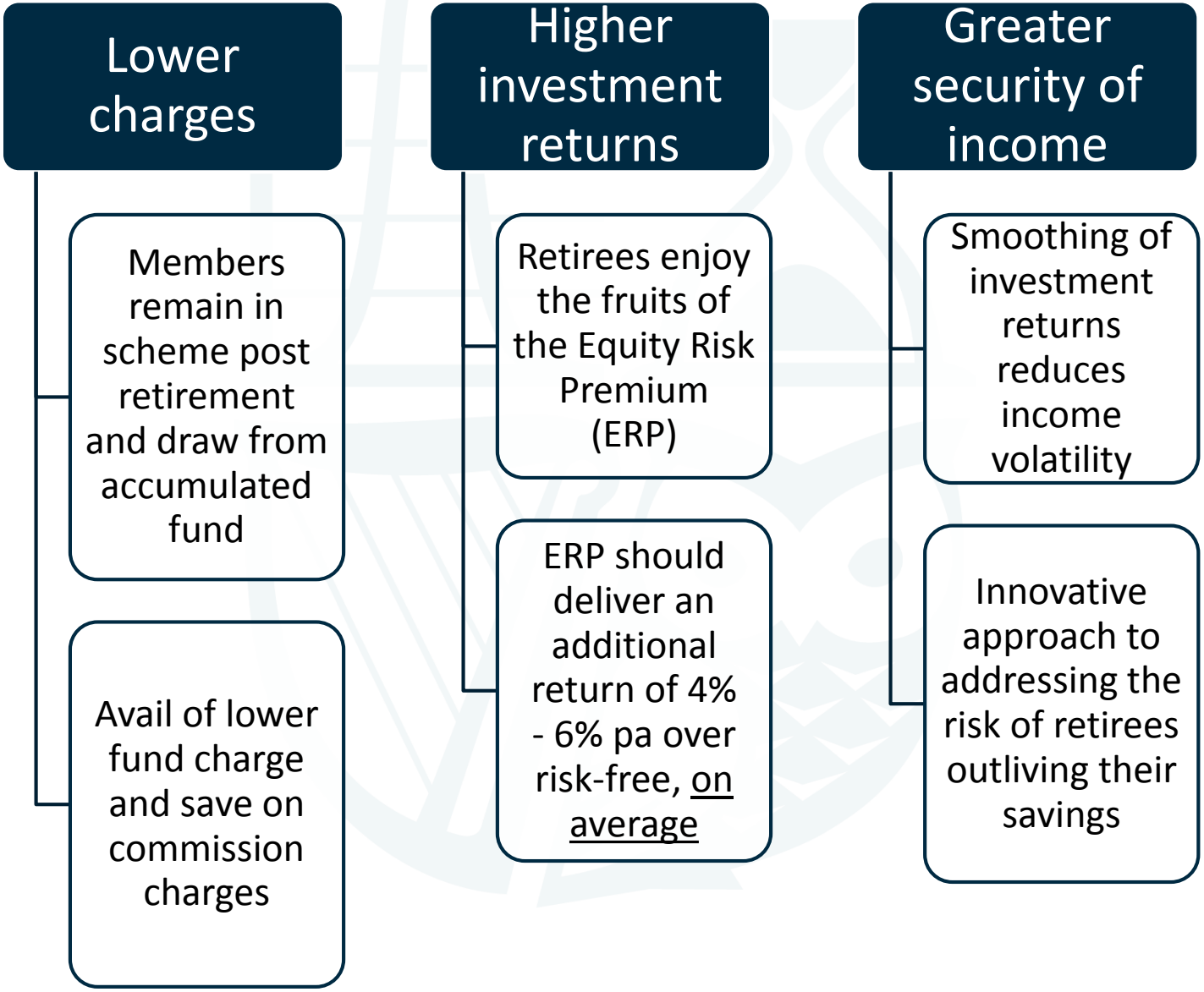
- Over 40% of insured ARFs are 100% in cash *
- Risk aversion leads to low investment returns
- Advisers probably more risk averse than their clients: fear of failure

** November 2015 Working Party Paper to Society of Actuaries in Ireland*

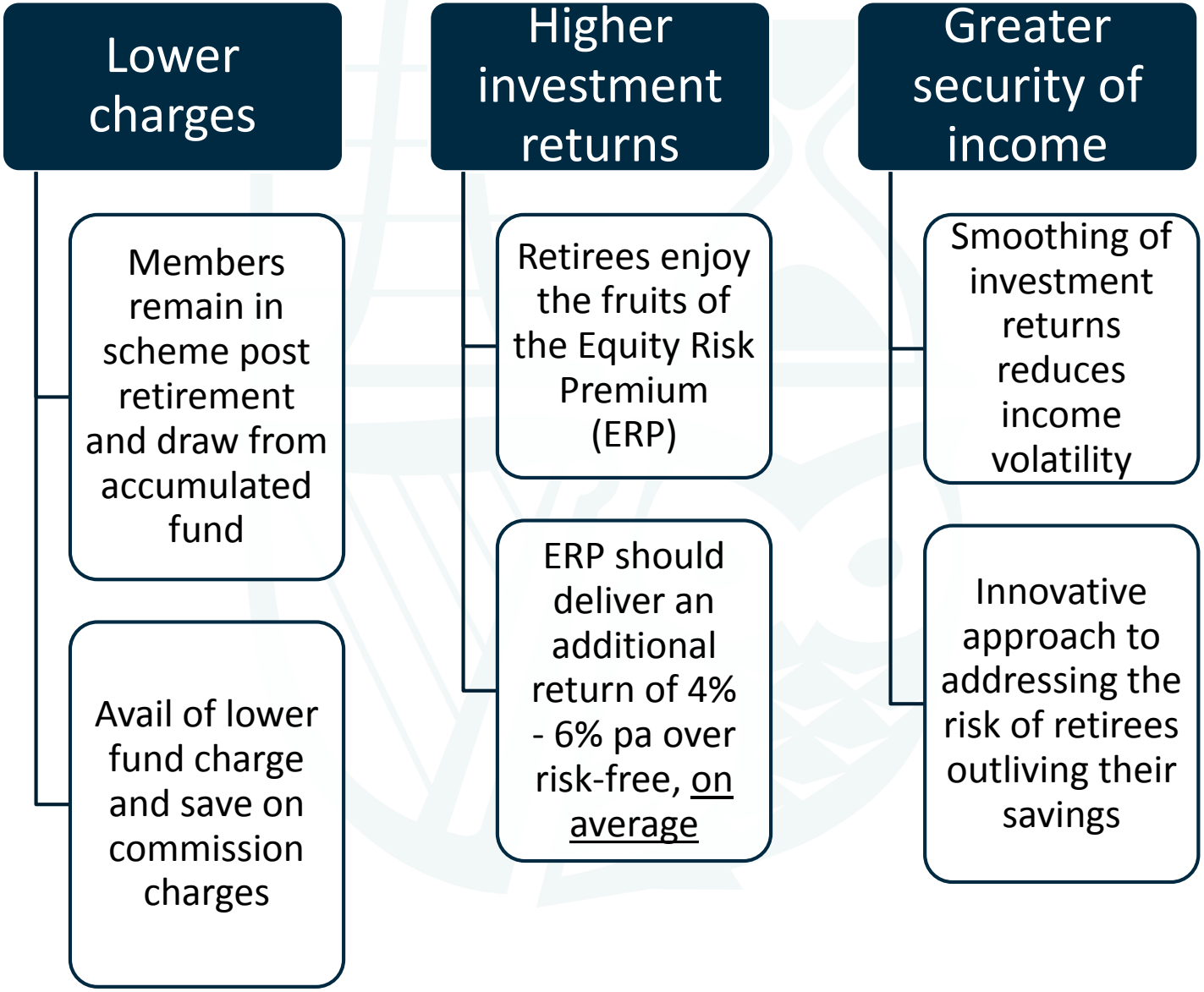
Where are we now? No security of income

- Actuaries can only tell average life expectancies for large numbers
- For a retiree in drawdown, all that matters is their own life expectancy, not the average
- Retirees could draw down too much – or too little
- Annuity option means a life spent in bond(age)

How the new approach addresses current deficiencies

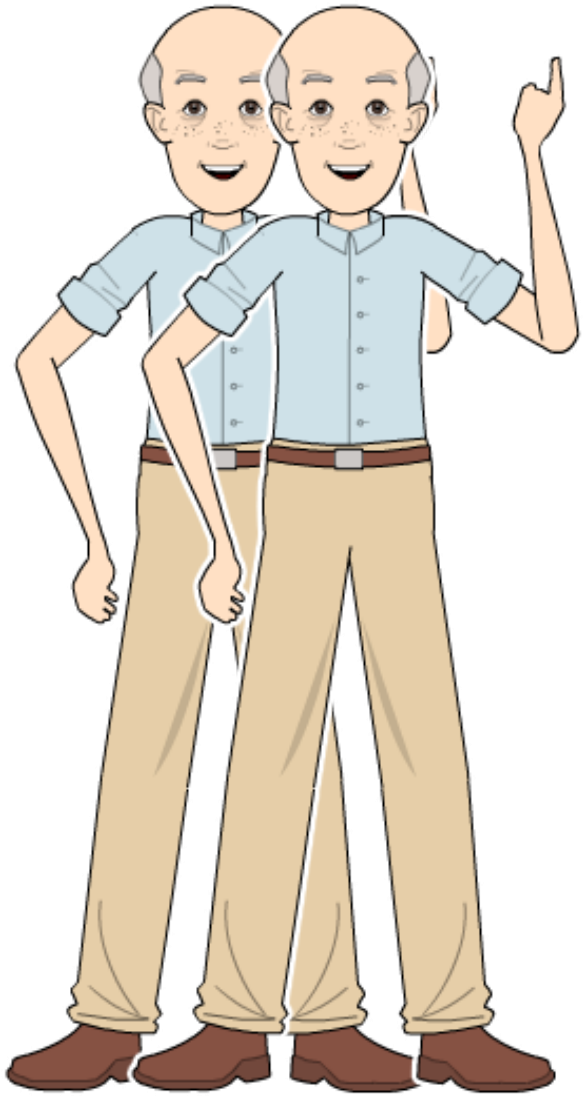


If Carlsberg did pensions ….

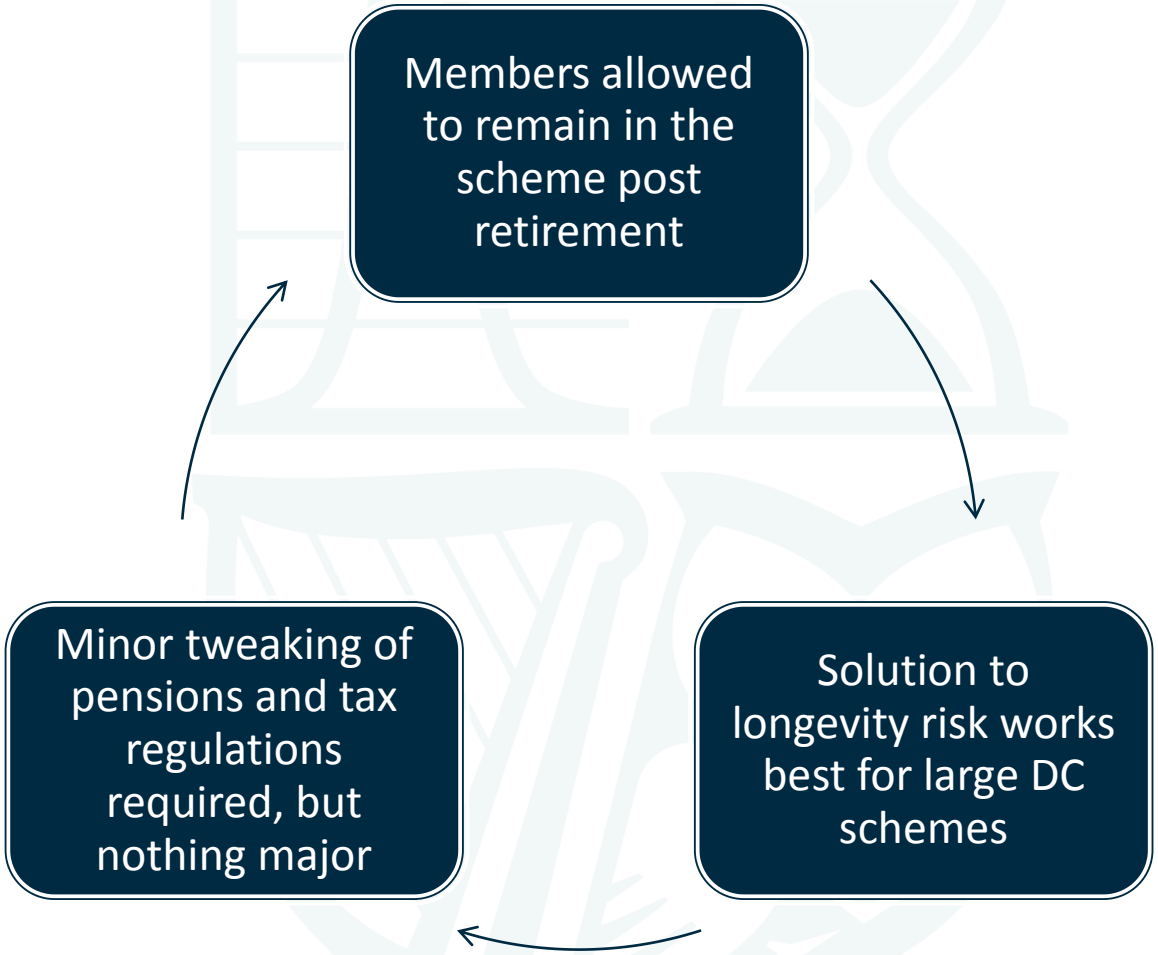


END RESULT

Potential total lifetime income more than double that delivered by a conventional life annuity



Prerequisites for proposed approach



Key challenges

Address the longevity risk

1.Maximise the expected net investment return, at an acceptable level of risk/volatility

Key challenges

1.Maximise the expected net investment return, at an acceptable level of risk/volatility

The Equity Risk Premium (ERP)

- **Federal Reserve Bank of New York, 2015: ERP between 5% and 6% per annum**
  - Derived from a combination of models, retrospective and prospective
  - Between 1960 and 2013, mean ERP of 9.3% per annum
- **Credit Suisse Global Investment Yearbook 2017**
  - Between 1900 and 2016, mean ERP (over Bills) of 4.3% per annum
  - Estimate is for global equities (in USD)
- **But ….. "Past returns are no guide to the future"**

ERP – a prospective assessment

- **KPMG Netherlands makes regular estimates of <u>prospective</u> ERP**
  - 5.5% per annum at end 2017
  - Measured against 30-year AAA-rated bonds; higher against cash or short-term bonds
- **"market-risk-premia.com": prospective ERP estimates at end 2017:**
  - China: 3.8% pa; US: 3.4% pa UK: 5.9% pa Japan: 6.5% pa Germany: 6.3% pa
- **Prospective ERP is lower when markets are elevated, and conversely**
  - Investment horizon for a 65-year old is 20 years +, so average market levels can be assumed

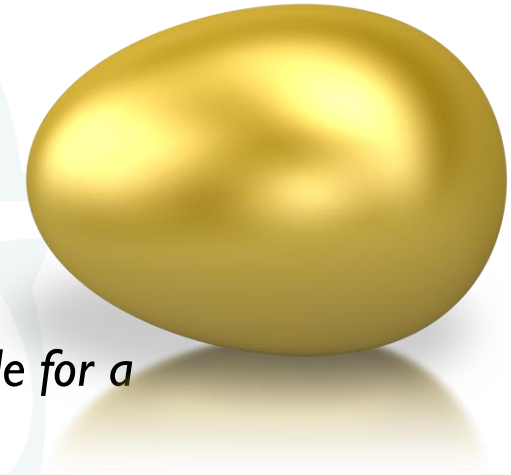
ERP – a prospective assessment (2)

- **Simplistic approach to estimating prospective ERP**
  - ERP = dividend yield + assumed long-term real growth rate
  - => ERP ≈ 3.25% + 2% = 5.25% per annum (real, over inflation)

  (Complicated by stock buybacks, share options, multinational operations, etc.)
- **ERP higher for private equity (PE)**
  - Studies generally show that returns on PE are 3% pa or more higher than on quoted equities
  - Proposed approach allows significant investment in private equity, infrastructure, real estate

Rich rewards for capturing the ERP

- **A healthy 65-year old can plan for a long retirement, so a good return on investments is vitally important**
- ERP 3% per annum => 41% increase in pension
- ERP 5% per annum => 73% increase in pension
- ERP 7% per annum => 108% increase in pension



Assumptions: Risk-free yield 2.5% per annum, pension payable for a fixed term of 25 years, increasing by 2% per annum

NB: Ignores extra returns from lower charges/commissions

But ERP rewards come at a high price in the form of higher risk

- **Since 1986, the FTSE All-Share Index has grown by 9.8% pa on average, but …**
  - It fell by 26.5% in one month (October 1987)
  - Down 21% in two days, 19th and 20th October 1987
  - It fell by 13.2% in Sep 08 and by 11.9% in Oct 08 => down 23.6% in two months
  - An even greater fall of 33.8% occurred in the two months October and November 1987

- **Market downturns can be prolonged**
  - Index remained below its August 2000 level for five years
  - Index stayed below its October 2007 level until February 2011, 40 months later
  - On seven occasions since 1987, the Index has remained below its previous high for more than 12 months.

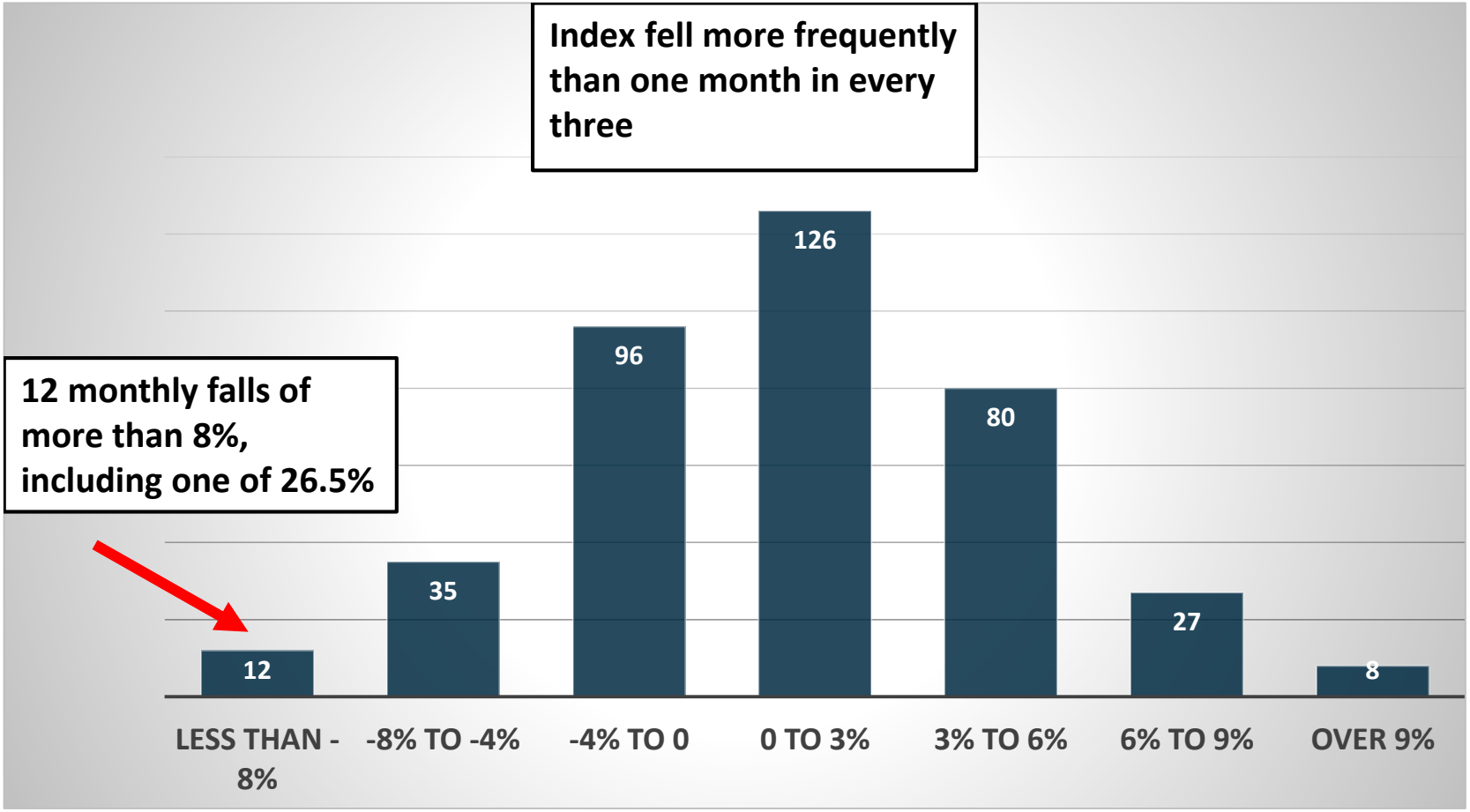
ERP rewards carry a high level of risk

- **Allowing for charges (say 1% per annum), the longest losing streak increases from 61 to 73 months**
  (Dec 1999 – January 2006)
- **Why risk the stock market if you can earn more in the Post Office ?**
  "It wouldn't be worth my while getting out of bed for less than 3% pa" (Linda Evangelista?)

  Would have been better off leaving money in the post office from December 1999 to October 2013 than investing it in the stock market (assuming 1% pa charge on investments, 3% pa interest in PO)

The Equity Risk Premium carries a heavy price tag in terms of extra risk. Is it worth it?

FTSE All-Share Index: 1986-2017



Loss aversion makes matters worse

People worry more about negative outcomes than celebrate positive results

Normal to give twice as much weight to losses as to gains

Share price falls can be unnerving, even for experienced investors

Hindsight bias militates against stocks

“ .. decision makers who expect to have their decisions scrutinised with hindsight are driven .. to extreme reluctance to take risks.” (Kahneman)

The solution to ERP conundrum?

Key principles of smoothing formula

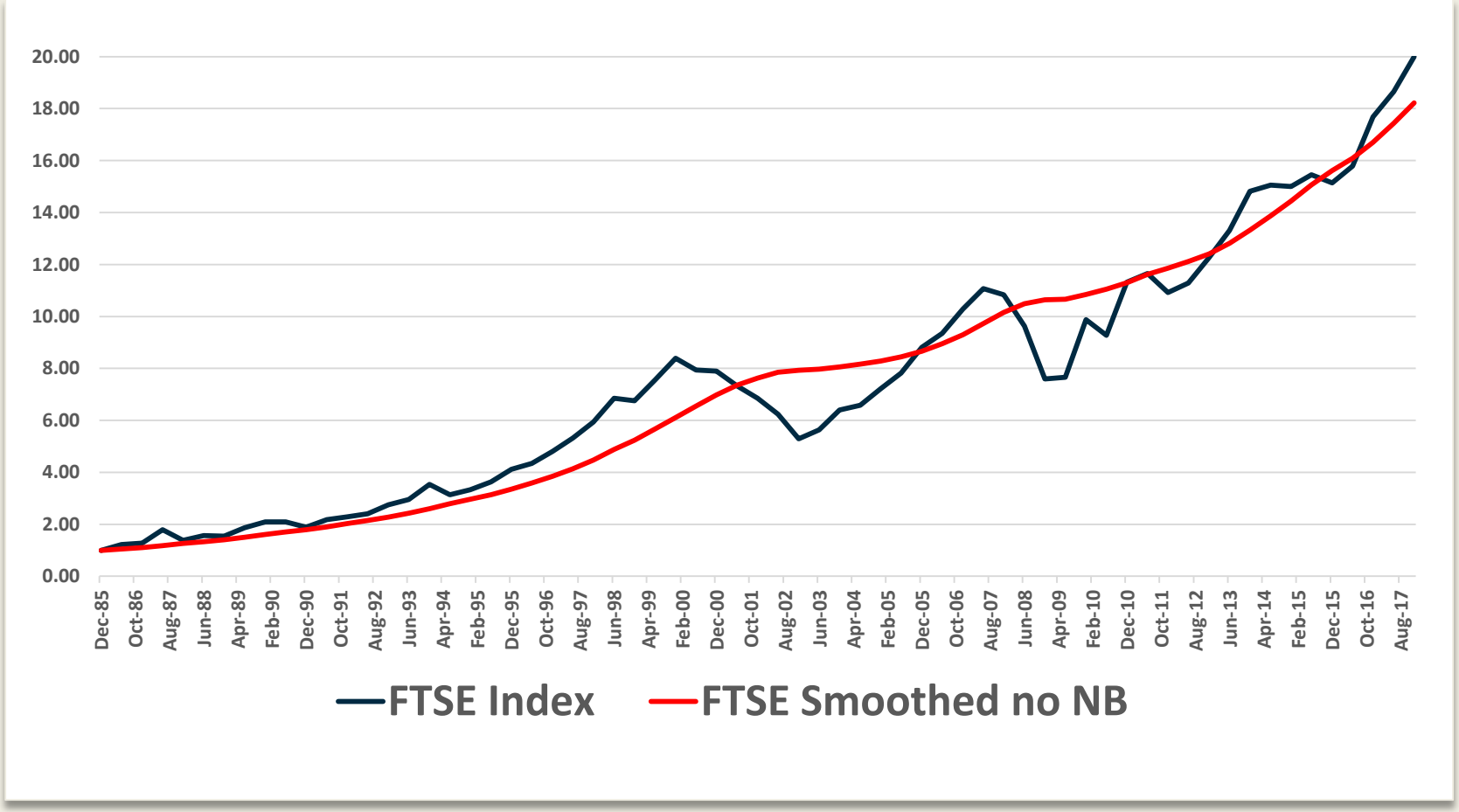
- Transparent, objective, easy to apply
- When applied to historic data, it should mitigate – ideally eliminate – negative price changes
- It should faithfully reflect long-term trends
- It should remain broadly unchanged over time
- Risks of adverse selection must be minimised

Proposed smoothing formula

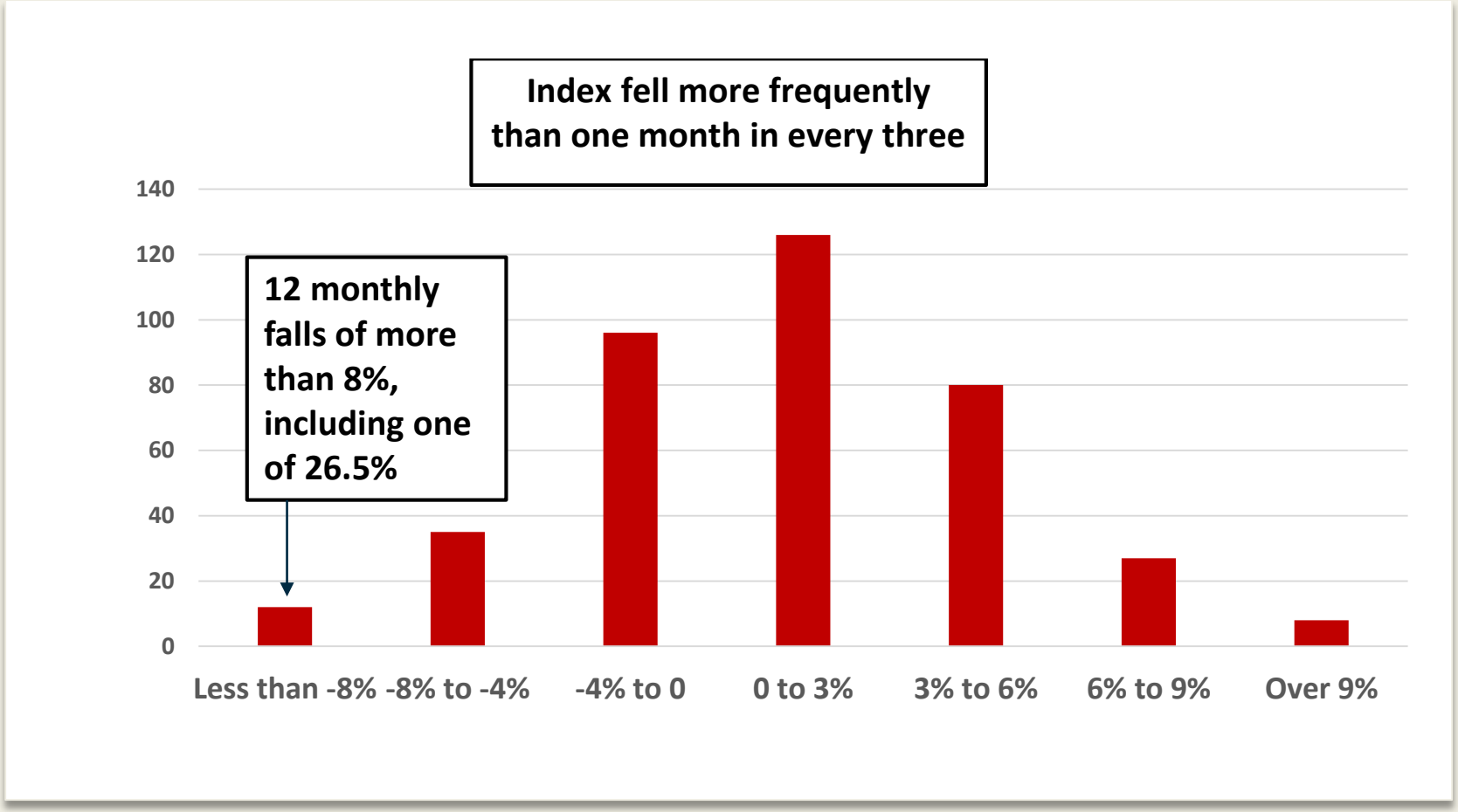
- **Assumes smoothed prices are calculated monthly**
- **Exponential smoothing:** formula to calculate smoothed value (SV) in any month gives:
  a) 1.5% weighting to current month's market value (MV)
  b) 98.5% weighting to last month's SV, increased by one month's "interest" at the assumed long-term rate, plus current month's cash flow
- **The "interest rate" in (b) above is in the range 4% to 10% pa.** Starts at the mid-point (7%) and moves towards the upper limit (10%) if MV>SV and towards the lower limit (4%) if MV<SV. Rate of movement is 2.5% of the difference between the prevailing rate and the limit point being approached
  - e.g. if the long-term rate in month t is 6% pa and MV>SV, then assumed long-term rate in month t+1 is 6% plus 2.5% of (10% - 6%) = 6.1%.

Formula applied to FTSE All Share 1986-2017

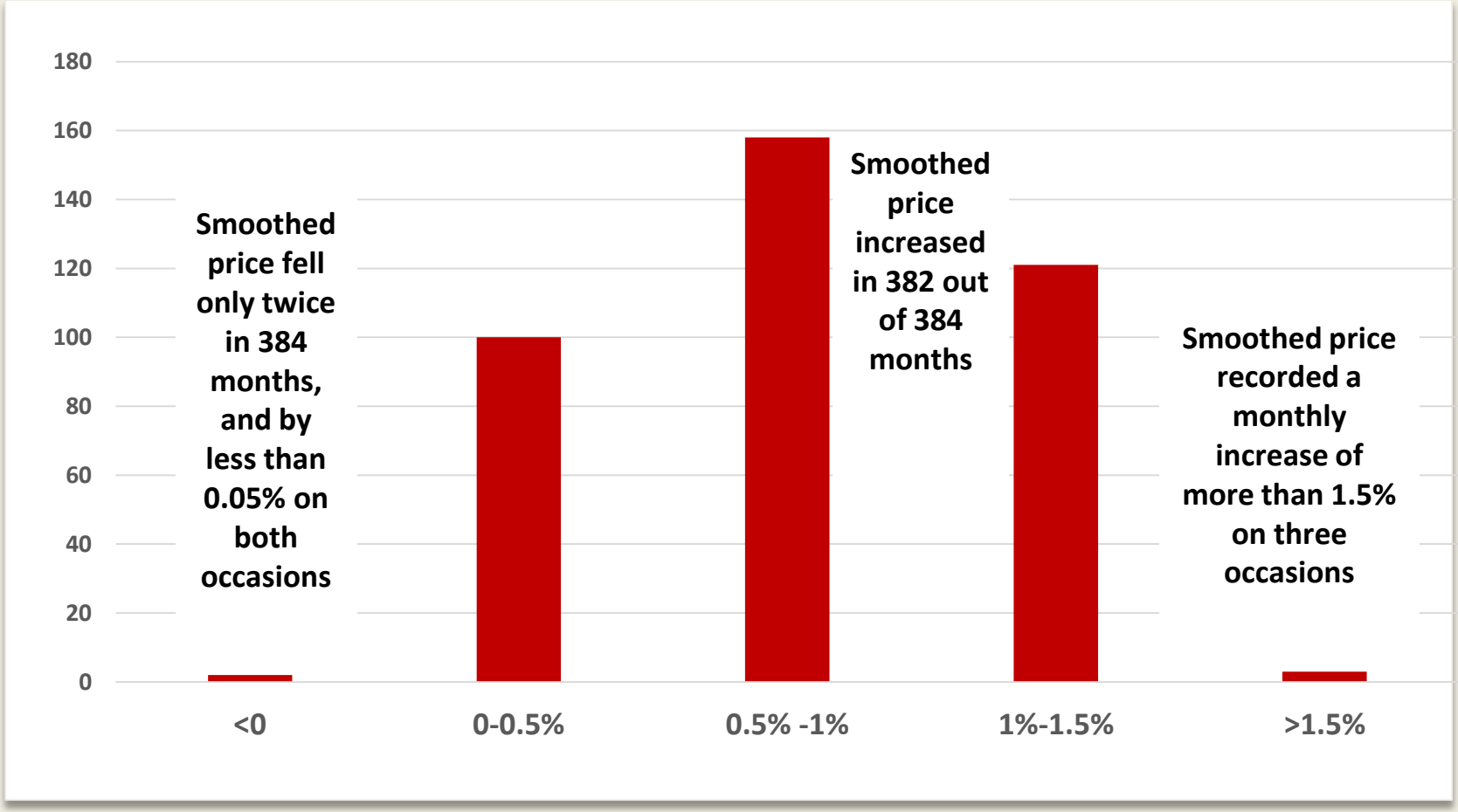
Gross dividends reinvested



Revisit monthly changes in FTSE All Share Index 1986- 2017

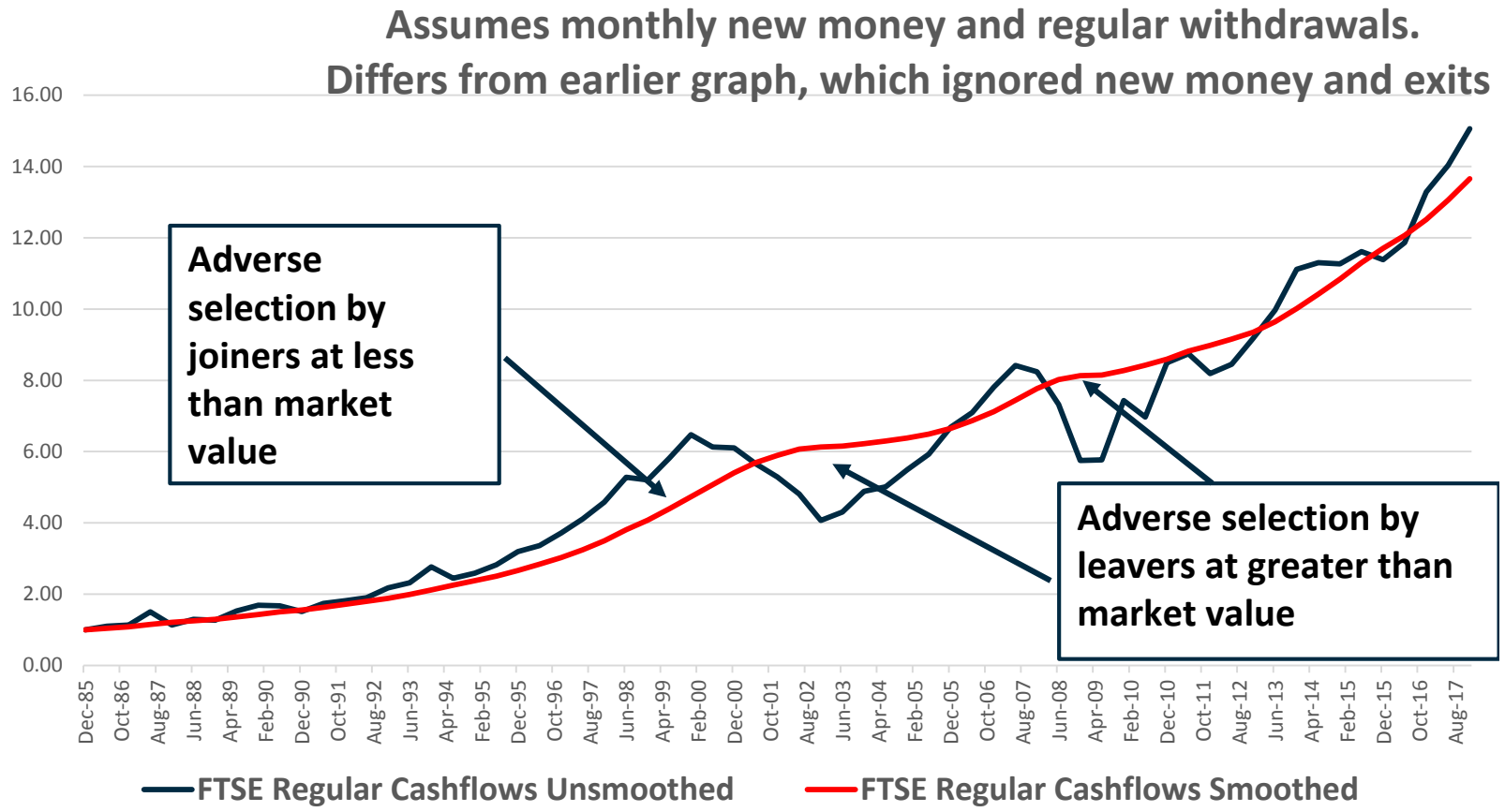


Monthly changes 1986 - 2017 (smoothed)



Smoothing: interim scorecard

Objective	
Transparent, objective, easy to apply	✓
When applied to historic data, it should mitigate – ideally eliminate – negative price changes	✓
It should faithfully reflect long-term trends	✓
It should remain broadly unchanged over time	✓
It should avoid the risk of adverse selection	✗



Risk of adverse selection

Adverse selection risk

If people can buy into the Fund when SV < MV

Someone joining in late 1990's could have bought in at less than 70% of MV

If they can sell out when SV > MV

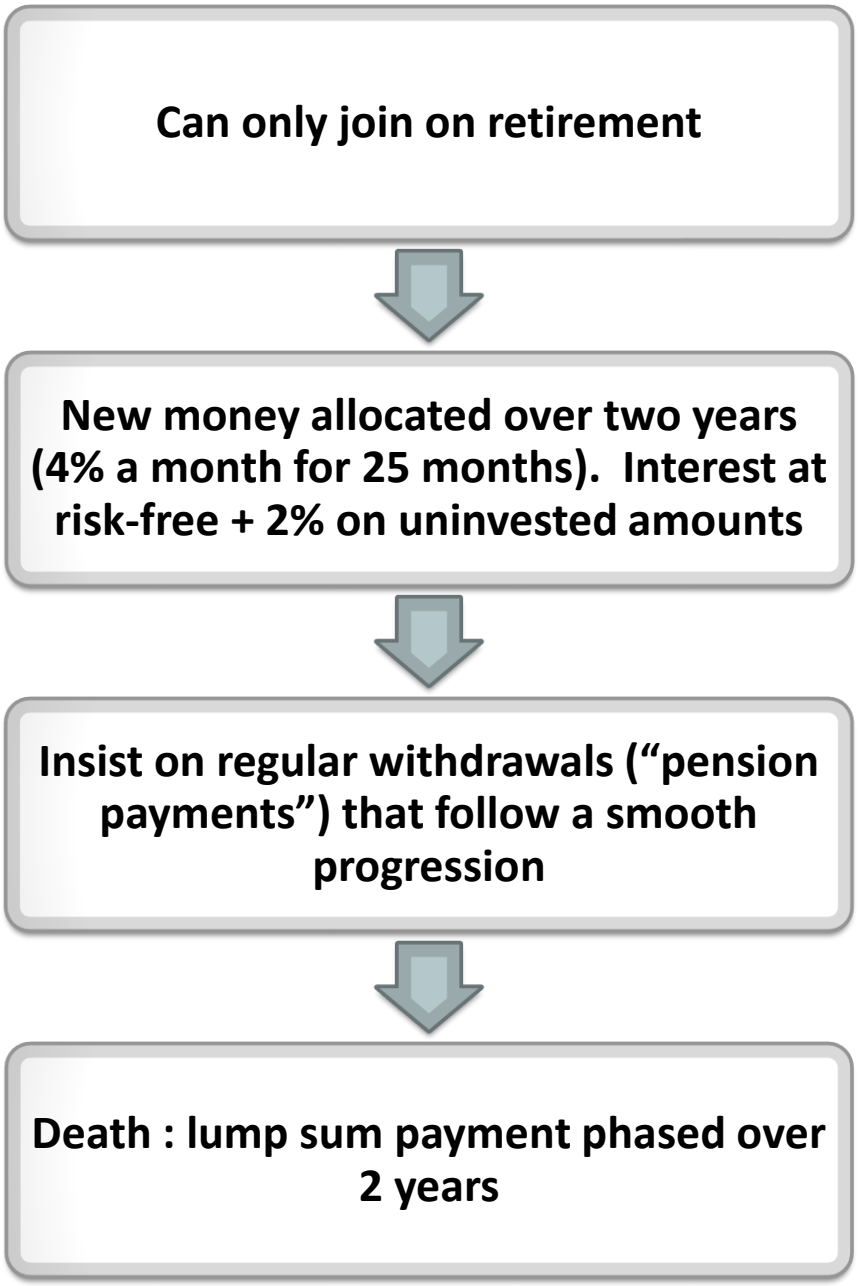
Selling in early 2000's or in 2008/09 could have netted 150% of MV or more

Mutual nature of fund means that continuing members lose out in both cases

Shrewd investors (or their shrewd advisers) could milk the fund

Essential to take steps to reduce the risk of adverse selection

Minimising the risk of adverse selection



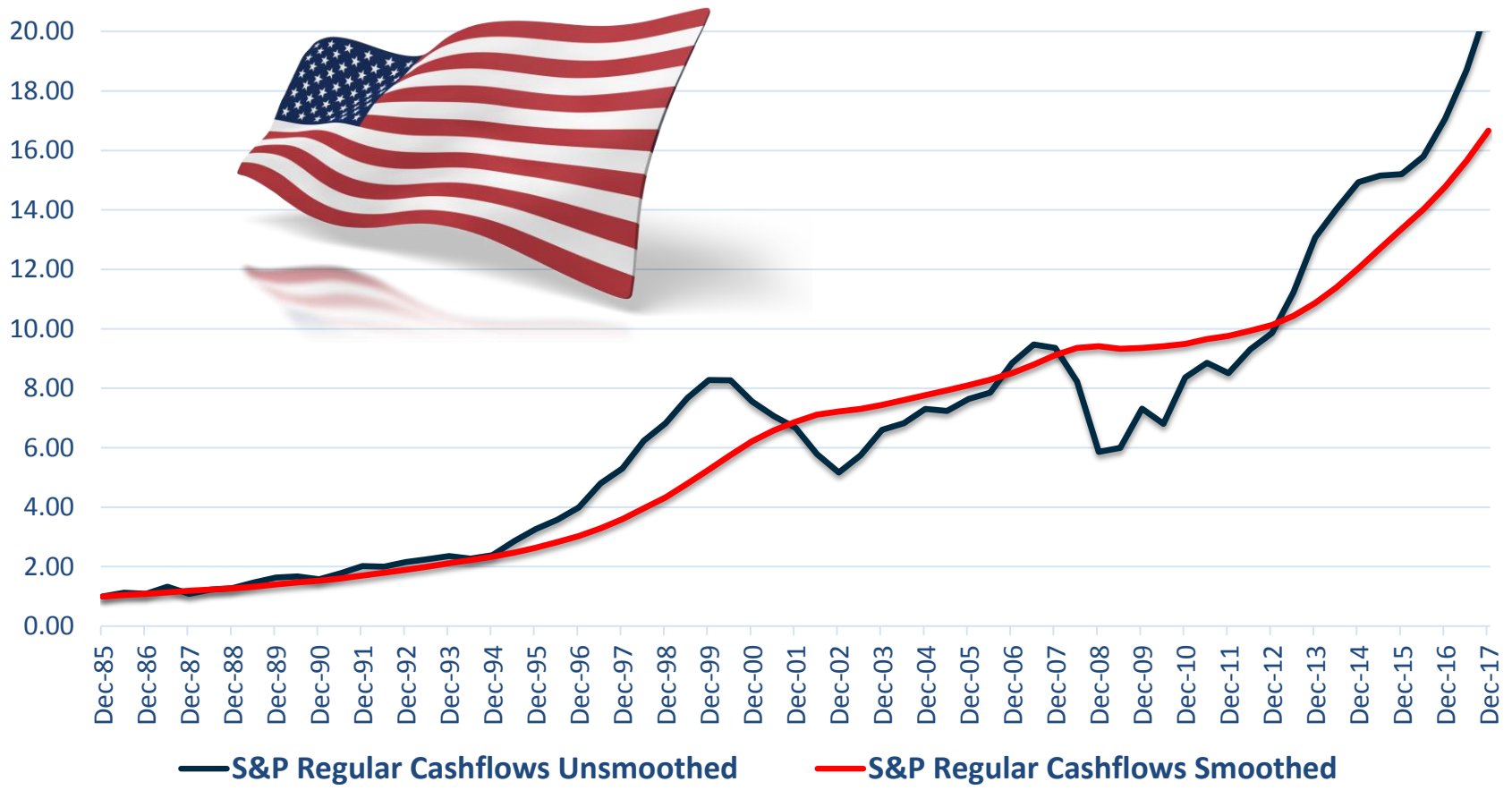
How much could adverse selection cost (1)?

- Assume “natural order” is steady monthly stream of new retirees, starting from 31 December 1985, with identical investments. Everyone takes an “income” of 5% pa (monthly)

- Smoothed price grows by 8.5% pa on average to end 2017
  - This is lower than the 9.5% average smoothed growth rate from Dec 1985 ignoring new money. Under model of constant new business, funds under management are lower in the early stages, when the average return on underlying assets is higher.

How much could adverse selection cost (2)?

- Now assume new investment falls by 50% in any month in which MV < 90% of SV
  - This is extremely cautious, in the light of the phasing rule for new money
  - "90% rule" results in new investment falling to 50% from 2002 to 2004 and through all 2009.
- Minimal impact: less than 3% leakage over 32 years
  - Average smoothed return over the period reduces by 0.1%, to 8.4% pa
- If new money dries up completely when MV < 90% of SV, average smoothed return over the period reduces by 0.2%, to 8.3% per annum



US: Similar to UK

Risk of adverse selection for US stocks?

- Assuming steady flow of new retirees , each taking an “income” of 5% pa, smoothed price grows by an average 9.2% pa between 1986 and 2017

- Similar results to UK if we assume adverse selection by potential new entrants
  - Smoothed unit price grows by an average of 9.0% pa (rather than 9.2%) over 32 years if no new business in any month in which MV < 90% of SV

Conclusion:
US exposure to adverse selection risk is also negligible; smoothed growth rate falls by only 0.2% pa over entire period if no new money when MV<90% of SV

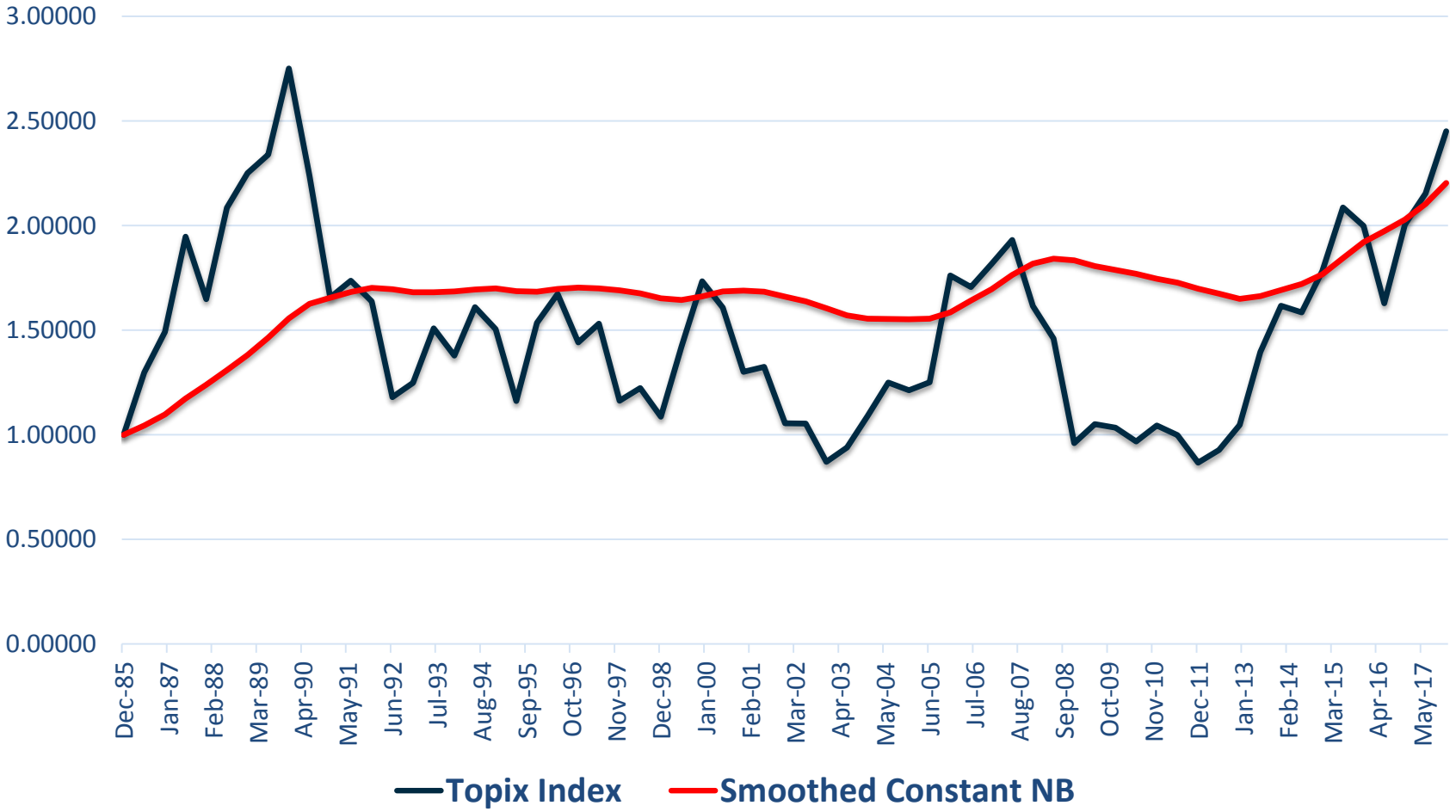
Looking good for smoothing formula …

- **Formula works brilliantly for the US and UK stock markets over last 32 years**
- **Mitigates stock market falls – almost eliminates them entirely**
- **On draconian assumption of no new money in any month in which MV < 90% of SV, yield reduction is equivalent to less than 0.2% per annum**
- **Approximate calculations indicate that the formula would work equally well for the last 118 years (UK), the last 92 years (US), i.e. for as long as we have data**
  - Don’t have monthly data for entire period, but favourable indications from yearly data

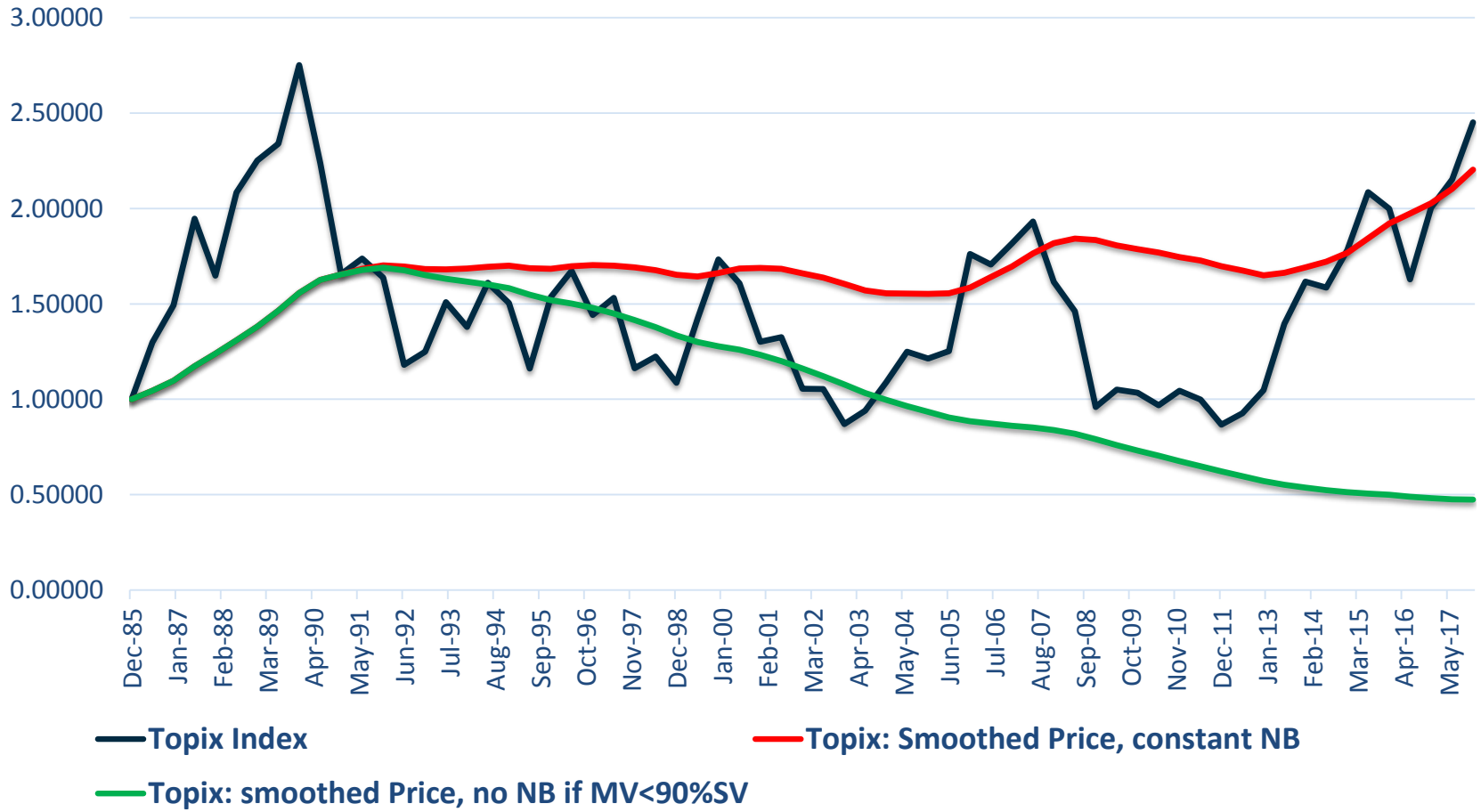
BUT …

Japan: Topix Index:

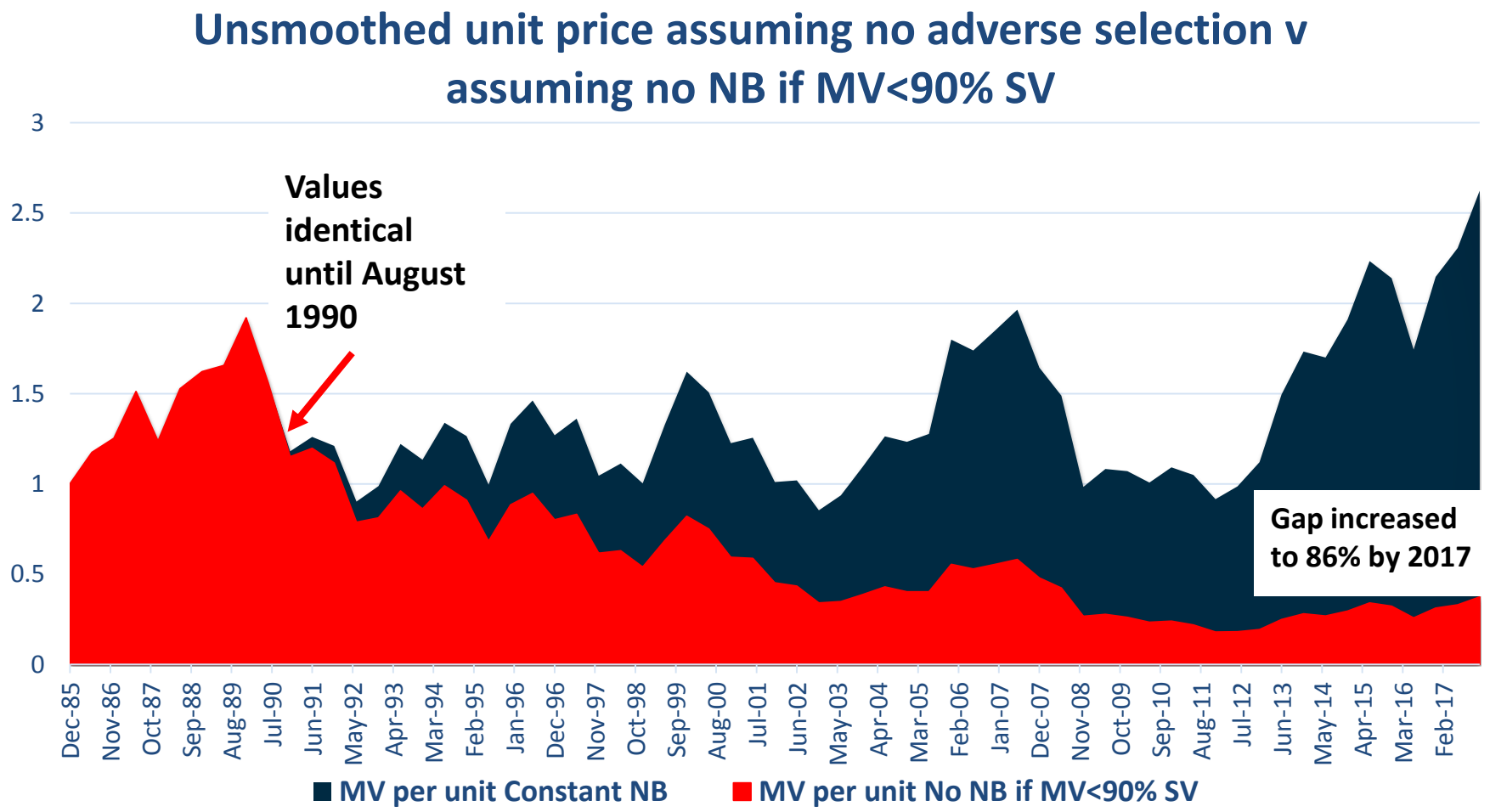
Actual v Smoothed assuming constant new business



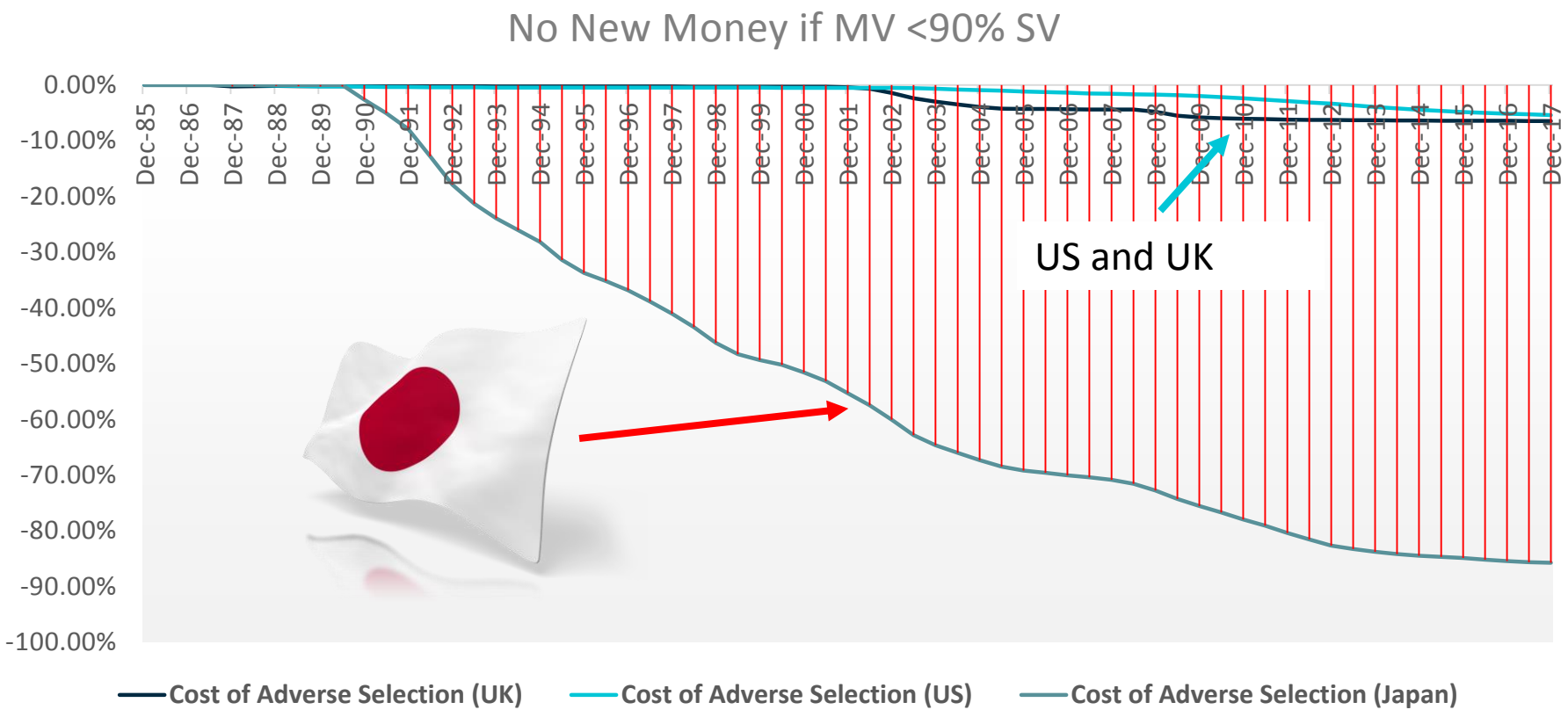
Japan: impact of adverse selection



Japan: adverse selection results in unsustainable burden for continuing members



Cumulative cost of adverse selection - contrast UK/ US experience with that of Japan



Japan : aberration or precedent?

1. **The bubble**
   - Japan in the 1980's: tulipmania on steroids –property **and** stocks
   - Imperial palace in Tokyo supposedly worth as much as the entire state of California
   - In 1990, total stock of property in Japan was four times the value of US property stock
   - Topix Index more than trebled between December 1984 and December 1989
   - Nippon Telephone and Telegraph floated in 1987 at a P/E of 250
   - At end 1991, despite the already steep falls in stock prices and a rising tide of bad loans, Tokyo's banks' shares traded at an average P/E of c60

Japan : aberration or precedent?

2. The bust and the long hangover

- Index fell by over 70% from its peak in December 1989 to its nadir in March 2003
- Hangover prolonged (for decades) by failure to deal with zombie banks and zombie corporates, which were kept on life support when it would have been far better to have let them die
- Long hangover caused more problems for smoothing than boom and bust

Could a smoothed DC fund suffer a Japan-like fate?

- **Japanese experience 1985-2010 was unique**
  - Nothing similar in the UK or US over entire period from 1900 (UK), 1926 (US) – including years spanning great crash of 1929
- **Fund will include property and other assets expected to earn real returns of 4% +**
  - Low correlation of property returns across geographies reduces risk still further
- **December 2017 paper, *"The Rate of Return on Everything, 1870 – 2015"* indicates that smoothed returns for a fund invested in equities and housing across 16 developed markets would have delivered stable returns over the entire 145-year period from 1870 to 2015**

Conclusion: risk of fund experiencing a Japan-like fate is extremely low and can be discounted

Context for investment strategy

- Rules against adverse selection mean that outflows are highly predictable. Inflows also steady
- No risk of sudden unanticipated cash outflows
- Accurate estimates of current market values not an important criterion
- Benefits paid gradually over 20/30 years, so a long-term focus is essential
- Smoothing allows escape from tyranny of short-term performance measurement, to focus on long-term performance


Proposed investment strategy … Every investment (without exception) should be expected to earn a minimum return of the risk-free rate plus 4% per annum


Don't touch bonds, actuary tells pensioners!

Proposed investment strategy

Every investment should be expected to earn a minimum of the risk-free rate plus 4% per annum

Up to 20% in unquoted investments, e.g. private equity, infrastructure, real estate

Investment managers can capture illiquidity premium , possibly 3% per annum

Manage risks

Avoid excessive exposure to specific industries, geographies, technologies, investment themes, economic outcomes

Personal preference for a small (<20) number of individual investments

Markets are better at setting prices for individual stocks than in aggregate. They are micro-efficient but macro-inefficient (Samuelson)

“It works in practice but will it work in theory?”

"It works in practice but will it work in theory?"

Proposed approach works for UK and US markets: over last 117 years (UK), last 90 years (US)**

Random walk aficionados will probably claim that it doesn't work in theory

But theorists ignore impact of politics on markets at the extreme – e.g. Bernanke put

Markets must follow a random walk in the short-term (no arbitrage opportunities)

- But mean reversion evident in the long-term (c30% reduction in variance over 8 years?)

** Lack of monthly data prior to 1985 means that this contention is unproven, but yearly data support it

Key challenges

Address the longevity risk

1.Maximise the expected net investment return, at an acceptable level of risk/volatility

Key challenges

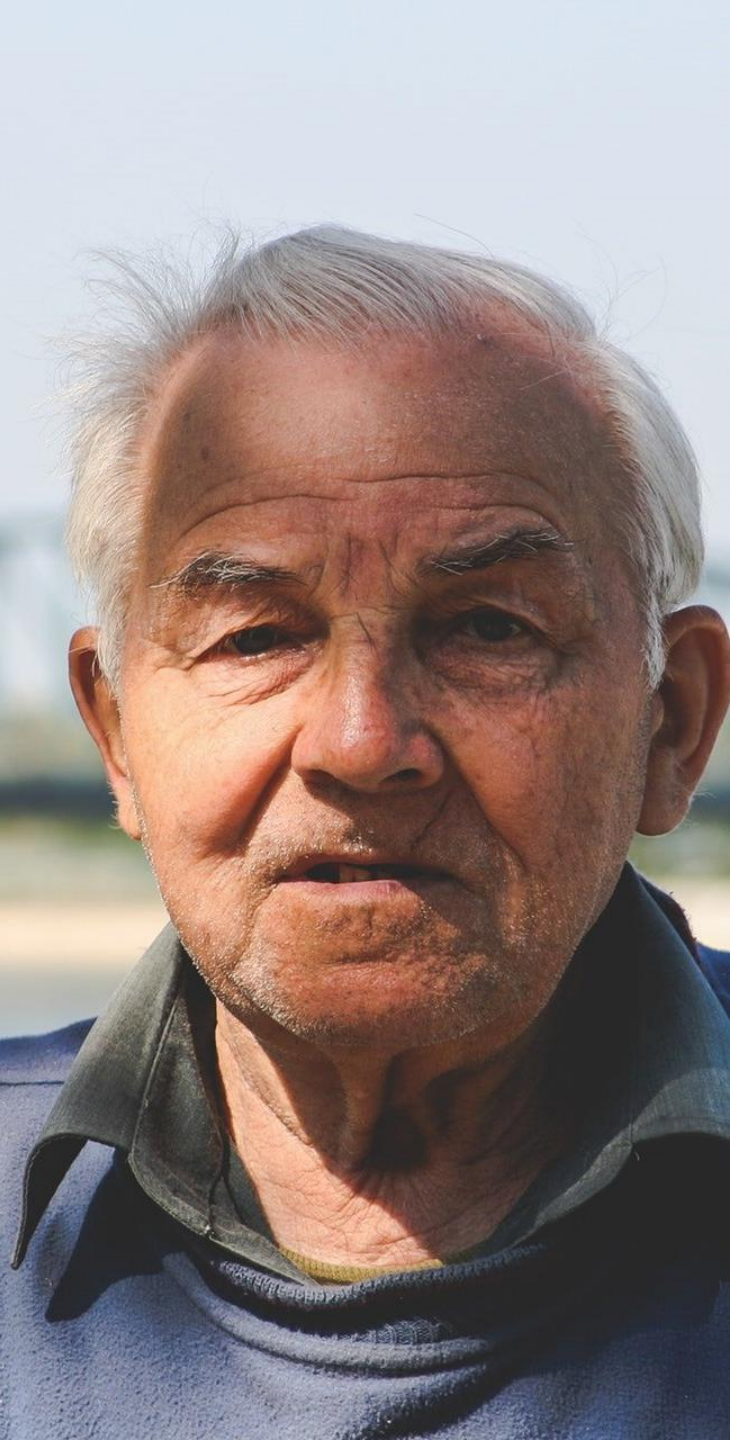
Address the longevity risk

Lifetime Income Fund (LIF)

- **Retirees may join LIF immediately on retirement - if they retire on or after normal retirement age (assume retire at 65)**
  - No compulsion to join. Withdrawal rules as outlined above for non-joiners.
  - Early retirees may join when they reach age 65. Prior to that, treated as non-joiners
- **Proposed LIF membership fee: 1% pa of reducing account balance**
  - Actual rate depends on profile of scheme membership (gender & occupation mix)
- **Members' contributions to LIF transferred to a separate pooled account, which the trustees invest in the same assets as the main smoothed fund**

Benefits of joining the LIF

- **LIF members may withdraw 4% of their original investment every year (plus accrued interest)**
  - i.e. account divided into 100 identical sub-accounts; one cashed each quarter for 100 quarters
- **LIF then takes over**
  - continues to pay 4% of original investment each year (plus accrued interest as before) for the rest of their life, unconditionally
- **On death before age 90, any unclaimed balance payable to dependents/ estate**
  - Example: member invests 100k at retirement, withdraws 4k (plus interest) in year 1, then dies at end of year 1: unclaimed balance of 96k (plus interest) is payable



LIF example

- **Assume average smoothed fund growth rate 5.5% per annum, before contribution to LIF**
  - Sample underlying rates: Risk-free 2.5%; ERP: 3.75%; Fees, charges: 0.75%
- **Contribution to LIF: 1% per annum => net investment return 4.5% per annum**
- **Withdrawals**: 1% per quarter (4% per annum) of original investment, plus accrued smoothed investment return
  - 1/100th of account balance withdrawn at end of Q1
  - 1/99th of remaining balance withdrawn at end of Q2, etc.

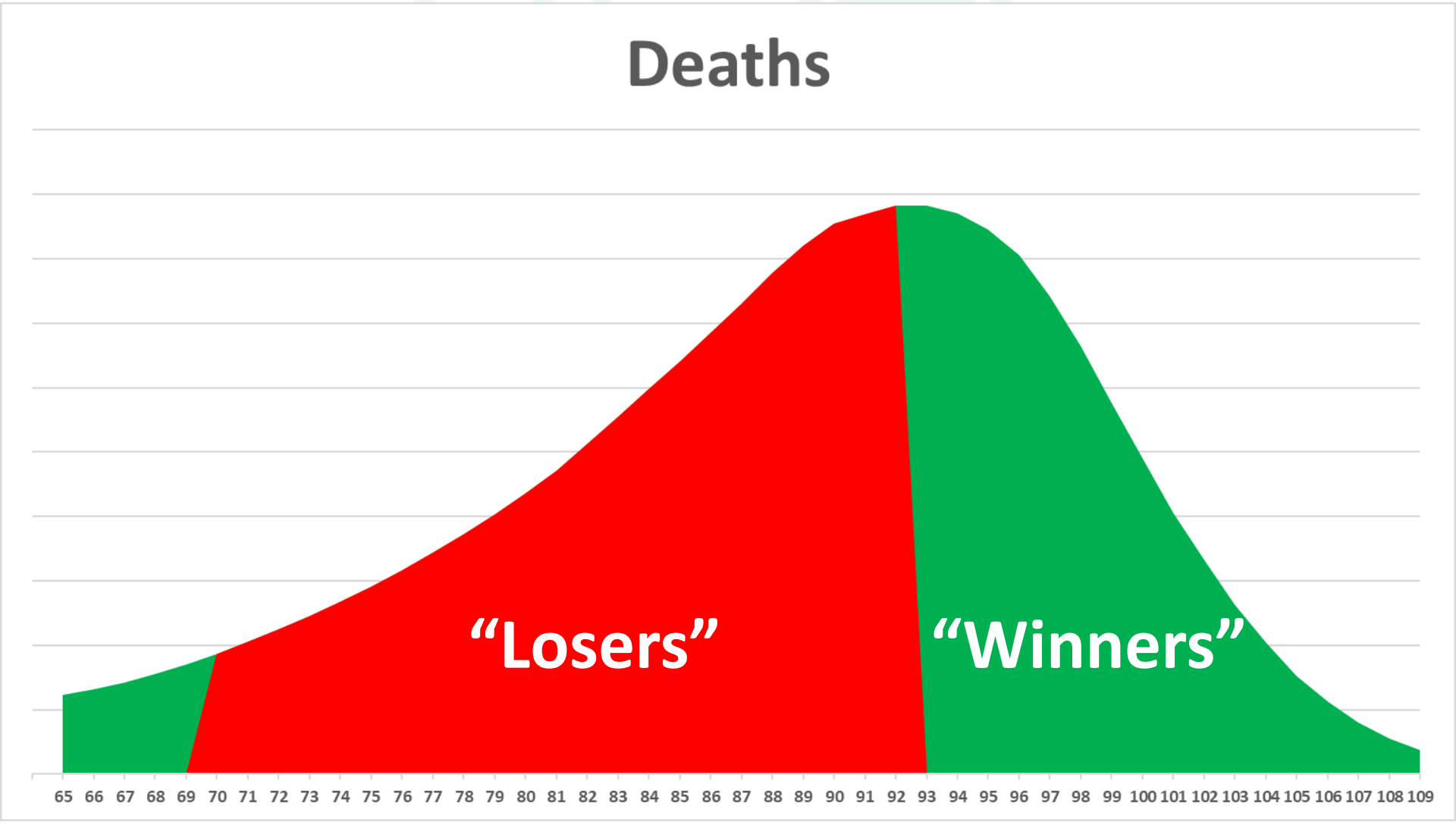
LIF Example

Year	Age (start)	Amount withdrawn (per €1,000 invested)	Account balance at year end	Payment from LIF
1	65	€41.14	€1,003.93	-
2	66	€43.02	€1,006.64	-
3	67	€44.99	€1,006.43	-
…..	….	…	…	-
23	87	€110.10	€223.91	-
24	88	€115.14	**€117.08**	-
25	89	**€120.41**	-	-
26	90	-	-	**€125.92**
27	91	-	-	**€131.68**

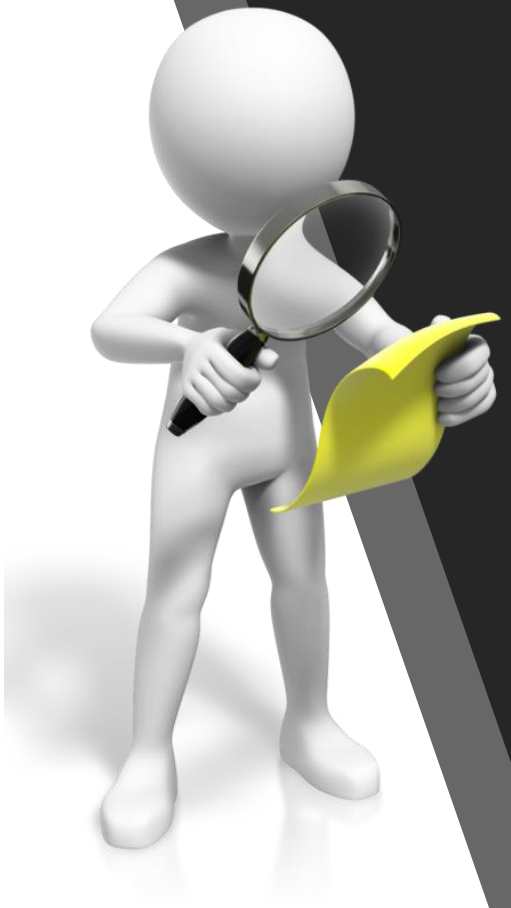
Year	Age (start)	No of Survivors (Start of year)	Payment per member from LIF (100 invested)	LIF at year end
1	65	10,000	-	10,256
2	66	9,939	-	21,035
….	….	….	-	….
25	89	5,506	**-**	**402,548**
26	90	5,096	**12.02**	**364,402**
….	….	….	….	….
35	99	1,387	17.87	111,436
36	100	1,098	18.67	98,867
37	101	853	19.51	89,255

LIF … the trustees' perspective

People tend to focus on extremes of probability distributions and ignore the middle



LIF … the small print



- **Members not obliged to take the full 4% each year; they can put some aside for the "rainy day"**
  - Any such savings will boost the finances of the LIF because 1% fee will be charged anyway
- **Can take more than 4% in a year, but subsequent entitlement will reduce**
- **Can opt out of LIF at any time, but will lose contributions paid to date**
- **Age for new members joining the LIF will increase with secular improvements in longevity**
  - e.g. entry age might increase to 66 in five years' time.

Annuity: Current market rate: €4,000 pa for life (€100,000 investment; male aged 65)		Drawdown with Longevity Protection			
No escalation, nothing on death after age 70	Lifetime income assuming death on 100th birthday: 35 * €4,000 = **€140,000**	Assume 5.5% pa return (2.5% risk free + 3.75% ERP – 0.75% fees) and 1% pa contribution to LIF	Income €4,101 in year 1, increasing by 4.57% per annum	Lifetime income assuming death on 100th birthday = **€340,000** (almost 2.5 times annuity amount)	Unclaimed balance paid on death before age 90 => €78,265 (dies at 80), €48,946 (dies at 85)

Where's the catch?

- **5.5% pa investment return may not be achieved**
  - But assumed ERP is lower than expert consensus
- **It's a pension, not a piggybank. Money cannot be withdrawn at will**
- **Restrictions on withdrawals (and on new money) are essential to minimise the risk of adverse selection**
- **Nevertheless, must include a provision to cover risk of Japan-like spiral when SV>MV**
  - e.g. change smoothing formula to give greater weight to current market values if selection cuts smoothed return by (say) 1% over a year

Capital implications?

- **Trustees not offering any guarantees, so arguably no capital implications**
  - Investment promise is simply to smooth actual returns across generations
  - Longevity benefit is funded by members' contributions. Rate can vary from assumed 1% pa on actuarial advice
- **Suggest that sponsoring employer injects seed capital at the outset as a once-off investment. This will have liquidity implications, but no capital implications, for the employer**
  - Seed capital will earn the same smoothed return as that credited to members
  - Seed capital repaid at the Trustees' discretion, dependent on inflows from members and progression of investments
- **Fund at its most vulnerable in the early years, so employer may promise that monthly smoothed return will not fall below zero for the first 3 years**

Possible cost of promising a minimum return, using history as a guide

- Assume that a sponsoring company introduced the new drawdown approach on 31 October 2007, at the top of the market (UK example chosen). Index fell 34% over next 12 months
- Assume "natural" inflows from new retirees of £100,000 per month, falling to £50,000 if MV< 90% of SV and members take "income" of 5% per annum (monthly)
  - Ignore complication of drip-feed investment of members' contributions
- Assume employer invests £500,000 at outset as seed capital, when the UK stock market is at its peak, i.e. employer suffers full impact of market fall on its seed capital investment
- Assume assets transferred from employer's account to members' account as required to support promise of a minimum smoothed return of zero each month. Assets transferred back to employer's account when monthly return >0

Results for October 07 start date

- Despite steep falls from October 2007 peak, **smoothed return is negative in only one month** (February 2009), and then only marginally
- **Employer's promise of a zero return in that month requires transfer of assets worth £37,000** from employer's to members' account
  - Total smoothed fund value at the time is £1.5 million
- Amount advanced plus interest (£38,000 in total) credited back to employer's account in March 2009, so **employer was out of pocket for only one month**

Next frontiers for proposed approach?

- Individuals and small groups?
- Accumulation phase?
- Auto enrolment scheme?

Individuals and small group schemes

- **Insurers are the natural first port of call**, given their experience of pooling longevity and investment risks
- But serious risk of **adverse selection** by self-employed and proprietors in deciding when to join and "retire"
  - Limitations on "retirement date" vital to minimise the risk
- **Distribution costs** of insurance-based products an extra complication
- **Insurance regulators** may impose capital requirements, which would further complicate matters

Conclusion: Concept could be extended to individuals and small groups through insurance based arrangements, but preferable to have proven the concept first in the mutual environment of a large employer-sponsored scheme

Why not extend it to pre-retirement?

- Smoothing of investment returns was conceived initially as a solution for the default investment option on DC schemes
- **Concluded that it wouldn't work pre-retirement because of adverse selection**, in the form of options for members (and company) to select against the fund:
  - Contribution levels, including AVC's, can be varied
  - New contributions and existing investments can be switched between funds at inopportune times
  - Range of options at retirement: cash, annuity, drawdown.
  - Option of transfer value or a deferred pension on leaving
- Nevertheless, it will seem illogical to encourage active service members to shift to less "risky" investments in the run-up to retirement, and then invest 100% in such assets post retirement

Suitable for auto enrolment?

- **Ideally suited to auto-enrolment scheme, pre- and post-retirement**
- **Large numbers and steady flow of new entrants ensure good pooling of risks**
- Rules can be set at the start to **minimise risk of adverse selection**
  - **Pre-retirement:** Contributions expressed as a % of earnings; percentage can be varied only once a year; smoothed fund is the only investment option, so no risk of members switching at an inopportune time
  - **At retirement:** No lump sum option. If required, lump sum can be funded by a separate arrangement
  - **Post retirement:** Must opt for LIF. Eliminates risk of outliving savings

Next steps …

- Confirm belief that a fund invested in real assets across different geographies and asset classes would have delivered stable smoothed returns over the last 145 years
- Confirm related conclusion of negligible risk of a Japan-type spiral
- Find a champion, ideally trustees and sponsoring employer of a large DC scheme, committed to achieving better outcomes for members

Can we do it? Yes we can!

Objective	
Lower costs	✓
Higher returns	✓
Lower volatility of returns	✓
A secure income for life – with inflation protection	✓
Unclaimed balance returned on death	✓

Society of Actuaries in Ireland

A New Approach to Drawdown on Group DC Pensions

Colm Fagan

7th February 2018