Auto Enrolled Pensions: Macro and Micro Perspectives

Colm Fagan *10 July 2021 v3*

This is an alternative articulation of a January 2021 paper[1] to the Society of Actuaries in Ireland, setting out a new approach to auto-enrolled pensions.

The macro perspective

1. The macro perspective on auto-enrolled (AE) pensions shows net cash flows (contributions less benefit outgo) growing strongly in the early years as new employers sign up and employee take-up rates increase. Cash flows plateau as older contributors retire and start withdrawing their savings as 'pensions', then start to fall. Eventually, outgo should exceed income on a consistent basis, on the reasonable assumption that contributors earn positive returns. A model for the progress of AE in Ireland sees net cash flows peaking around year 17 or 18, then falling gradually, going negative around year 50, although dividends on existing investments mean that it should be many years after that, if ever, before it proves necessary to sell investments.

2. The first chart in appendix 1 shows projected contribution income less claims outgo over the scheme's first 60 years. The second shows cumulative cash flows and cumulative funds, first ignoring investment return, then assuming an average investment return of 2% a year. Allowing for a 2% investment return, accumulated funds after 60 years are approximately €70 billion, or two-and-a-half times the corresponding amounts ignoring investment return (€28 billion). This shows the importance of investment return, particularly in the long-term.

3. Assets under management will continue to grow well past year 50, so from a macro perspective the trustees' instructions to investment managers should be along the lines of: ***"The investment horizon is fifty years or longer. Your objective is to earn a good return over that period. You will never be a forced seller, so there is no need to worry about marketability or market values in the intervening period. We will be disappointed to see you trading or churning."***

The micro perspective

4. At a micro level, the picture is very different. Looking at the UK precedent, NEST (National Employment Savings Trust), a pension scheme established by the UK government to facilitate AE, has 46 different retirement date funds, plus a number of specialist funds. Money is added to or withdrawn from individual funds on a daily or weekly basis and each of the funds must also be valued at the same frequency. That is just pre-retirement. The UK has not yet given serious consideration to what happens under auto-enrolment post-retirement.

5. The Irish government, in its 2018 'strawman' proposals, envisaged 'lifestyle' default investment strategies for individual contributors, similar to NEST's 46 retirement date funds. It envisaged funds being allocated between up to four providers, with employees choosing their own provider. The basis for competition between providers was unclear. A 'carousel' was proposed for employees not actively choosing a provider.

6. Under 'lifestyle' default investment strategies, funds are shifted from '*risky but hoped-for high retur*n' assets to '*less risky but certain lower-return'* assets as employees age. Contributors bear the cost of the shuffling and of valuing individual unit funds at every shuffle. Furthermore, the constant shuffling of monies from higher-risk to lower-risk assets means that the overall rate of investment return is considerably lower, on average, than if the investment strategy in the macro perspective were being followed. Expert consensus is that, over the long-term, so-called

[1] https://www.colmfagan.ie/documents/40_Document.pdf?d=January%2030%202021%2016:55:59.

'risky' assets such as equities should outperform 'safe' assets such as government bonds by around 4% a year on average. As noted above, a 2% pa reduction in the average net return (a not unreasonable estimate of the potential yield difference, considering the constant shuffling to lower-yielding assets and the associated costs under a 'lifestyle' approach) would result in total assets set aside for scheme members after 60 years being just 40% of what they would have been if a macro investment strategy had been followed. In other words, members collectively could be up to two-and-a-half times better off after 60 years under a macro investment strategy which dispensed with 'lifestyle investing'. Surely, that is a prize worth fighting for.

The dilemma and a solution

7. Why are funds moved from expected high-return to low-return assets as employees age? The reason is that, although equities are expected to outperform bonds by around 4% a year on average in the long-term, they can underperform significantly in the short-term. In the first three months of 2020, for instance, equities fell by around 25%.

8. The aim in moving to less risky assets as retirement approaches, and for then leaving members' funds in low-risk assets during their retirement, is to reduce exposure to market volatility when a loss would have a significant financial impact on member outcomes, and when there is less time to recover losses. The other side of the coin, however, is that investment return are reduced just when members' accounts have their highest earning potential: an extra 2% a year in the ten years before and the ten years after retirement results in a 45% higher pension, compared with a 17% uplift from earning the same 2% extra in the first twenty years.

9. Scheme flows are positive for the first 50 years, so the scheme as a whole has no need to sell investments for the first half-century of its existence, possibly for considerably longer when dividend income is allowed for. Despite this, a significant portion of the scheme's total assets languishes in low-risk, low-return investments for the entire period, with a consequent permanent drag on investment return. This enduring reduction in investment return, a brake on performance which increases over time in both percentage and actual terms as the average age of the membership increases, is a consequence of allocating societal-level assets to individual members by reference to market values, which can fluctuate wildly, and of reallocating investments between leavers and joiners and between older and younger members, also at market values, purely to address the non-existent risk of having to sell at inopportune times. In effect, investment return is being sacrificed on the altar of market values, despite the god of market values having no dominion over the scheme in those years. This makes no sense.

10. There is a better way. If instead, joiners and leavers agree that it is in both their interests to make the transfers from leavers to joiners, not at market values, but at values that equate to market values on average, while damping the extremes in both directions in a manner that is fair to both parties, then everyone will be happy. Incoming contributors will pay the same, on average, as if they were buying at market value, but at more predictable prices, while departing members will also receive market value, on average, but with considerably less volatility. Everyone gains in the long-term, but older members gain particularly, as the use of damped/ smoothed values means that they can hold on to expected high-return assets for longer.

11. In theory, new and existing contributors will be unhappy, if they are asked to overpay to buy into the scheme when smoothed values exceed market values – which is expected to happen around 50% of the time – but asset purchases (through regular contributions) are spread over many years, as are sales (through regular pension payments) so losses and gains balance one another out on average. Also, younger contributors will eventually age, and they will then enjoy the higher returns from remaining invested in growth assets for longer. There is the further

important consideration that loss aversion, the natural human preference to avoid losses than to acquire equivalent gains, affects all contributors, young and old, rich and poor. Smoothing reduces the incidence of losses, to everyone's benefit.

12. Simulations show that, even if funds are invested entirely in 'equities' throughout, smoothed values determined in accordance with the formula of appendix 2 fluctuate less than if they were invested in marked-to-market bonds. Charts 3 to 6 in appendix 1 show market indices and smoothed indices assuming cash flows as projected for auto-enrolment and market movements in accordance with either (a) the UK market between 1990 and 2019 or (b) the Japanese market over the same period. A picture is worth a thousand words. The benefits of smoothing are evident in both charts. The one simulating UK experience between 1990 and 2019 shows positive smoothed returns every month, without exception, over the entire 30-year period. There is no assurance that the next 30 years will be as stable as the last 30, but historic patterns are remarkably similar across different time periods and for different markets over the last century or longer and are unlikely to change drastically in future.

13. The lower volatility of smoothed returns means that scheme members can hold on to growth assets forever, including all through their retirement years. Continuing members will also appreciate the lower volatility of changes in the value of their pension pots. The net result is a doubling in overall value for money, more than doubling for younger joiners, less for older joiners.

No such thing as a free lunch

14. For the system to work, financially sophisticated members must be prevented from exploiting differences between market values and smoothed values to their advantage and to other members' disadvantage. The scheme's mutual nature means that one individual's or group's gain must be another's loss. This is achieved by setting strict rules for when and how much members can contribute or withdraw.

15. Rules on contributions are straightforward: only regular contributions, expressed as a fixed percentage of earnings, are allowed. Workers can cease contributions at any time, but that means forfeiting the employer's and the state's contribution, so it's a no-brainer to keep contributing, even if the smoothed value is significantly above market value. Rules will also be required to prevent members leaving temporarily, when smoothed value exceeds market value, then re-joining when the reverse is true.

16. The main rule on withdrawals is a complete prohibition on transfers out (and on transfers in). Funds must stay in the scheme until retirement or death (earning 'interest', of course). Other rules are an obligation to take a gratuity at retirement and to withdraw the remaining balance during retirement at a rate that remains reasonably stable from one period to the next. There is less flexibility than in a 'pure' DC pension, but more than in a DB pension, particularly in relation to flexibility during drawdown.

17. Scheme outgo in the form of pensions, gratuities and death benefits will eventually exceed contribution income. When that happens, new joiners (and existing contributors) will continue to pay smoothed value when 'buying' assets from members leaving, but any excess of exits over joiners will mean funds being withdrawn from the scheme[2]. Leavers will still receive smoothed values, but any amounts withdrawn from the scheme must be at market value, to ensure its continued stability. It follows that any excess of smoothed value over market value for net exits

[2] Note, however, that this will not imply a forced sale of assets. Dividends on existing investments mean that it could be many years later before assets need to be sold.

must come from a separate buffer account. Similarly, if market value exceeds smoothed value for net exits, the excess will be transferred to the buffer account. Therefore, a positive buffer account is essential from whenever benefit outgo exceeds contribution income, estimated to occur around year 50.

18. The buffer account will be funded from margins in the management charge over and above the costs of administration and investment management. The buffer account will start to be funded from around year 20. By that time, costs of administration and investment management are projected to have fallen to 0.3% of assets under management or less, compared to a management fee of 0.5% a year. The remaining 0.2% will be transferred to the buffer account and will be applied as above from year 50. The 0.3% cost estimate assumes admin costs considerably lower than in a NEST-type scheme, because there will be just one fund for all members, active and retired, current and future, and it will only be necessary to calculate smoothed returns ('interest rates') once a month (possibly even less frequently because of the stability of smoothed returns). Costs in the early years will be higher than 0.5% of AUM, but those excess costs will have been more than recouped (with interest) by year 20.

19. Simulations indicate that the 0.2% transferred to the buffer account from year 20 will be more than sufficient to meet any calls on it from when cash flows turn negative. As a failsafe measure, the trustees will be empowered to increase the management fee if projections at any time indicate that margins may prove insufficient at some future date. It is not envisaged that this failsafe measure will ever need to be activated.

20. The bottom line is that the proposed approach to AE will deliver the risk-free return plus the ERP (less the management fee) over the long-term, with volatility close to that of a deposit account. As noted above, simulations based on UK market performance over the last 30 years, assuming cash flows as projected for AE, show that smoothed returns would have been positive over the entire period. Simulations also indicate positive smoothed returns in each of the scheme's first four years (at least) for a 1 January start date in any year from 1986, assuming cash flows as projected and UK market performance.

The Six "S"'s

21. Any new approach to pension provision, whether it be for auto-enrolment or for a more conventionally structured DB or DC scheme, should be based on six "S"'s: it should offer ***simplicity*** and ***security*** for members; there should be equitable ***sharing*** of risks; ***sustainable*** investment which generates returns whilst achieving social goals, the ***system*** as a whole needs to be resilient, and assets should be wisely ***stewarded***. The proposed scheme ticks all six boxes.

22. It will be **simple** for members to understand. They will see it as a form of high-interest deposit account to which money is added during their working years and withdrawn in retirement (at retirement for the retirement gratuity) or on death. 'Interest', which can be positive or negative, is credited monthly. As noted above, smoothed returns will be positive in almost all periods if past experience is any guide to the future. Even simulations based on the disastrous Japanese experience in the 30 years 1990 to 2019 show ten-year smoothed returns never falling below +10%, despite the market falling more than 50% in the first three years and ending the 30-year period 12% below its starting level. These results can be seen in the charts of appendix 1.

23. The scheme's financial ***security*** is assured through the strict rules on contributions and withdrawals, the buffer account, and the facility for trustees to increase charges in extremis when cash flows eventually turn negative (after year 50). Older members can also enjoy the security of longevity protection. On reaching 75, members may opt to convert some or all of

their account into 15 identical sub-accounts. In exchange for a reduced 'interest rate' they can withdraw one sub-account each year for the rest of their lives, without sacrificing any of their capital: on death before 90, any unclaimed subaccount balances are paid to the member's estate/ dependants; on survival beyond age 90, continuing sub-account payments are funded from the 'interest' deductions between ages 75 and 90.

24. Members join and leave at smoothed values, which equate to market values on average. This ensures equitable **sharing** of risks. Retirees are neither penalised nor rewarded for being unlucky or lucky in the timing of their departure (noting that 'departure' occurs over the entire period from retirement to death, not just at retirement date). The proposed rules preventing unscheduled contributions and unscheduled withdrawals should ensure the integrity of the system and the equitable sharing of benefits and risks between young and old, active and retired, early and late joiners.

25. The aims of **sustainable** investment and wise **stewardship** of assets are achieved through the trustees' instructions to investment managers, as above, to have a 50-year investment horizon, not to be overly concerned about short-term market fluctuations, and to avoid over-trading or churning. The trustees also require a robust governance system.

26. Short-termism is probably the biggest obstacle to responsible investing. All unitised/ unit-linked investment options, by emphasising the importance of market values, suffer from this malaise. The proposed approach encourages long-term investment. Current market value gets a low weighting in the smoothing formula (a weighting of just 1% is proposed for current month's market value). Furthermore, the combination of the low weighting for current market value, the prohibition on unscheduled withdrawals and the likelihood that there will be no need to dispose of assets until well after year 50 mean that there can be high allocations to illiquid, unquoted investments. Up to 30% in such investments is suggested as a possibility in the paper.

27. The paper referenced above tested the financial resilience of the proposed approach using Monte Carlo simulations. It passed the tests with flying colours, on the key assumption that scheme cash flows are largely independent of market conditions. That is assured if the proposed scheme does not face competition from market-based alternatives, which is the most likely outcome, given that other putative providers seem unable to meet the 0.5% charge limit. Even if it does face competition, considerations based on behavioural finance indicate that contributors will stay the course through good times and bad. Social solidarity – the '*meitheal*' effect noted in paragraph 1.5 of the paper - should also help ensure the resilience of the **system** as a whole; however, this aspect needs to be investigated thoroughly.

Appendix 1

AE cash flow projections (contribution income less benefit outgo) are shown below. The graph crosses the x-axis at year 49 and stops at year 60:

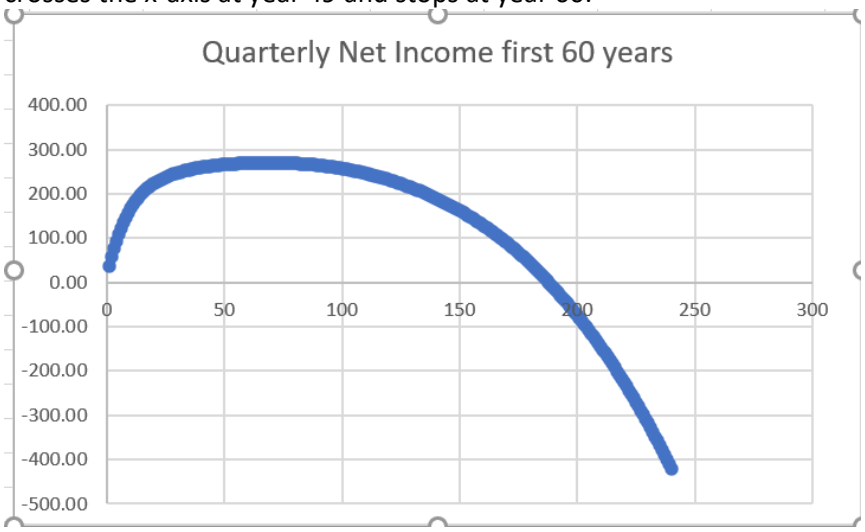

Chart 1

Projected cumulative cash flows over the first 60 years, assuming investment returns of 0% or 2% a year, are shown below. The cumulative fund value after 60 years assuming a 2% annual return is two-and-a-half times the value assuming a zero return.

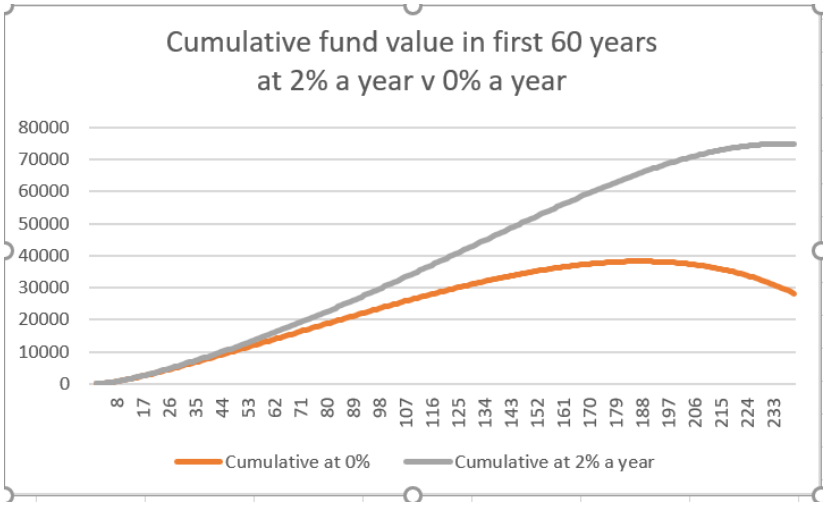

Chart 2

The graph of the FTSE All-Share Index between 1 January 1960 and 31 December 2019 is as follows:

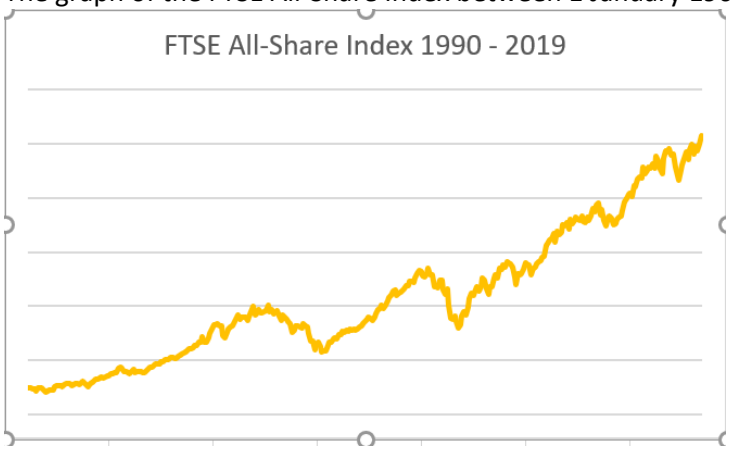

Chart 3

The graphs of the FTSE All-Share smoothed index and market index (adjusted for cash flows) over the same period are shown below. The slope of the smoothed index is positive throughout.

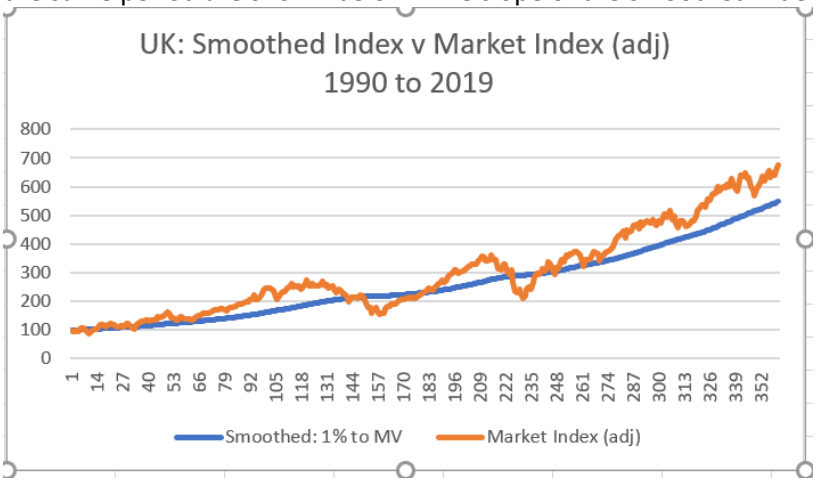

Chart 4

The Japanese TOPIX Index 1990 to 2019 is shown below. The index fell 55% in the first three years and was still 18% below its starting level after 30 years.

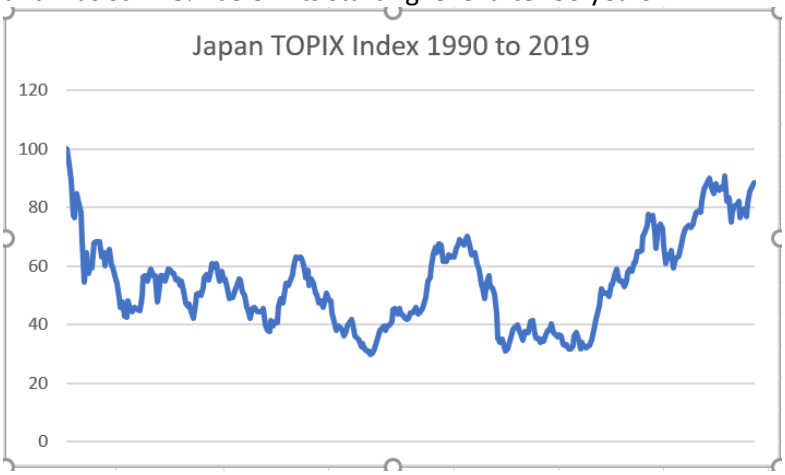

Chart 5

The Japanese smoothed index and market index (adjusted for cash flows) are shown below. The fall in the market index adjusted for cash flows is not nearly as precipitous as the fall without allowing for cash flows. This is because new cash flows are being invested on better terms in a falling market.

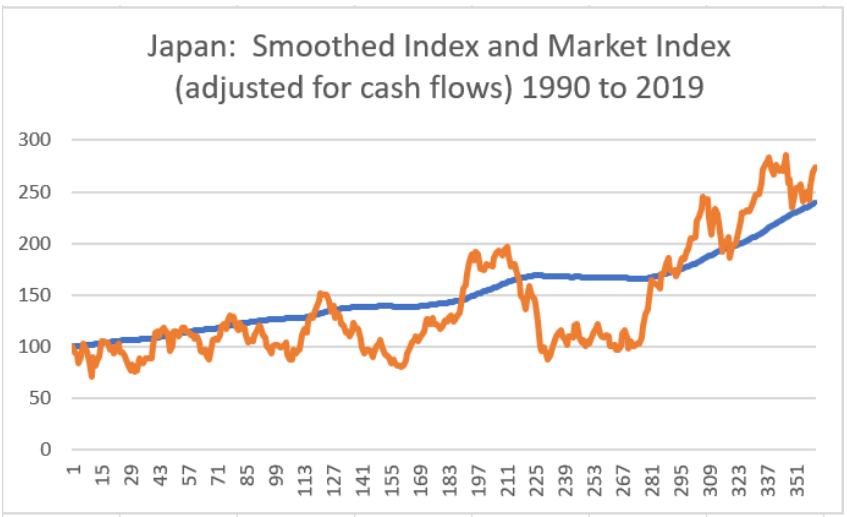

Chart 6

Appendix 2
Smoothing formula

The smoothed fund value at time t (where t is in months) is the sum of three components
(1) cash flow in month t
(2) weighting of **p** for current market value (excluding current month's cash flow)
(3) weighting of **(1-p)** for last month's smoothed value increased by one month's return at the assumed long-term rate.
Algebraically, the formula is as follows:

(1) < --------(2)-------- > < ----------(3)---------- >

- $\mathbf{SV_t = CF_t + p * (MV_t - CF_t) + (1-p) * SV_{t-1} * (1+i_{t-1})}$,

where:

- $\mathbf{SV_t}$ is smoothed fund value at time t, including current month's cash flow.
- $\mathbf{CF_t}$ is cash flow at time t (monthly cash flows assumed)
- **p** is the weighting for current market value in the smoothing formula (a 1% weighting for current market value is assumed in this paper; a 1.5% weighting was assumed in the paper presented to the Society of Actuaries in Ireland in January 2021, but Section 9 of that paper concluded that a 1% weighting was more appropriate).
- $\mathbf{MV_t}$ is the fund market value at time t (including the cash flow at time t, which explains why CF_t is deducted before applying the 'p' weighing in the above formula, to avoid double-counting)
- $\mathbf{i_t}$ is the assumed long-term rate of return at time t, including an assumed ERP. The example below assumes a constant 4% per annum, including ERP.

Example:
Calculation of smoothed returns in first 6 months of 2020, assuming cash flows and market returns (net of management charges) as per the table. Assumes a 1% weighting for current market value (i.e., p = .01) and assumed long-term return (including ERP) of 0.33% a month (4% a year).

Month	**Jan 20**	**Feb 20**	**Mar 20**	**Apr 20**	**May 20**	**Jun 20**
(a).Net investment in month (CF_t):	10	20	30	40	50	60
Market return in month	**-3.3%**	**-8.9%**	**-15.1%**	**+4.9%**	**+3.4%**	**+1.5%**
Market value at month end (MV_{t+1} - CF_{t+1}):	9.67	27.04	48.44	92.79	147.68	210.87
(b) p *(MV_t -CF_t)	0	.0967	.2704	.4844	.9279	1.477
(c) (1-p) * SV_{t-1} * (1+i_{t-1}) (i_t = 0.33%)	0	9.9327	29.828	59.693	99.505	149.42
(d) SV_t = (a) + (b) + (c)	10	30.029	60.098	100.18	150.43	210.90
Smoothed return in month: = (SV_{t+1} – CF_{t+1})/ SV_t - 1	**0.29%**	**0.23%**	**0.13%**	**0.25%**	**0.31%**	**0.33%**

The table shows monthly market returns ranging from a low of -15.1% (March 2020) to a high of +4.9% (April 2020). The range from lowest to highest is 20%. The corresponding smoothed returns range from a low of +0.13% (March 2020) to a high of +0.33% (June 2020). The range from lowest to highest is 0.20%, one-hundredth of the range for unsmoothed returns.

The same formula was used to calculate the smoothed values shown in the graphs of appendix 1.

Appendix 3
Five Key Differences from With-Profits

1. **No discretion on investment strategy – 100% invested in 'growth' assets at all times.**
    a. Avoids conflicts of interest in trying to look after interests of different groups.
    b. Also avoids shifting to bonds, often at the wrong time, for solvency purposes.

2. **No need to hold back returns to create an 'estate'/ 'buffer account.'**
    a. Assurance that incoming contributors will buy departing members' assets at smoothed value eliminates need for estate while net income (contributions less claims) is positive (i.e. for first 50 years)
    b. Estate only needed when cash flows (contributions less claims) turn negative.
    c. Start setting funds aside for buffer account from year 20, potentially start calling on it from year 50.

3. **No discretion on bonus rates ('interest declarations').**
    a. 'Interest rate' determined entirely by smoothing formula.
    b. Wary of ceding control but cannot envisage formula not delivering (caveat that impact of variable long bond yields hasn't been considered). Nevertheless, should insert a review period, subject to condition that adverse impact minimised.

4. **No guarantees.**
    a. However, simulations show low risk of negative smoothed returns. Risk of a negative smoothed return is practically zero in the scheme's early years.

5. **Only regular contributions, no lump sums (which caused problems for traditional life companies).**
    a. Restrictions in other areas, such as amounts of contributions, no transfer values, claim only on/in retirement or death.