

LCP on point 

When QE broke the 4% rule

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01 Executive Summary

The thorny problem of investing and drawing on your assets in retirement in a world of zero interest rates

In this piece we –

- Show the results of our modelling of the sustainability of retirement portfolios
- Share new insights on asset allocation for retirement (decumulation) portfolios
- Explain why we think spending rules and retirement model portfolios need updating

It has been called “the nastiest, hardest problem in finance”¹, and that was before interest rates fell close to zero.

Key new insights:

- The game has changed. Setting a spending level and indexing that withdrawal to inflation is a tougher investment challenge than ever in a world of zero (or negative) real interest rates.
- This has changed significantly in the last decade, so a lot of standard thinking needs updating.
- A common benchmark for withdrawal strategies: the “4% rule” can no longer be assumed to work reliably in today’s environment.
- Individual advice is never more important than when drawing on a portfolio in retirement, but the costs of acquiring it can impact significantly on outcomes.
- We are in a world of zero interest rates where investors need to take quite a lot of risk just to pay fees and keep up with inflation.
- Value for money and fees at all stages of the investment chain need to be re-assessed (managers, platforms, trading expenses etc).
- The effect of lower interest rates mean that common retirement spending rules are 3x more likely to lead to failure. Spending would need to be slashed by a quarter on average to get back to the sustainability levels seen a decade or more ago.
- From an asset allocation perspective we find that the cautionary approaches adopted by many for their asset allocation in retirement could be working against them and could be more likely to lead to years of lost income than more growth-focused allocations.
- Classic drawdown portfolios heavily weighted toward bonds may no-longer be best.
- The well-known “4% rule” for spending is more than 20 years old, and comes from a different world, but many of those drawing on retirement pots in the UK are doing so at level of 4% or more (around 6 out of 10).
- The best example of this is gilts, once a staple of retirement portfolios. Current gilts have a real yield (relative to inflation) of -2% p.a. Add to this typical private wealth / IFA fees of c2% this creates an annual 4% loss relative to inflation. This means that over a typical 23-year retirement an investment in gilts would be expected to lose 60% of its real value after inflation and fees.
- Other spending rules are available, such as varying spending in line with performance of portfolio but these can often be hard to implement, as reducing spending, or even not increasing with inflation is easier said than done. Linking spending increases to inflation immediately points to the need for quite high allocations to growth assets.

¹ Bill Sharpe <https://www.barrons.com/articles/william-sharpe-how-to-secure-lasting-retirement-income-51573837934>

- **Fees** can matter more than asset allocation
- A lot of time and effort gets spent deciding on the best asset allocation in drawdown, balancing risk and return. But we find that almost any allocation at low fees fares better than the best allocation with a higher fee
- Low-risk propositions when coupled with standard fees are particularly problematic, and almost never look like optimal solutions from the customer's perspective
- Allowing for the variability in lifespan points to high return-seeking allocations than assuming a static lifespan
 - The average retirement at age 65 is around 23 years, but there is a 10% chance this could be more than 30 years. This greatly increases the risk of running out of money
- Could expenses consume a disproportionate amount of your retirement? This could be the case if you are too cautious with both your investment strategy and your withdrawal rate
- Our results turn standard thinking on their head and point to a high chance of bad outcomes associated with cautious approaches to investment and spending. Traditional "low risk" investment strategies consisting mainly of bonds potentially being the most dangerous and least sustainable – when coupled with average fees, the potential for 30 year retirements and the need to link withdrawals to inflation. Beware the risk of reckless prudence.

Conclusions for individuals

- Quantitative Easing (QE) and low interest rates have changed the game for investing in retirement in the last decade, and have made this job much harder. A spending rate that was sustainable for a retiree 10 years ago can no longer be considered sustainable. Rules need updating.
- Take advice, as each individual situation is different and it is crucial to take all aspects into account.
- Fees matter, you should know how much you are paying in total in expenses (across fund managers, platform and adviser). Ensure you are getting the best value-for-money in all 3 areas of expenses you are paying.
- Like it or not, the signals are we may be in a low-rate environment for a long time. Check – does your investing and withdrawing strategy account for the current low interest rate environment lasting?
- Avoid “reckless prudence” – challenge your adviser on the right level of return seeking assets (and their fees), bearing in mind the right level of return seeking assets might be a little higher than you imagine.
- Consider approaches that delay or semi-delay retirement for a period of time which can substantially increase the chances of savings lasting.
- Work with your adviser to plan realistically for your spending needs. If you can avoid needing to increase your spending each year in line with inflation this makes the investment challenge a little easier.
- There are no magic solutions but a combination of partial retirement for a period, not linking spending to inflation, and even decreasing real-terms spending after a few years can in combination make a difference to the sustainability of common withdrawal rates like 4%.
- *The paper shows the results of model simulations and does not constitute investment advice. The approximate impact of fees and expenses is incorporated as explained. Past performance is not necessarily a guide to future performance.*

Conclusions for wealth managers

- Assess value for money and the possibility of reducing expense in all parts of the investment chain. This includes manager fees, platform fees, external adviser fees other expenses. Manager fees have come down significantly², so you may be able to make substantial savings.
- Review the role of active management and whether your clients are getting value for money for the expenses paid to active managers.
- Review whether your own fee structures and levels have adjusted sufficiently from the days of high interest rates.
- Use technology to augment adviser propositions, speed adoption among client base, prioritise legacy system migration, all to make more efficient and able to offer best value on fees given how important these are to your clients’ retirement outcomes.
- Review your retirement model portfolios to ensure they have enough growth assets in a world of zero/negative interest rates – traditional approaches may no longer be fit for purpose, more growth assets may be needed.
- Help clients understand any increase in risk coming from more allocation to growth assets.
- Review glidepaths to ensure they are consistent with the growth asset allocation in retirement model portfolios.

² LCP investment management fees survey 2019
<https://www.lcp.uk.com/pensions-benefits/publications/lcp-investment-management-fees-survey-2019/>

Call to industry

- We need to be clear that QE has broken the 4% rule.
- Value for money in all parts of the investment supply-chain and a focus on cost transparency and comparability is key. There is some progress here but cost comparability between providers remains a challenge.
- Product innovation may help, particularly around limiting longevity risk later in retirement³. If these can be delivered in a form that represents value for money to the end investor, recognising there is no magic solution to the combination of low interest rates and product expenses⁴.
- Embrace new technological solutions to supplement/augment advice models if they can lower fees, as fees are such a central determinant of outcomes.

Call to government

- Develop the “fuller working lives” agenda further to continue incentivizing those in a healthy position at age 65 to continue working given this has a number of potential societal benefits:
 - o Allows invested pension pots to become more sustainable through retirement at low interest rates, allowing savers to more sustainably support themselves through a retirement and placing a lower potential reliance on the state in later years.
 - o A positive contribution to GDP, employment and training in keeping some of the most experienced workers in the workplace.
 - o Continued tax revenues from longer working lives.
 - o Government research⁵ has quantified these benefits: for a one year increase in working lifetime GDP is 1% p.a. (c£20bn) higher 6 years after implementation and government budget would improve by 0.6% GDP or c£12bn. The benefits of larger increases in working life are proportionally greater in the long term.
- Regulators, including the FCA and PRA should tighten focus on value-for-money in the drawdown phase. This is in light of the impact of charges highlighted in this paper, and to protect against savers being pushed into products with high charges but low investment returns (the worst outcome).

How LCP's experts Can Help You

- Private wealth managers: *contact LCP and we can run these simulations for your portfolios and withdrawal strategies*
- Private wealth managers: *contact LCP and we can work with you to develop strategies that will increase the chance of your clients' money lasting*
- We can help you reduce manager / platform costs

Contact LCP's [Dan Mikulskis](#) or [Hishendhra Ravindra](#),

³ For example that provided by the Nest Defined Contribution Scheme www.nestpensions.org.uk

⁴ The Institute of Actuaries did a wide-ranging market research project in 2017 which catalogued approaches around the world, but relatively little product innovation has emerged in the UK since then

<https://www.actuaries.org.uk/documents/pension-decumulation-market-research-september-2017>

⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/214392/WP95.pdf

02 Introduction

At what rate do retirees withdraw?

FCA data shows a wide spread of withdrawal rates used in practice. We have looked only at the larger pension pots above £100k to avoid being skewed by activity in smaller pots which may not be representative.

The mean withdrawal rate is close to 5% p.a. based on this data, but there is a very even spread across all levels from 2-4% up to 8%+

Figure 1 : FCA data on withdrawal rates



The Facts and Figures on Drawdown:

Over the next decade, we estimate that some 9 million people will reach retirement age, meaning that combined savings of c£160bn will enter decumulation over that period of time⁶. The Retirement Market Data⁷ from the FCA shows that in 2018 c£28bn of plan assets entered drawdown in that year. There will be hundreds of billions of additional pounds invested in strategies seeking to deliver a sustainable retirement over coming years, making this a vitally important area for study.

The same FCA data also shows that **6 in 10 of those accessing drawdown with pension pots over £100k withdraw at a rate of 4% or more per year**. This sets a high bar for investment strategies to support such withdrawal rates over a 30-year retirement, in the rest of this paper we investigate what sort of investment strategies might deliver this, and wrestle with the difficult question of how to define “sustainable”.

Since William Bengen first investigated sustainable drawdown strategies in 1994 and coined the “4% rule” there has been an entire genre of literature dedicated to testing and updating these rules which we summarise in the appendix.

⁶ Source: statista.com , ONS , LV State of Retirement Report, LCP Calculations

⁷ <https://www.fca.org.uk/data/retirement-income-market-data>

03 Areas of investigation

In this paper we seek to ask, and answer the following questions:

1. How can we define sustainability in drawdown?
 - How does sustainability vary with spending level and asset allocation?
2. How have low interest rates affected sustainable strategies?
3. How do expenses affect the sustainable strategy?
4. What are realistic ways that individuals increase the sustainability of their retirement, we look at two options
 - Changing spending pattern
 - Retiring later or partial retirement

Throughout this paper we look at “extinction probability” which represents the likelihood of running out of money based on a pre-set withdrawal strategy and investment approach, across 1,000 simulations of investment returns and lifespan.

We think this is a realistic and helpful outcome-metric, that is also widely used in previous literature (see appendix).

Of course, in practice in most cases a retiree would not actually run out of money as they could start to reduce spending materially as the position worsened.

Nevertheless, we think this approach is reasonable to test the overall sustainability of a withdrawal and investment approach (after all, if spending has to be drastically reduced then the strategy has probably not passed the test of being sustainable).

All of our modelling looks at the total invested portfolio that a retiree has, and considers gross (pre-tax) withdrawals. In practice in the UK (and elsewhere) there is significant tax-optimisation to be done between tax-sheltered and taxable accounts, as well as various tax allowances. Individuals should always seek advice to ensure they have the most tax-optimal solution for both their invested portfolio, and their withdrawal strategy.

In the UK the state pension provides up to £9,110 per year income for all retirees with a full National Insurance qualifying criteria (equivalent to a present value of more than £250k at retirement). This is a base level of income that the majority of UK retirees will receive. We have not included this in the analysis, so all withdrawal and spending rates we consider are over and above what is received from the state pension.

We propose more work in the following areas:

- Testing performance of variable equity glidepaths, can these improve outcomes and sustainability?
- Investigating combination of insurance products alongside investments
- Further analysis of downsides of the higher equity allocations suggested in terms of potential years of lost income in downside scenarios
- Further analysis of inheritance amounts to inform investment strategy thinking in situations where that is an important consideration

04 Defining Sustainability in Retirement

- Below we show the baseline results assuming the lowest possible level of total expenses around 0.4%p.a. This represents a DIY investor using passive funds on a low-cost platform
- The initial spending rate (left hand column of figure 2) is fixed and upgraded in line with inflation through retirement
- Longevity is modelled using the latest actuarial models (details in appendix). This modelling results in a variable retirement length, with an average of 21 years but some scenarios being much longer
- Full details of investment portfolios and capital market assumptions are contained in the appendix

How to read this chart. We use similar graphical representations throughout this paper for ease of comparison. The numbers in the coloured cells each represent the extinction probability of a particular combination of initial withdrawal rate and investment portfolio. Extinction probability means the likelihood of running out of money during a typical retirement (retiring at age 65). The different initial withdrawal rates as a percentage of the pension pot are specified in the first column. The different investment portfolios are specified in the first row classified by their allocation to return-seeking assets. Full details of the investment portfolios used can be found in the appendix.

Figure 2: Extinction probabilities for various drawdown rates and investment portfolios. 0.4% p.a. TER

The chart shows the results of model simulations and does not constitute investment advice. The approximate impact of fees and expenses is incorporated as explained. Past performance is not necessarily a guide to future performance.

Drawdown Rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
2.0%	0.2%	0.1%	0.2%	0.5%	1.0%
3.0%	5.1%	3.3%	3.0%	3.8%	4.6%
4.0%	21.6%	16.7%	12.7%	13.5%	12.5%
5.0%	42.4%	32.7%	26.9%	23.1%	23.1%
6.0%	64.5%	54.9%	44.1%	40.6%	35.4%

Comments

- 75%+ return seeking assets giving the best probability of good outcomes (lowest extinction probabilities).
- A 5% (inflation linked) spending rule gives at best about a one in four chance of running out of money.
- What is a good probability to aim for? That is a difficult question, Pfau & Kitces (2013) test withdrawal rates at a 10% threshold failure rate for various capital market assumptions suggesting this is a relevant threshold to use⁸.
- In a 2012 article⁹ Wade Pfau finds that the 4% rule has roughly a 10% failure rate. A 10% failure rate seems to be a common threshold used in previous literature.
- Suggestion: we adopt thresholds such that an extinction probability of <10% equates to “sustainable” <20% “somewhat sustainable” More than 40% “not sustainable”.
- *Many of the popular withdrawal levels illustrated in the FCA data do not qualify as sustainable on this basis, as they have extinction probabilities above 20% as shown in figure 2.*
- Ultimately the question of what is an acceptable extinction probability will be specific to an individual’s risk tolerance, and also depend on the extent of additional sources of guaranteed income.
- In this analysis the 4% rule is holding up fairly well with extinction probabilities between 10-20%, a little worse than what earlier studies find, but still somewhat sustainable.
- 5% and 6% spending rules do not appear to qualify as “sustainable” here, given they largely have greater than 25% extinction probability, however as noted in the FCA data many retirees do appear to be withdrawing at these rates.

- This is starting to suggest that higher allocations to return seeking assets give a better probability of good outcomes, but we need to balance this with the downside
- So in the next analysis we examine the situations where the assets were exhausted, and look at the average number of lost years of income

⁸ https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2324930

⁹ <https://www.advisorperspectives.com/articles/2012/04/17/rethinking-safe-withdrawal-rates-the-meaning-of-failure>

Years of missing income, where pot runs out

Figure 3 How to read this chart: The numbers in the coloured cells each represent the average number of years of lost income, for those scenarios where the retiree runs out of money during retirement. The different initial withdrawal rates as a percentage of the pension pot are specified in the first column. The different investment portfolios are specified in the first row.

Drawdown Rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
2.0%	Small sample	Small sample	Small sample	Small sample	5.1
3.0%	4.4	4.3	5.3	6.1	6.2
4.0%	5.5	5.9	6.7	6.5	7.7
5.0%	7.2	7.2	7.4	7.8	8.5
6.0%	9.1	8.2	8.6	8.8	9.6

This analysis is important, as in figure 2 we look at the probability of running out of money, but it is also important to know in those cases that do run out of money, how severe the outcome is. Running out a year after retirement is clearly a much worse outcome than running out at 95.

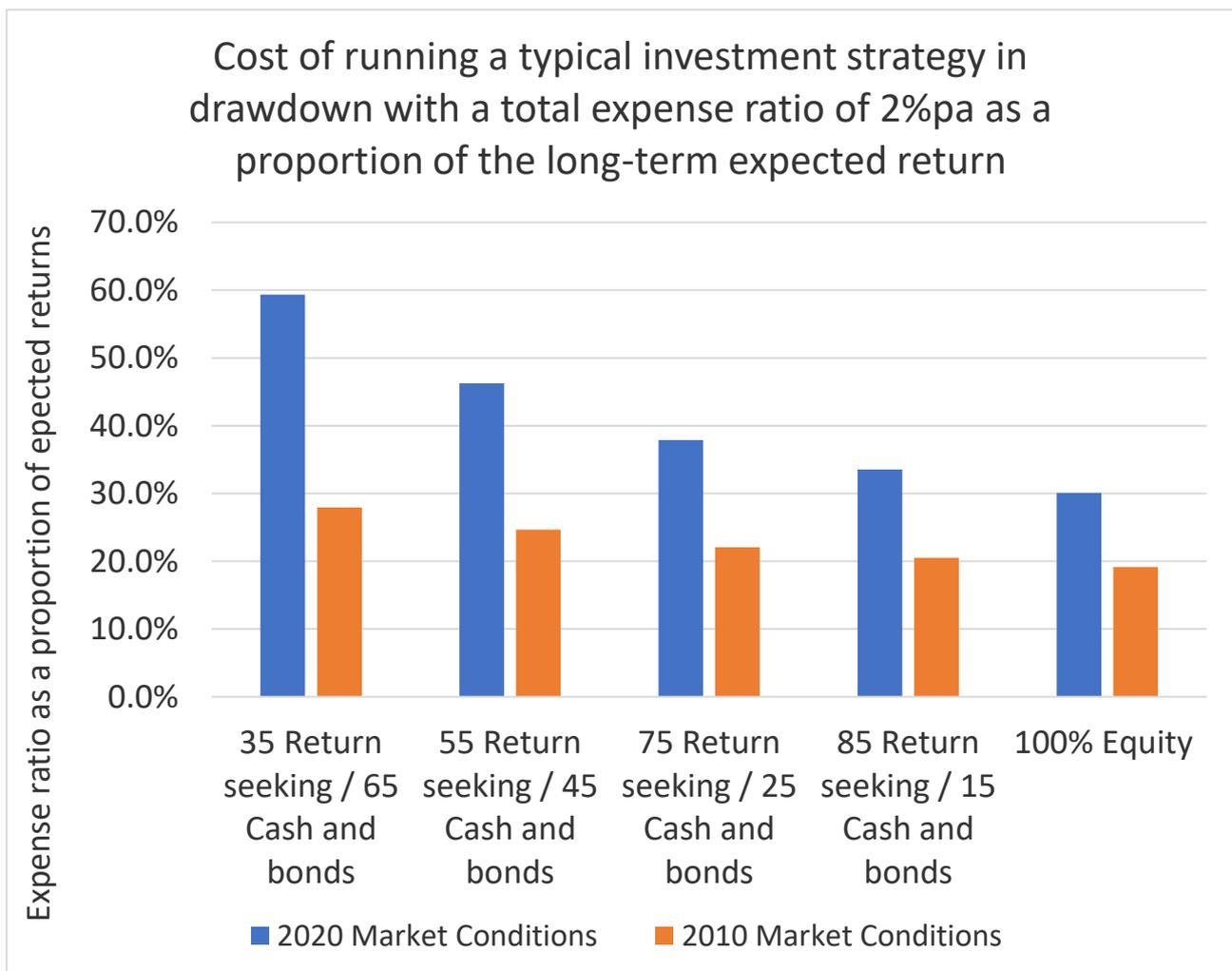
Comments:

- Five or six years of lost income on average is clearly not a good result for individuals who end up in this situation.
- However, reducing the chance of this happening results in a very small withdrawal rate.
- It points to the need for alternative tools such as insurance products or a delayed state pension to provide some kind of backstop in later retirement to allow the right level of investment risk to be taken earlier on.
- We see the risk of 100% return seeking assets, with 8-9 years of missed income on average in the scenarios where the pot runs out this stands out as particularly worse
- A higher return-seeking portfolio results in slightly more years of lost income than portfolios with less growth assets.
- We don't see material variation here for return seeking allocations between 55%-85%, this is interesting. Suggests that (on this measure) there is not a great deal of extra downside risk in a 85% return seeking strategy vs 55% and the trade-off in terms of higher returns may well be worth it.
- For high withdrawal rates (6%+) low risk strategies are equally likely to lead to many years of lost income as high risk strategies.

05 The impact of low interest rates

The big problem with low interest rates is that charges eat up a much greater proportion of the investment returns than was the case before. The chart below compares today with 2010

Figure 4



- This shows why low-risk portfolios are so problematic today – left hand bars, with interest rates so low up to 60% of the returns get eaten up in expenses (compared to less than 30% in 2010).
- The analysis assumes a 2%p.a. total expense ratio (asset management fees, platform fees and adviser costs) which we believe is in line with the average in the UK.

- Even with the highest return portfolio (100% equities) it is not possible to get back to the same ratio of expenses to returns as investors enjoyed in 2010 of around 20%.
- This has big consequences for the sustainability of withdrawal strategies as we will find later.

- This has been looked at before by several authors , and our conclusions contradict earlier findings that expense rates matter less than you think. We believe this is due to the timing of the earlier research which was before the full impact of the toxic combination of ultra-low rates and expenses, and it being focused on the US which has had materially higher long-term interest rates than the UK for much of the last decade.

06 Updating sustainability calculations for today's low-interest rates and average expense levels

Here we move into today's real world by running the same sustainability calculations, but with a typical¹⁰ total expense ratio for personal fund management of 2% p.a.

We also contrast this position with the market conditions prevailing in 2010, to illustrate just how much an influence the current low interest-rate environment has on the results.

Figure 5: 2020 Market conditions, 2% Total Expenses

Drawdown Rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
2.0%	0.8%	0.5%	0.6%	2.4%	3.6%
3.0%	16.3%	9.6%	8.1%	8.5%	9.6%
4.0%	42.1%	30.4%	24.0%	20.5%	22.9%
5.0%	60.5%	49.9%	38.2%	36.6%	34.5%
6.0%	70.0%	68.3%	57.6%	49.0%	45.0%

Figure 6: 2010 Market conditions, 2% Total Expenses

Drawdown Rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
2.00%	0.0%	0.0%	0.1%	0.0%	0.7%
3.00%	0.5%	0.5%	0.9%	2.2%	3.1%
4.00%	8.3%	5.4%	3.8%	7.0%	9.2%
5.00%	28.7%	18.5%	18.3%	16.3%	17.0%
6.00%	50.6%	40.3%	27.5%	27.1%	26.8%

- QE has broken the 4% rule.
- The analysis illustrates the “silent victims” of QE who are left with much less sustainable retirement pots due to the impact of low interest rates on their future returns, and faced with the need to take more investment risk when arguably they can least afford to.
- The 4% rule stood up pretty well back in 2010 (right hand diagram), coming out as having a good level of sustainability, only a 5-10% extinction probability once typical expenses were allowed for.
- This changes markedly in 2020, the extinction probability has more than tripled due to low interest rates.
- The 4% rule can no longer be considered sustainable at the 10% or 20% threshold levels in today's world. Investors would have to go down to 3% to get back to the sustainability levels enjoyed by the 4% rule in 2010, this would mean cutting spending by a quarter.

¹⁰ Total expense ratio includes asset management fees, platform fees and adviser costs. Typical levels taken from the following survey: <https://www.thetimes.co.uk/article/the-real-cost-of-personal-fund-management-k26zrp2fd>

- Our results are in line with comments by Larry Swedroe that “3% is the new 4%”¹¹
- This difference is driven entirely by the level of interest rates – 10-year rates in the UK were at 4% in 2010, compared to 0.2% in 2020. This feeds through to expected investment returns in all asset classes being 3%p.a. lower
- We aren’t the first to observe the effect of lower rates on income sustainability, Pfau & Kitces (2013)¹² have made a similar observation that capital market assumptions with lower interest rates have worse sustainability probabilities and “compel” retirees to move toward higher risk portfolios
- However previous authors have differed in one of two key ways:
 - They have assumed that low interest-rates are a temporary phenomenon, generally using longer term historical rates for their base case – we think this can no longer prudently be assumed to be the case.
 - They have focused on the US, where rates have been and still are significantly higher than in the UK, this is another important difference. At the time of writing 20 and 30 year rates are almost 1%p.a. higher in the US than the UK.

¹¹ Swedroe: The Four horsemen of the retirement apocalypse

¹² https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2324930

Focusing just on today’s market conditions, we can investigate the impact of different levels of expenses in isolation and assuming a 4% spending rule in all scenarios.

In the chart below the rows represent different levels of total fund expenses, listed in the first column

Figure 7: Extinction probabilities of 4% spending rule with various levels of total expenses

Total Annual Expenses	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
0.40%	20.2%	15.0%	11.8%	12.1%	13.1%
0.65%	23.9%	17.7%	13.8%	13.5%	14.9%
1.00%	29.1%	19.6%	14.7%	16.8%	15.7%
1.50%	35.1%	27.7%	19.1%	18.7%	18.1%
2.00%	41.7%	30.6%	23.2%	21.9%	22.0%

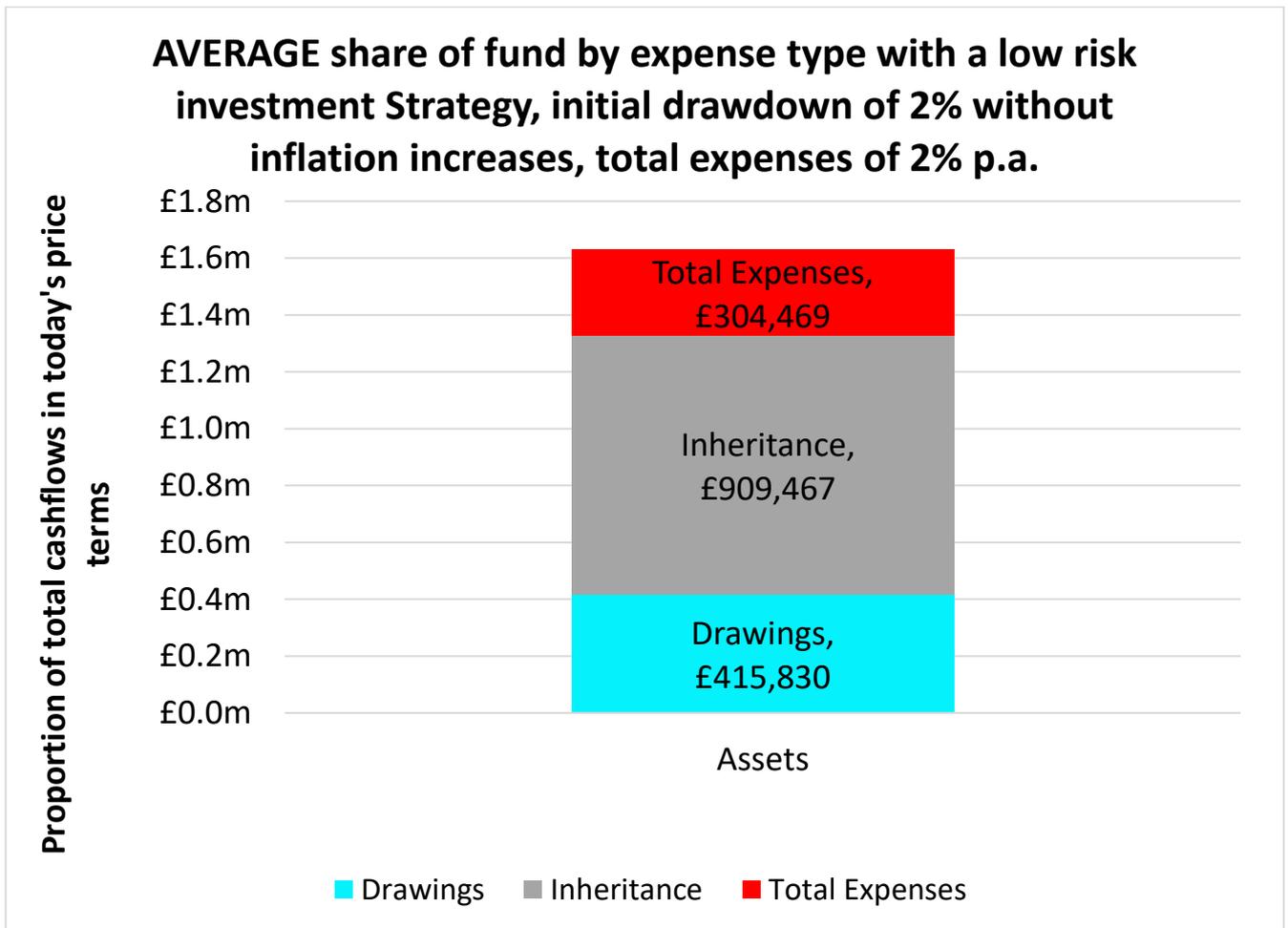
- Fees matter, particularly so at lower levels of return seeking assets. This is because (as shown in figure 4) fees eat up the majority of investment return for portfolios with lower allocations to return seeking assets
- Comparing a 1% total expense level (at the most competitive end of what’s available) with 2% (overall average) shows that the lower level of expenses has a significant impact on client outcomes. For example it means the 4% rule meets one of our definitions of sustainability at the more competitive fee level (of 1%), but falls outside it at industry average fee levels

- These results emphasise the danger of lower-return investment strategies, with significant extinction probabilities (30%+) associated with lower return investment strategies with average fees.
- It points toward a clear need to make adjustments to the investment strategy to take into account the impact of zero interest rates and fees on investment outcomes – specifically a higher allocation to return seeking assets.
- Other possibilities for an individual to help manage this are:
 - Considering partial retirement for a period of time.
 - Not inflation-linking expenditure every year.
- This analysis leads to our comment that “fees matter more than asset allocation” as we can see that all the asset allocations shown for the lowest fee level have a better extinction probability than the best asset allocation at the highest fee shown (20.2% being the worst extinction probability for 0.4% fees vs 21.9% being the best at 2% fees).

Expenses compared to withdrawals

- Excessive caution in investment strategy and withdrawal rate could lead to an unreasonable amount of the pension pot going to expenses.
- For example, withdrawing at 2% p.a. coupled with a low-risk investment strategy could in many scenarios lead to a significant part of the pension pot going to expenses compared to what the retiree themselves receives.
- In the example below, of a £1m starting pension pot, on average £416k is taken by the individual and over £304k goes in expenses, the balance being an inheritance.
- At the same time only very modest net investment returns of about 1% per annum would be achieved on average.
- This highlights that a poor outcome could be unwittingly achieved by investing in a cautious way.

Figure 8: Average share of fund withdrawals by type with a low risk 35% return seeking asset investment strategy, a drawdown of 2% without inflation increases, total expenses of 2% p.a.



7. Increasing the sustainability of retirement: changing the spending pattern

We investigate two broad options which have been proposed: firstly removing the inflation linkage to spending and assuming a flat spending profile, and secondly assuming a “smile” shape to spending, decreasing in mid-retirement and rising later on.

On the left we compare with the base-case which consists of 2020 market conditions, 2% p.a. fees and inflationary increases to spending.

Figure 9: Base case: inflationary spending increases

Drawdown rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
2.0%	0.8%	0.5%	0.6%	2.4%	3.6%
3.0%	16.3%	9.6%	8.1%	8.5%	9.6%
4.0%	42.1%	30.4%	24.0%	20.5%	22.9%
5.0%	60.5%	49.9%	38.2%	36.6%	34.5%
6.0%	70.0%	68.3%	57.6%	49.0%	45.0%

Figure 10: Spending does not increase

Drawdown Rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
2.0%	0.0%	0.1%	0.1%	0.3%	0.7%
3.0%	2.3%	1.4%	1.7%	2.4%	4.6%
4.0%	17.6%	11.5%	8.8%	9.1%	11.2%
5.0%	39.0%	30.4%	23.5%	19.2%	22.4%
6.0%	58.3%	44.5%	41.4%	34.9%	30.2%

Comments:

- “Turning off” inflation linkage makes some strategies significantly more sustainable. Specifically, it brings back the 4% rule into a sustainable level (<10% failure) and the 5% spending pattern is also now somewhat sustainable at higher growth asset allocations.
- This may be easier said than done for some retirees, but research suggests that many expenses do not increase as fast as inflation.
- Inflation-increased spending along with a long-lived retirement (compounding inflation over 30+ years) is a clear risk that is avoided in scenarios where spending is not inflation-indexed. This is perhaps why we start to see more modest allocations to equities becoming more reasonable again once inflation indexing is removed. For example a 55% allocation to return seeking assets gives broadly the same sustainability as higher allocations for the 4% spending level, where with inflation-indexed spending there is a clear preference for more return-seeking assets.

- Perhaps the most striking result here is the improvement in sustainability for the lower-risk investment strategies (eg 35% return seeking). Removing the link to inflation makes these strategies much more sustainable.
- This suggests an interplay between spending preferences and investment strategy.

We also investigate using David Blanchette's¹³ income smile which sees retirees' spending fall in real terms initially, then increase later (due to medical expense) – details in appendix (figure 22).

Blanchette's smile also reflects different patterns at higher and lower income levels, with lower initial dollar withdrawal rates suffering proportionally more inflation than higher dollar amounts.

¹³ Blanchett, David. 2014. "Exploring the Retirement Consumption Puzzle." *Journal of Financial Planning* 27 (5): 34–42

- The charts below compare the extinction probabilities for our base case of inflationary spending increases against spending increases determined by David Blanchette’s spending “smile”

Figure 11: Base case

Figure 12: Spending increases in line with Blanchette smile

Drawdown rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking	Drawdown Rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
2.0%	0.8%	0.5%	0.6%	2.4%	3.6%	2.00%	1.0%	0.8%	1.0%	1.5%	3.1%
3.0%	16.3%	9.6%	8.1%	8.5%	9.6%	3.00%	9.9%	8.3%	6.0%	6.8%	9.4%
4.0%	42.1%	30.4%	24.0%	20.5%	22.9%	4.00%	31.7%	24.8%	20.2%	17.0%	17.4%
5.0%	60.5%	49.9%	38.2%	36.6%	34.5%	5.00%	53.1%	43.0%	34.0%	29.0%	30.3%
6.0%	70.0%	68.3%	57.6%	49.0%	45.0%	6.00%	66.9%	60.7%	50.4%	44.9%	41.7%

Comments:

- The ‘spending smile’ approach improves sustainability from the base case, but does not change the picture massively.
- The 4% initial spending level is brought back beneath the 20% extinction probability level by linking spending this way. 5% still appears unsustainable.
- One interesting feature here is that lower-risk investment strategies become more sustainable. For example the 35% return seeking portfolio shows significantly better outcomes for those withdrawing at 3 or 4% initially.
- This – in tandem with previous results - suggests that it is inflation linkage that points toward higher return-seeking allocations. If spending increases can be de-coupled from inflation then lower-risk investment portfolios become more sustainable.
- Preferred investment strategies under the spending-smile approach are again focused on the more return seeking asset heavy portfolios, presumably as a consequence of the compounding risk of a long-life and escalating costs toward the end.

08 Increasing the sustainability of retirement: Later or Partial Retirement

We test the impact of sustainability on partial retirement between the ages of 65 and 70 which means drawing half as much from the pension pot from the period between age 65 and age 70. The charts below show the extinction probabilities under these two cases:

Figure 13: Base case

Drawdown rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
2.0%	0.8%	0.5%	0.6%	2.4%	3.6%
3.0%	16.3%	9.6%	8.1%	8.5%	9.6%
4.0%	42.1%	30.4%	24.0%	20.5%	22.9%
5.0%	60.5%	49.9%	38.2%	36.6%	34.5%
6.0%	70.0%	68.3%	57.6%	49.0%	45.0%

Figure 14: With partial retirement

Drawdown Rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
2.0%	1.0%	0.3%	0.8%	1.2%	2.5%
3.0%	11.1%	7.8%	4.8%	6.4%	7.2%
4.0%	28.4%	21.3%	17.4%	16.0%	16.8%
5.0%	47.9%	40.3%	30.0%	28.4%	25.5%
6.0%	63.0%	55.0%	45.6%	38.4%	36.4%

- Partial retirement does make some meaningful improvements to the sustainability of retirement income.
- For example, it makes a significant improvement to the sustainability of a 5% spending rule, decreasing the extinction probability from 34.5% to 25.5%.
- This leads us to the policy recommendations around promoting a “fuller working lives” agenda allowing those still in good health to work for longer.

Appendix 1

Background Literature Review – the 4% rule

William Bengen conducted a number of simulations of historical market behaviour.

He concluded that a person could "draw down" up to 4 percent annually ... without fear of outliving their money.

He published his research in the Journal of Financial Planning, October 1994. From an investment perspective his work pointed to equity allocations of 50-60% to achieve these spending rules, and importantly he assumed a fixed retirement of 20 or 30 years. Other work for different retirement periods points toward sustainable withdrawal rates towards 5% for shorter retirement periods of 20 years, and higher equity allocations needed for longer retirements.

This rule has come under a lot of scrutiny in our current negative real yield environment.

Who is William Bengen?

William P. Bengen is a retired financial adviser who first articulated the 4% withdrawal rate ("Four percent rule") as a rule of thumb for withdrawal rates from retirement savings in Bengen (1994); it is eponymously known as the "Bengen rule". The rule was later further popularized by the Trinity study (1998), based on the same data and similar analysis. Bengen later called this rate the SAFEMAX rate, for "the maximum 'safe' historical withdrawal rate", and revised it in Bengen (2006) to 4.5% if tax-free and 4.1% for taxable. (Wikipedia)

The rule is based upon the historic returns that have been delivered by a 60/40 portfolio of equity and US government bonds, and the stable withdrawal rates that this strategy could have supported historically.

Many people mistakenly believe that to follow the 4% rule you simply withdraw 4% of your nest egg each year throughout retirement. Not so. You withdraw 4% of the total value of your nest egg the first year of retirement. Then you increase the value of all subsequent annual withdrawals by the inflation rate to maintain your purchasing power. (money.com)

Since William Bengen there has been an entire genre of literature dedicated to updating the 4% rule for different retirement lengths, investment strategies, spending rules and market environments. Michael Kitces¹⁴ and Wade Pfau have contributed useful summaries.

Kitces updated¹⁵ the 4% rule after the 2008 financial crisis, concluding it had held up pretty well, and highlighted that it remains quite a conservative approach to spending (ie, that in most

¹⁴ <https://www.kitces.com/march-2012-issue-of-the-kitces-report-expanding-the-framework-of-safe-withdrawal-rates/>

¹⁵ <https://www.kitces.com/blog/how-has-the-4-rule-held-up-since-the-tech-bubble-and-the-2008-financial-crisis/>

scenarios it will under-shoot the potential spending in order to avoid running out). However, he did highlight two potential issues that have magnified since then:

- That those retiring in the year 2000 were potentially on a challenging path, with the withdrawal rate now representing some 6% of the portfolio annually, as the portfolio had not kept up with inflation
- That low government bond yields in the future could make future retirees spending needs more challenging at this rate

This last point is one that we pick up on in this paper and we find lower interest rates since 2010 to have totally changed the game in terms of retirement spending and investing, rendering the 4% rule much less tenable.

One big issue with much analysis in this area using historic returns is that they likely greatly overstate the potential future returns from government bonds given how low interest rates are. This poses a big problem with the result that retirees need to consider pushing further out along the risk spectrum.

The Risks of Retirement – why is it such a hard problem?

A retiree looking to fund retirement through an investment portfolio faces at least five types of risk -

- **Underperformance or asset volatility risk:** the growth assets in the portfolio don't deliver returns expected over retirement. For example equities have a bad decade or couple of decades, with small or zero overall returns. This becomes less likely the longer the time period, but cannot be ruled out as a risk. Diversification and setting an appropriate risk tolerance are the main ways to mitigate against this.
- **Sequence risk:** growth assets deliver returns overall but in a "bad" order - specifically large drawdowns early on. This means that the spending magnifies the investment risk but drawing on a depleted portfolio. This can cause a portfolio to be exhausted more quickly than expected. This can be partly mitigated by flexing spending in response to portfolio falls, or including assets in the portfolio that help protect against drawdown.
- **Inflation risk:** the risk that the increases in the basic cost of living and expense rise more than forecast and outpace rises in the portfolio value. We have not seen high inflation in the UK for a number of years but this remains as a risk. This is hard to mitigate against with investments, as those assets that can protect well against inflation are expensive and offer relatively poor returns.
- **Longevity risk:** often underestimated, but this is the risk that a retiree lives significantly longer than expected placing a drain on the portfolio in later life. Most people don't appreciate they there is a significant chance they live a lot longer than the average (good news of course, but needs to be planned for).
- **Excessive conservatism:** assets invested in a way not expected to deliver enough returns (after fees)

Summary of analysis - Technical notes

We have modelled a typical retirement starting with a portfolio of assets and drawing down for spending at a set rate which is increased each year in line with inflation.

We have considered a range of investment strategies which for modelling purposes are expressed as a percentage in “growth” assets. The composition of the growth and asset portfolios is detailed in the appendix

The portfolio is assumed to take into account all of a savers’ liquid financial assets, whether these are held in ISAs, SIPPs or DC pensions. We have not modelled taxes, everything should be viewed as “gross”. In practice taxes will make a difference.

Male aged 65 retiring now with a nest egg of £1m

Consider initial drawdown levels of:

£20,000pa increasing in line with inflation

£30,000pa increasing in line with inflation

£40,000pa increasing in line with inflation

£50,000pa increasing in line with inflation

£60,000pa increasing in line with inflation

Figure A1: Average investment returns required to deliver a range of inflation-indexed spending requirements

Initial Drawdown Level	Required Return (%pa)
£20,000pa	-3.4%
£30,000pa	-0.9%
£40,000pa	1.1%
£50,000pa	2.1%
£60,000pa	4.5%

Using Base table = 100% of S2PMA : Projection = 100% of CMI_2017_m[1.5%] from 2007 : U2020

Initially, we assume a very low 0.4%pa Annual Expense Rate which is the lowest feasible cost for a DIY investor using passive investment management and a low-cost investment platform. We compare this with a typical all-in advice and fund management cost of 2% p.a. according to a comparison by the Sunday Times¹⁶.

We have not considered the difference between encashing units to deliver spending and taking natural income from assets. In some cases the latter may be optimal or desired, although this ought not to affect the overall investment strategy. We discuss income investment strategies in more detail [here](#).

We have directly measured one of the most key outcomes to the whole investing process -whether the individual runs out of money or not during retirement. We call this the **extinction probability**.

This is not quite sufficient on its own however as it does not take into account how severe the shortfall is in cases where money runs out. We have also looked at the average years of lost income, across those cases where income ran out.

Finally, we look at the amount left over as a potential bequest or inheritance.

¹⁶ <https://www.thetimes.co.uk/article/the-real-cost-of-personal-fund-management-k26zrp2fd>

Appendix 2 – additional results

The full spread of withdrawal rates with fees updated

- Here we vary the annual drawdown level to investigate how different drawdown levels compare with 2% fee levels.

0.4%pa Annual Expenses

2%pa Annual Expenses

Figure A2

Drawdown Rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
2.0%	0.2%	0.1%	0.2%	0.5%	1.0%
3.0%	5.1%	3.3%	3.0%	3.8%	4.6%
4.0%	21.6%	16.7%	12.7%	13.5%	12.5%
5.0%	42.4%	32.7%	26.9%	23.1%	23.1%
6.0%	64.5%	54.9%	44.1%	40.6%	35.4%

Figure A3

Drawdown rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
2.0%	0.8%	0.5%	0.6%	2.4%	3.6%
3.0%	16.3%	9.6%	8.1%	8.5%	9.6%
4.0%	42.1%	30.4%	24.0%	20.5%	22.9%
5.0%	60.5%	49.9%	38.2%	36.6%	34.5%
6.0%	70.0%	68.3%	57.6%	49.0%	45.0%

Figure A4: Years of missing income

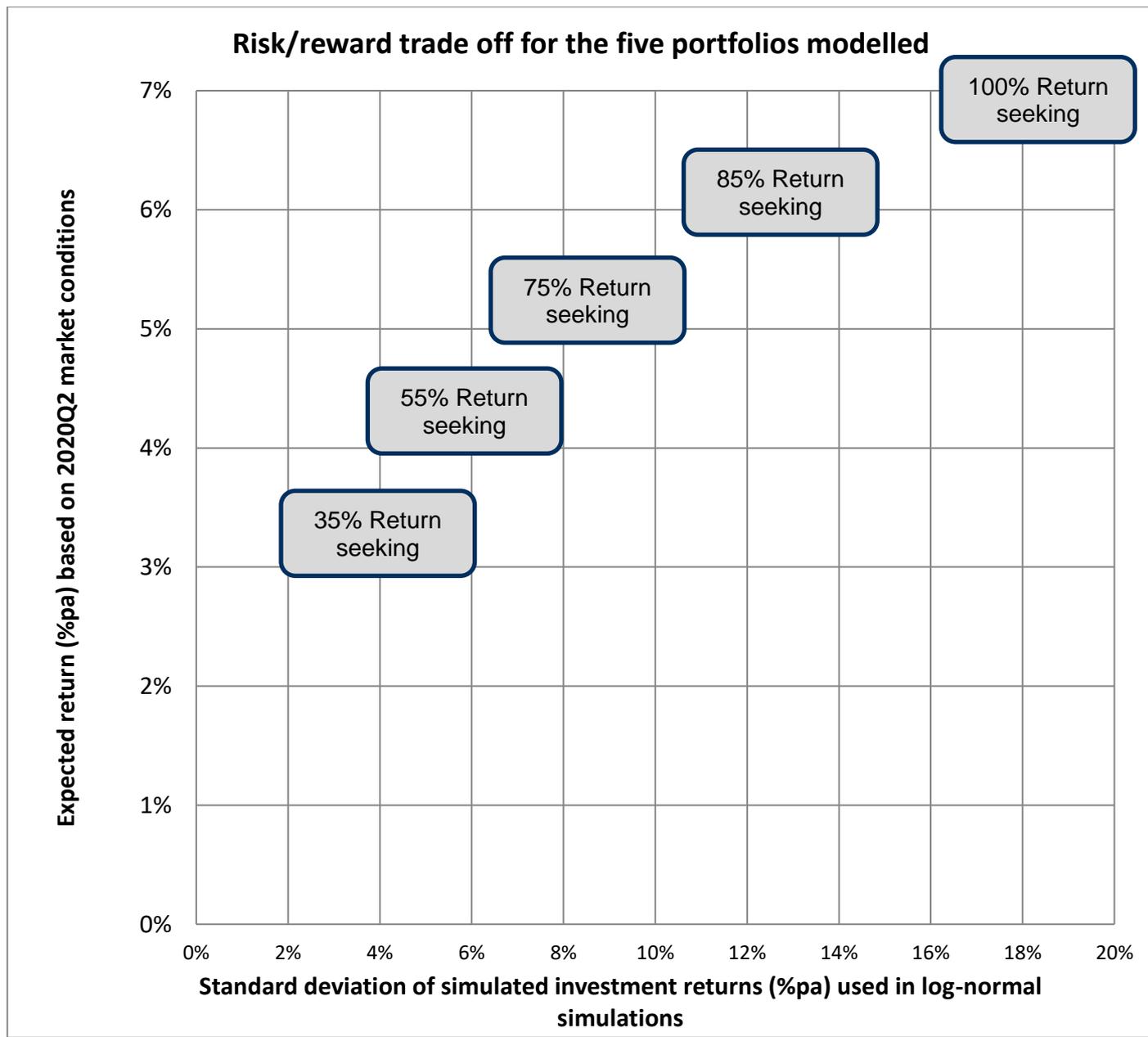
Drawdown rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
2.0%	Small sample	Small sample	Small sample	Small sample	5.1
3.0%	4.4	4.3	5.3	6.1	6.2
4.0%	5.5	5.9	6.7	6.5	7.7
5.0%	7.2	7.2	7.4	7.8	8.5
6.0%	9.1	8.2	8.6	8.8	9.6

Figure A5: Years of missing income

Drawdown rate	35% Return Seeking	55% Return Seeking	75% Return Seeking	85% Return Seeking	100% Return Seeking
2.0%	Small sample	Small sample	Small sample	5.0	5.3
3.0%	5.0	5.4	5.5	7.8	7.2
4.0%	6.4	6.3	6.6	7.3	7.7
5.0%	8.1	7.9	7.9	8.8	8.9
6.0%	10.2	9.6	9.3	9.4	10.2

Underlying investment strategies

Figure A6



Portfolios

Asset Class	100% Return Seeking Portfolio	85% Return Seeking Portfolio	75% Return Seeking Portfolio	55% Return Seeking Portfolio	35% Return Seeking Portfolio
Passive Emerging Markets Equity Index Fund	15.0%	12.5%	10.0%	6.5%	3.0%
Passive Global Equity Fund	70.0%	55.0%	40.0%	26.0%	12.0%
Passive Global Property Fund (REIT)	-	4.5%	9.0%	8.3%	7.5%
Passive Infrastructure Equity Fund	15.0%	12.0%	9.0%	8.3%	7.5%
Active Global High Yield Bond Fund	-	3.0%	6.0%	5.5%	5.0%
Total Return Seeking Portfolio	100.0%	87.0%	74.0%	54.5%	35.0%
Passive Emerging Market Government Bond Fund	-	3.0%	6.0%	5.5%	5.0%
Passive Investment Grade Corporate Bond All Stocks Fund	-	6.7%	13.3%	25.0%	36.7%
Passive All Stocks Index-Linked Gilts Fund	-	3.3%	6.7%	12.5%	18.3%
Active Sterling Liquidity Fund	-	-	-	2.5%	5.0%
Total Cash/Low Risk Bond Portfolio	-	13.0%	26.0%	45.5%	65.0%
Total Allocation	100.0%	100.0%	100.0%	100.0%	100.0%

Capital Market Assumptions

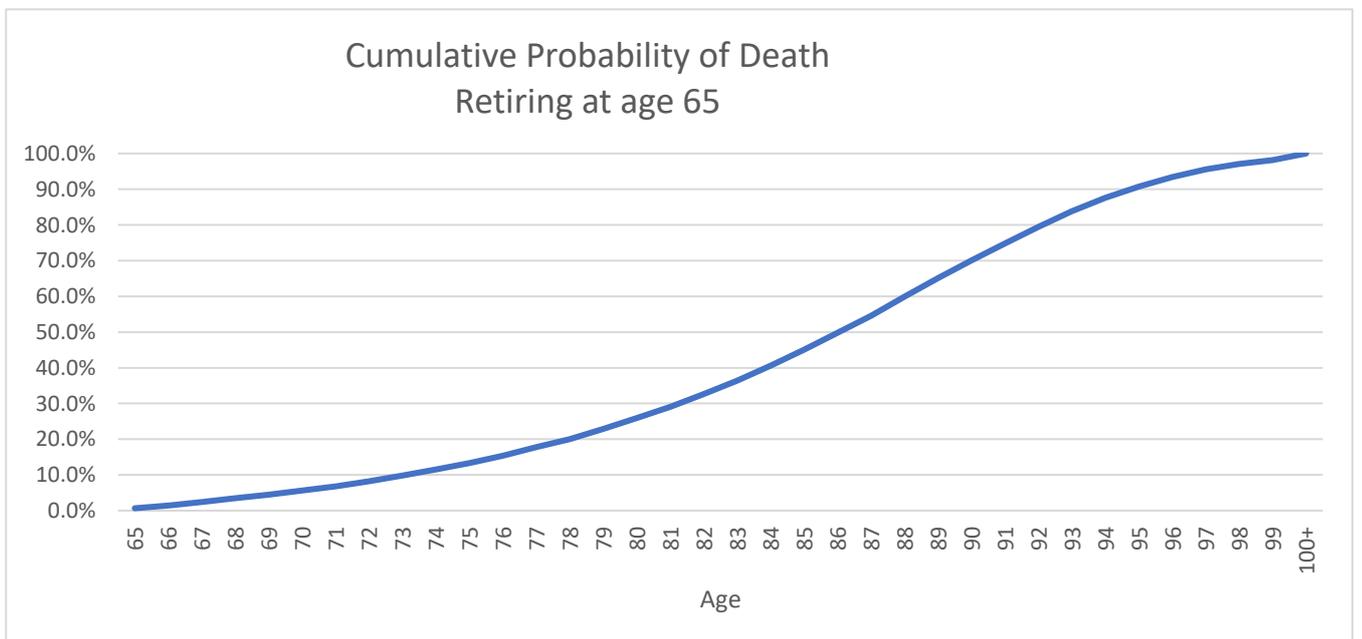
Portfolio /Asset	Expected gross ¹⁷ annual investment returns (Median %)	
	2010	2020
Risk Free Investment Return (20Y Gilt Yield)	4.4%	0.8%
CPI inflation (20Y Average Estimate)	2.8%	2.0%
35% Return seeking (gross)	7.0%	3.4%
55% Return seeking	7.9%	4.3%
75% Return seeking	8.8%	5.2%
85% Return seeking	9.5%	5.9%
100% Equity	10.1%	6.5%

¹⁷ Before asset management, platform and adviser costs

Longevity distribution

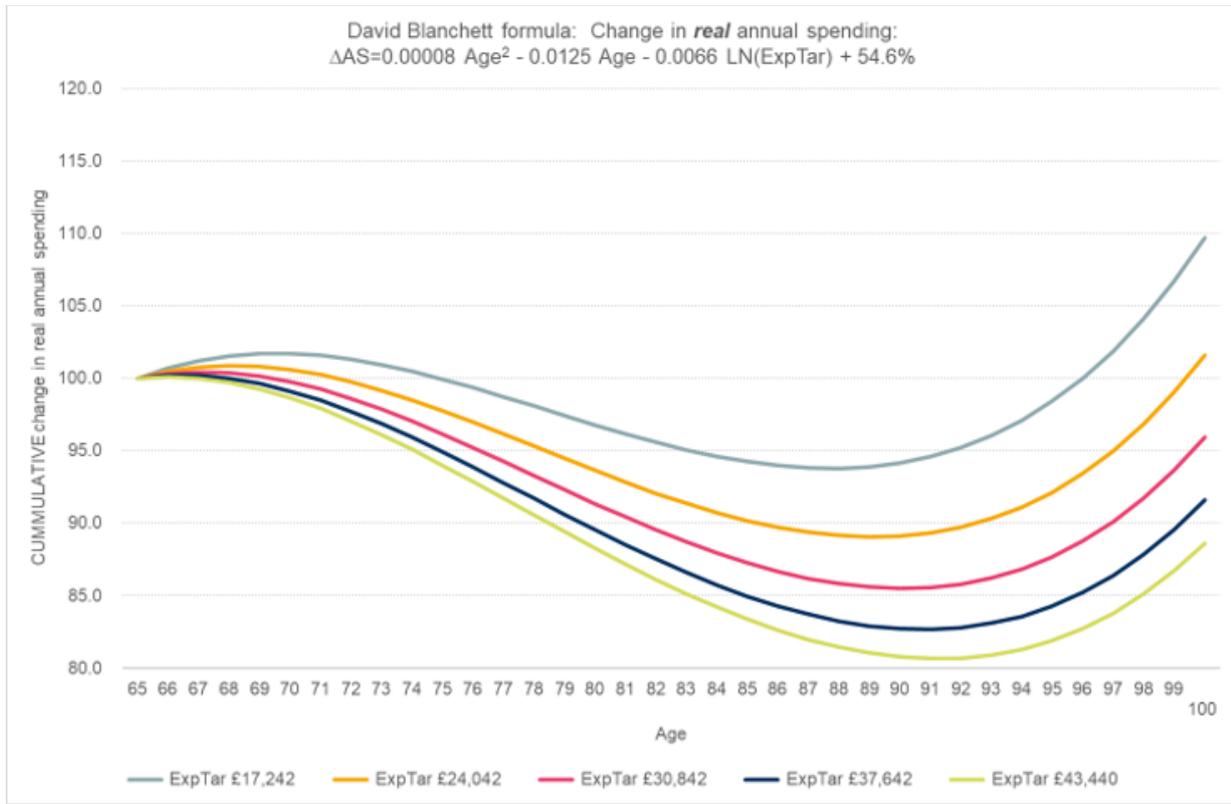
Life expectancy at age 65 is around 21 years (to 86) but there is a significant chance of much longer lifespans.

Figure A7: Summary of longevity assumptions. Using Base table = 100% of S2PMA : Projection = 100% of CMI_2017_m[1.5%] from 2007 : U2020



The Spending Smile

Figure A8



Additional reading

William Bengen (1994) – [the 4% Rule](#)

Wade Pfau (2012) - [Rethinking Safe Withdrawal Rates: The Meaning of Failure](#)

Pfau and Kitces (2013) - [Reducing failure with a rising equity glidepath](#)

Pfau, Wade D. and Kitces, Michael, Reducing Retirement Risk with a Rising Equity Glide-Path (September 12, 2013). Available at SSRN: <https://ssrn.com/abstract=2324930> or <http://dx.doi.org/10.2139/ssrn.2324930>

Fink, Pfau and Williams (2011) - [Spending Flexibility and Safe Withdrawal Rates](#)

Finke, Michael S. and Pfau, Wade D. and Williams, Duncan, Spending Flexibility and Safe Withdrawal Rates (November 8, 2011). Available at SSRN: <https://ssrn.com/abstract=1956727> or <http://dx.doi.org/10.2139/ssrn.1956727>

Michael Kitces (2012) - [Adjusting withdrawal rates to the time horizon](#)

Michael Kitces (2012) - [March 2012 issue of The Kitces Report on “20 Years of Safe Withdrawal Rate Research – Expanding the Framework of Safe Withdrawal Rates”.](#)

Milliman - [Retirement guarantees – are they worth it?](#)

David Blanchett (2014) – Spending smiles

Blanchett, David. 2014. “Exploring the Retirement Consumption Puzzle.” *Journal of Financial Planning* 27 (5): 34–42

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