

Converting cash sums into monthly pay cheques: rational income investing in a post-QE environment

Rethinking risk and techniques for income investors, pension drawdown
and trust investment in today's markets

- We argue that Modern Portfolio Theory is an inappropriate basis for generating a retirement or other long-term income for individual investors because their main objective is reliability of income, not capital growth.
- Equities have two sources of return, capital and income; commonly these are viewed as one, which is an error because the capital volatility hides the income stability.
- Sequence risk is largely irrelevant to a retiree deriving income from dividends paid out by a portfolio of investment trusts (Strategy 4). This is because shares in the trust are not being sold to generate income.
- As advisers on regulated investments...we would define risk as the likelihood that an investment will fail to do what an investor expects.
- Traditionally, the 0% equity portfolio would have been seen as the least risky and the 80% equity-heavy portfolio the highest risk, yet this is not borne out by the historical results.
- Investment trusts: stretching back to 1974, the research analysed 1,236 consecutive annual payments. This analysis found that...the (dividend) payment was the same or higher than the prior year in 98% of all cases.
- Industry's view of risk management has now shifted from a probabilistic approach to a possibilistic one.
- A Monte Carlo chart is quite useless at reassuring a retiree he will be able to pay his gas bill.

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Introduction

This paper considers the solutions available to income investors, chiefly trusts and those using SIPPs in drawdown, to generate long term income in 2019. A post-QE environment with interest rates at record lows, UK gilt yields below 1% and more than \$12 trillion in negative yield accounts. This is a unique investing environment requiring new thinking on suitable solutions. It cannot be just 'unfortunate' for 65-year olds to be retiring with ultra-low yields, it is the adviser's job to source current solutions for current investors applicable to trusts, drawdown pensions and investors.

This paper examines equity funds as bond proxies and naturally focuses on investment trusts due to their ability to support dividends with balance sheet reserves.

£0.5 trillion is a wall of purchase pension money in DC workplace schemes and in SIPPs that is peeling off each year. Expecting pensioners themselves to convert the accrued lump sum into a monthly pay cheque. UK demographics show the problem is increasing every year, and the collapse in the UK annuity market means bond proxies are necessary: this means that suitable equity income funds should not be risk graded as high risk and therefore unsuitable for pensioners. We examine and analyse why today's income seekers should not be steered away from equity solutions.

Let them eat cake.

1. The problem to be examined

CONVERTING CASH SUMS INTO MONTHLY PAY CHEQUES

The OECD Pensions Outlook (2016 and 2018)¹ examines the myriad reasons behind the growth in money purchase pensions: the slow death of final salary pension schemes means, increasingly, that many people have to rely on their own savings for a retirement income. They face significant obstacles, not least of these are historically low-interest rates that have undermined traditional sources of income such as bank deposits and gilts. This combination of circumstances has made the importance of investment drawdown strategies that minimise the risk of cash exhaustion acute, while still allowing the investor to avoid a life of unnecessary parsimony.

Yet there are assets available that income-seekers can use with reasonable certainty that their money will not run out. Traditionally, such investors have been steered towards bonds and annuities, for which gilts provide a reasonable proxy.

- If we take 15-year gilts (represented by the FTSE Actuaries Gilts over 15 Yrs Index), a redemption yield of 1.62%, a duration of 19 and a five-year volatility of 12.2 (FTSE Russell²) suggests that these traditionally 'safe' investments are no longer able to provide either the level of income or the capital certainty people need.
- Comparatively, with the FTSE 100 Index offering a historical yield of 4.36% and a volatility of 10 (FTSE Russell, 30.4.19), we examine if equity's income bears the same level of risk as its capital sister.

Equities have two sources of return, capital and income; almost always these are viewed as one which is an error because the capital volatility hides the income stability – the risks of the two should not be conflated. Simply expressed, in the thirty years since 1989 the FTSE 100 and All Share Indices both had discrete capital gains in 66.7% of those years, whereas they both had positive income returns in 100% of the years. Whilst there may be no capital gain in a year, there is always an income paid.

The FTSE indices have never failed to provide an income return in any year.

To assess solutions, this paper has sought to simplify the construction of retirement income portfolios by focusing on the actual recent performance of assets, rather than theoretical portfolios. This process has led us to a group of investment assets that over decades have demonstrated the ability to produce constant income with significant reliability. To grow that income in both nominal and real terms: investment trusts. Our research covers actual income records back to 1966.

¹ OECD (2018), OECD Pensions Outlook 2018, OECD Publishing, Paris https://doi.org/10.1787/pens_outlook-2018-en.

² FTSE Russell fact sheets FTSE 100 index, FTSE Actuaries UK conventional gilts over 15 years, 30 April 2019

UK retail guidance on drawdown income risk is chiefly based on US data emanating from Bill Bengen's research in 1994³, using US RPI and US equities work by Dr Wade Pfau⁴ and using US assets and academic work by Professor Andrew Clare's team at the Cass Business School⁵.

The fallacy of using Bengen's US stock calculations for UK retirees was confirmed by Morningstar in their research in this area in 2016.⁶

Bengen's 4% Rule calculates that sum as a safe withdrawal rate to ensure that the investor's money never runs out. It is only 4% of the portfolio value in the first year, after which that sum is then increased by RPI (U.S. RPI in his figures).

U.S. and U.K. investment statistics do not transpose with accuracy: this is a common error in UK investment commentary due to the sheer volume of US research in this area. A simple example of this is very relevant to this research: at 30 April 2019, on a historical basis the yield on the FTSE 100 was 4.36% whilst the yield on the S&P 500 was less than half that at 1.95%.⁷

2. The normal route to retirement income: Modern Portfolio Theory

Why institutional techniques do not work for drawdown investors

The typical answer most advisers and money managers will give when asked to construct a portfolio to provide a long-term secure income is based on Modern Portfolio Theory (MPT)⁸. The essence of this theory is that there is no gain to be had in investment without risk, but that that risk can be contained within limits set by the investor via asset diversification. In the portfolio's simplest form, the gains – and therefore the risks – come from equities, while the containment – and traditionally the main source of income – is provided by bonds. Rather like a recipe, the proportions can be varied according to the taste of the investor, not for sweet and sour but for return and security.

As the inventor of the MPT, the Nobel-prize-winning economist Harry Markowitz, himself acknowledged, it was not designed for running an individual's portfolio, but an open-ended, undated, mutual fund with daily cashflows, seeking to grow in value. Indeed, he rejected the MPT for his own pension⁹. Despite these caveats, our research suggests that virtually all investment theory directed at the retail market in the UK is actually a restatement or reworking of the MPT based on analysis commissioned by institutional investors for funds, not people. It is then often 're-badged' by the marketing departments of fund management firms to suit their own ends when soliciting new money.

³ William P Bengen, Determining Withdrawal Rates using Historical Data, October 1994

⁴ <https://retirementresearcher.com/author/admin/>

⁵ Reducing sequence risk using trend following and the CAPE ratio, May 2017

⁶ Safe Withdrawal Rates for Retirees in the United Kingdom, May 2016

⁷ www.multpl.com/s-p-500-dividend-yield

⁸ Markowitz stated that the objective of the theory "is to obtain a 'good' probability distribution of year-to-year...percent increase in its net asset value.

⁹ Markowitz 1991, Financial Services Review 1(1):1-8, Individual versus Institutional Investing

We would argue that the MPT is an inappropriate strategy for generating a retirement or other long-term income for an individual investor because their main objective is reliability of income, not capital growth. Their need is an income that securely matches the regularity of the expenses they face on a daily, monthly and annual basis. A traditional fund manager generally has subtly different objectives. Certainly, they may have a remit to provide an income, which allows their fund to be marketed as suitable for income seekers, but they may also have less explicit goals. Competition for assets often makes maintaining and growing the capital value of the fund to improve the manager's position in fund league tables an equally important objective. And, of course, more assets and higher values mean increased *ad valorem* fees for the manager.

A fund provider derives its fees from the investors' capital, it makes no money from delivering income.

There is clearly a mismatch here between what income-seekers need and how the industry is trying to meet that need. To an extent, this reflects an honest difference of opinion about what constitutes risk to the respective parties. So what does 'risk' actually mean in this context?

3. Problems with Monte Carlo simulation

Why random walk modelling is of little use executing lifetime cashflow plans for investors

This is a tool that overlays multiple simulations, often 100,000, to project the potential differing outcomes, i.e. to forecast a likelihood of investment success. Given the myriad outputs it serves well to educate investors of market uncertainties, however in retail cash flow planning for lifetime incomes, it is constrained in its applicability.

Monte Carlo simulations are widely used to demonstrate likely investment outcomes for individuals and sit behind many robo adviser algorithms. It is important to consider the benefits of this technique to an income-seeking investor, either a trust or a person with a drawdown pension.

In 2014 Kenji Matsumoto¹⁰, a US game theory graduate stated with youthful clarity in his blog that 'if the results of simulation don't align with what happens in real life, the simulation fails to be useful'. His key arguments is that global variables overpower local items, and the investor, faced with multiple potential outcomes, does not examine causality, the reasons affecting – controlling – the outcomes. Our conclusions in this area are that the use of balance sheet reserves within an investment trust, and the long-term reliability of income payments, render the myriad outcomes of a Monte Carlo output redundant for an at-retirement investor.

¹⁰ Kenjispagewordpress.com/2014/12/18/problems-with-monte-carlo-simulation/

In the retail advisory sector, a key issue with the simulation is very clear to see when shown in a chart. Whilst we do not doubt the statistical veracity of the outputs, of the type shown below, the difficulty it delivers to the investor is that a gas bill is not calculated 'within a range of possibilities'. Expenses in retirement are absolute so income should be planned and matched in the same way.

The Applied Physics Lab at Johns Hopkins University observed that simulations help clarify understanding of outcomes in the real world and that they are useful for time compression; on the negative side they note that it is 'easy to misuse simulation by stretching it beyond the limits of credibility, a problem apparent when using commercial simulation packages due to ease of use and lack of familiarity with underlying assumptions and restrictions, slick graphics...may tempt the user to assign unwarranted credibility to output. Contrast: analytical solution provides exact values'. (Johns Hopkins)¹¹

This view is reinforced by David Nawrocki, PhD, a US finance professor, whose 2001 paper¹² on the subject challenges the simulations' reliance on normal distributions when those are not typical in financial markets. In his own words "The probability results from Monte Carlo simulations may look impressive to a client. However, if that number is derived from assumptions that are not realistic, there is no value to that number."

Lewellen and Long, way back in 1972, contended that 'the information provided by simulation is, at best, no better than is generated by the traditional single-point present value approach...'.¹³

Monte Carlo simulations may be relevant when planning the accumulation of money to convert into income in the future, for a future retirement, but not for at-retirement planning, when expectations of monthly income are required to be calculated. To quote Dr Nawrocki:

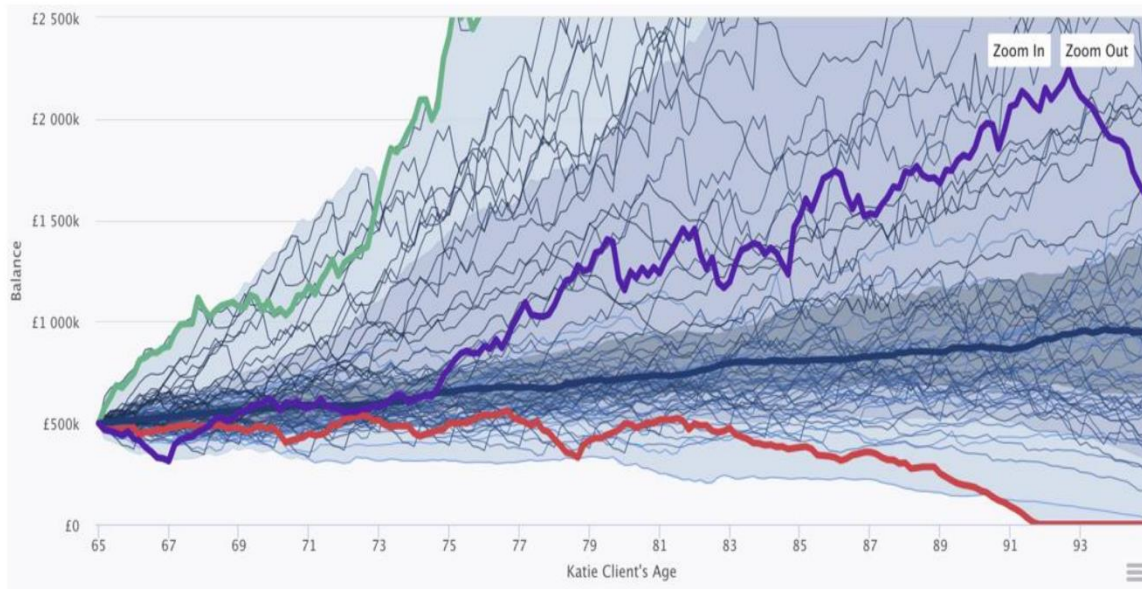
"Essentially, Monte Carlo simulation is useful only when nothing else will work. It has proved to be useful in academic financial and statistical research, but only when the data or the analytic solution is not available. This is not the case in the investment decisions typically faced by financial planners. Financial market data is plentiful and cheap."

¹¹ James C. Spall, Johns Hopkins University Applied Physics Laboratory <https://bit.ly/2X6n4DH>

¹² The Problems with Monte Carlo Simulation, Journal of Financial Planning Nov2001, Vol. 14 Issue 11, p92-106.

¹³ Lewellen and Long, Simulation versus Single-value estimates in capital expenditure analysis, Oct 1972, JoDSI,

Output chart of a Monte Carlo simulation for retail investors intended to demonstrate the likely outcomes for a retirement portfolio:



Source: timelineapp.co¹⁴

This tells the investor that the middle bounds of probability of capital she will have around age 80 is somewhere between £1.4m and £400k. A range of +/- £1m is not useful for planning how to meet life expenses in old age. Importantly, reverting back to the emotional behaviour of investors we believe this output does not allow the investor to form deliverable expectations from the investment. We do not see it as efficient for the liability matching required by an investor's retirement expenses, nor do we believe it was intended to be. We note the technique was invented by Stanislaw Ulam, a mathematician from the Manhattan Project.

Importantly, Monte Carlo simulations ignore everything that is not part of price movement; whilst that accords with passive index investing, it does raise the query of the impact of macro trends and cyclical investment factors. We argue that an ultra-low interest rate environment does indeed have an impact, hence reinforcing the notion that the simulation is fine for academic and multi-generational timespans, but not for the person setting up a drawdown contract now. Further, the ability of an investment trust to use reserves and borrowing to smooth investor returns moves this asset class far from the modelling relevance of randomly generated myriad returns.

¹⁴ [Timelineapp.co/blog/revisiting-capacity-for-loss-in-retirement](https://timelineapp.co/blog/revisiting-capacity-for-loss-in-retirement)

4. What really is investment risk for an individual or trust?

Risk of loss to a provider is not the same as risk of loss of income to a pensioner

We have questioned for some time the industry's accepted definition of investment risk. Typically, risk is defined as volatility, the amount by which an asset moves in relation to its own historical value or to other assets. We believe that is wrong, misinterpreted and misleading.

As advisers on regulated investments we would define risk as the likelihood that an investment will fail to do what an investor expects.

The MPT reduces volatility through diversification: the putting together of assets whose value moves differently to each other. Bonds, for instance, tend to react differently to equities when interest rates fall or rise. This approach can work with a long-term, open-ended fund with continuously variable cashflows. However for a drawdown income investor, specifically where drawdown is chosen because annuity rates are too low, it is the volatility of the income from the asset rather than its value that is of paramount importance.

If a pensioner's income disappears but his capital remains, he will panic; if the capital disappears but the income remains, he has an annuity deemed to be risk-free.

If we accept this analysis, very risk-averse individuals who need, say, a certain 4% income from their money may be best advised to seek out a secure cash account, annuity or bond portfolio if they can find something suitable. There are several problems with this approach, not least of which is the difficulty of achieving a certain 4% outside of an annuity in the current financial environment, the historical solution being to use bonds: lots of packaged debt with fixed income payments.

Industry's view of risk management has now shifted from a probabilistic approach to a possibilistic one. In 2009 the sociologist Professor Frank Furedi wrote¹⁵ that along with criticism of probabilistic thinking there is a growing influence of possibilistic thinking which equates what can possibly go wrong with what is likely to happen. This fear of unknown unknowns is elevated in our current society's culture of fear leading to a rejection of the proven long term returns of equities for long term income planning. This is a confusion between uncertainty of outcome and likelihood.

Extrapolating this shift in attitude we see that on the one hand probabilities can be calculated and managed to minimise adverse outcomes whereas focusing on the worst-case outcomes directs the imagination to just that – worst cases.¹⁶

¹⁵ <https://bit.ly/2XlyAof> Precautionary culture and the rise of possibilistic risk assessment

¹⁶ Risk is not a four letter word: Hilary Salt, First Actuarial

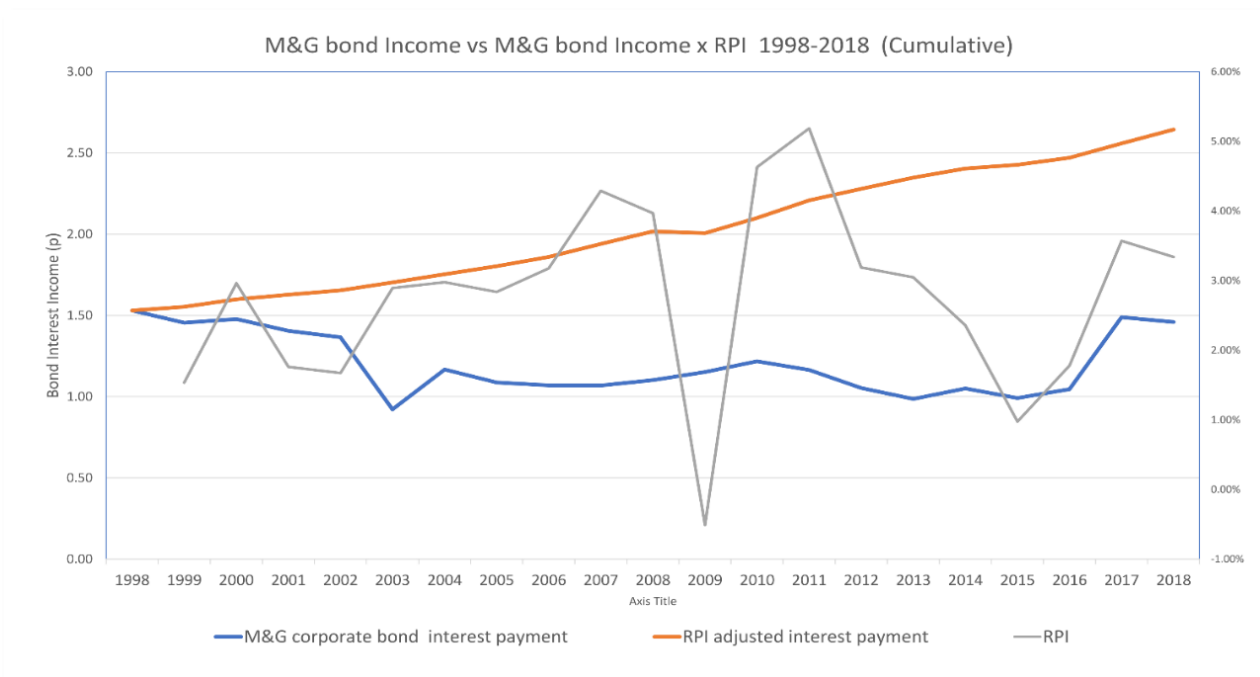
5. Why fixed income no longer does what it says on the tin

There is significant difference between income from one bond and from a bond fund

In the past, the industry's answer to providing a low-risk secure income, such as that required by a retired person, was often a portfolio of high-quality bonds. For many years, such a portfolio could be relied on to provide a 'natural' income from interest receipts that kept pace with or exceeded inflation. In principle, investors could live off this natural income without needing to touch their capital.

For better or worse, the collapse in interest rates has drastically changed these assumptions and reduced the attractions of high-quality bonds. Inflation has also fallen in recent years, but not enough to offset the fall in interest rates. To see how a real investor might have experienced this change in circumstances, we compared the natural income provided by M&G's £3.5 billion Corporate Bond fund over the last 20 years with inflation over that period. Note that is not to say that a combination of natural income and selling down units would have failed to deliver required income however that directly injects sequence risk into the portfolio, it increases the income seeker's risk of an unwanted outcome.

We have included the cost of inflation in discrete years to match annual income, which is paid in pence, and only displayed as a % yield. Fund distributions are not calculated nor paid as a percentage of the fund.



It is clear that an income investor seeking safety in fixed income has not been well served over the last 20 years. While both bond income and rates of inflation have fluctuated, the latter has generally remained stubbornly higher in recent years resulting in bond income has not having kept up over all three periods we examined.

More importantly, even if the nominal amount of income can be maintained, investors' money will inevitably be eroded by inflation over time. Arguably, the income-seeker has simply swapped their income risk for a capital risk.

Annuities are the traditional risk-free source of retirement income, secured by the balance sheet promises of the provider, and regulatory compensation framework on top. Here, investors have an immediate capital loss of all their money, choosing certainty of income as more valuable than any residual element of capital. In the age of pension freedoms, investors may be severely reducing the value of their estate for their heirs by refusing to accept any risk to income. The Financial Conduct Authority, the British regulator, seems to prefer the financial services industry's definition of risk, where volatility is used as a proxy. Thus, the FCA handbook identifies market risk for a fund as:

market risk

(1) (in *COLL* and *FUND*) the risk of loss for a *UCITS* or *AIF* resulting from fluctuation in the market value of positions in the *fund's* portfolio attributable to changes in market variables, such as interest rates, foreign exchange rates, equity and commodity prices or an issuer's credit worthiness.

Note, the FCA holds that it is not the fluctuation in value that is the risk – the volatility – it is the potential for a loss **caused** by volatility. Unfortunately, the FCA does not clarify that further which would be helpful.

Elsewhere the FCA goes on to provide a generic definition of risk¹⁷:

What is Risk?

“We consider risk to be the combination of impact (the potential harm that could be caused) and probability (the likelihood of the particular issue or event occurring).” (FCA)

In considering the rest of this research paper it is worth keeping this point in mind: that the FCA views risk as the percentage likelihood of an occurrence, and the potential harm that would cause.

- With the benefit of research, what is the percentage likelihood of income being cut or lost?
- Is the loss permanent or temporary?
- Does it have a material impact on the investor's lifestyle? Is that permanent or temporary?
- Does 'loss' to capital impact on the investor's income? Is that permanent or temporary?

¹⁷ <https://www.fca.org.uk/about/supervision/risk-management>

The US regulator, the Securities and Exchange Commission (SEC), takes a wider view, mentioning both uncertainty and capital loss. Its definition of risk for retail investors is set out on its web site²¹⁸:

What is Risk?

“All investments involve some degree of risk. In finance, risk refers to the degree of uncertainty and/or potential loss inherent in an investment decision”

(SEC)

Time and tide (and markets) wait for no man

Tides rise and fall every day, with roughly six hours between each rise and fall. There is no risk that the tide will not come in, or when that will be: both are as certain as anything can be.

An angler cut off by the tide, stranded on a sand bar, has made an error of judgment, not an error of fact. The risk was not that he would fail to predict that the tide would come in, but that he would fail to predict when.

The rise and fall of stock markets is as certain as the tides. The difference is that nobody has yet found a way of predicting when those rises and falls will occur.

But, like the angler, an investor facing a loss has made an error of judgment, not of fact. The risk was in miscalculating the investment period or failing to diversify or trading at the wrong moment, not that the market would rise and fall.

As advisers on regulated investments, we would also emphasise the uncertainty factor, but we would define risk as the likelihood that an investment will fail to do what an investor expects. This is perhaps less precise than other definitions but is we believe more realistic and understandable to the retail investor.

We agree with the basis of the MPT that seeking returns involves taking risks, usually by investing in the stock market. We expect stock markets to be volatile, and for the timescale between market peaks and troughs to be unpredictable.

The difference with other definitions of risk is that we emphasise the distinction between market volatility, which is predictable, and a permanent loss of capital, often lost through poor judgment. (See box: Time and tide (and markets) wait for

¹⁸ <https://www.investor.gov/introduction-investing/basics/what-risk>

no man.) All investors will experience temporary falls in value, it is generally only if the investor then decides to sell the fallen asset that the loss becomes permanent. Retail investors who buy shares and units still own those shares and units after markets fall. What fluctuates is not the risk but the market price. That is temporary and, knowing the price may rise again, something which investors are free to ignore.

6. The real risk to long-term income from equities

Volatility of equity capital has little correlation with that of equity income

Moving from theory to practice, it is clear that academic definitions of risk and how to reduce it in portfolios play an important role in determining how clients' money is invested.

In an increasingly tightly regulated market, advisers must determine the 'risk profile' of clients before they can handle their money. This leads to regulated advisers widely using computer-based risk-profiling programs to ascertain the level of risk to which a client's portfolio should be exposed by attempting to quantify the client's attitude to risk. However, the risk profiling software typically uses standard definitions of risk and diversification which may not coincide with people's own view of risk, with the result that they may be often pushed in the wrong direction when it comes to seeking a long-term, secure income. Where the output of the software is unchallenged, by an adviser perhaps, then the original software programmer's interpretation of risk wins.

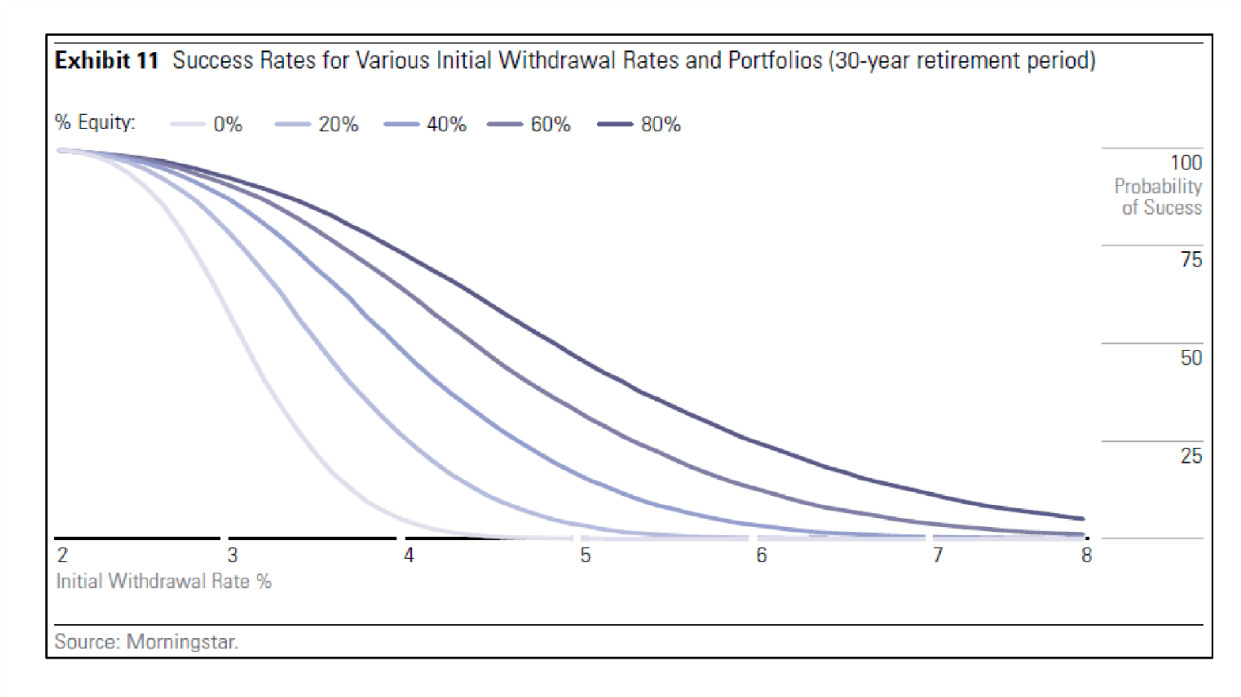
The software typically works by assessing the answers an investor gives to questions based on different scenarios where their money is subject to different levels of uncertainty. It then matches the answers to a risk score. This is meant to ascertain the investor's mental attitude toward risk.

- One mainstream profiling tool states, for instance, that it is developed by '*an independent team of leading psychology academics*'. The problem is that, however expert the developers of these programs, a standard set of questions cannot possibly extract the information necessary to meet the investment needs of very different individuals. That can only be done in a person-to-person discussion.
- One standard question exemplifies the issue, asking investors if they prefer their money '*safe from risk*' without finding out what 'risk' means to that person, or indeed if that person's understanding is correct.

In isolation, everyone would like their money to be 'safe from risk', but if it was explained that this would still leave it subject to the vagaries of inflation or unable to provide an income for the rest of their likely life, that their income could stop in their 70's or 80's, many might give different answers to those currently being recorded. Investors would certainly seek more clarification.

In reality, those displaying a dislike of uncertainty are steered towards low volatility, cautious assets, and away from equity income, because the characteristics of the stock market make a heavily equity-based investment 'risky'. The truth, we would argue, is that the stability of an equity-based investment is often the income solution with the least risk. This is illustrated in some recent research conducted by Morningstar, the data provider¹⁹. It examined mixed equity/bond portfolios, using differing proportions of equity ranging from 0% to 80%. Traditionally, the 0% equity portfolio would have been seen as the least risky and the 80% equity-heavy portfolio the higher risk, yet this is not borne out by the historical results.

The chart below is an extract from Morningstar's research. It shows the probability of success of meeting withdrawals over a thirty-year period using different proportions of equity within a drawdown portfolio. It is striking that in every case shown the highest equity allocations display the least risk of the money running out: in other words, the least risk to long-term income.



The 80% equity dark line has the highest probability of success with all withdrawal rates.

This suggests that standard investment advice applied to reduce risk in equity income is incorrect. The attempts to reduce the risk to the capital simply increase the risk to the longevity of the income.

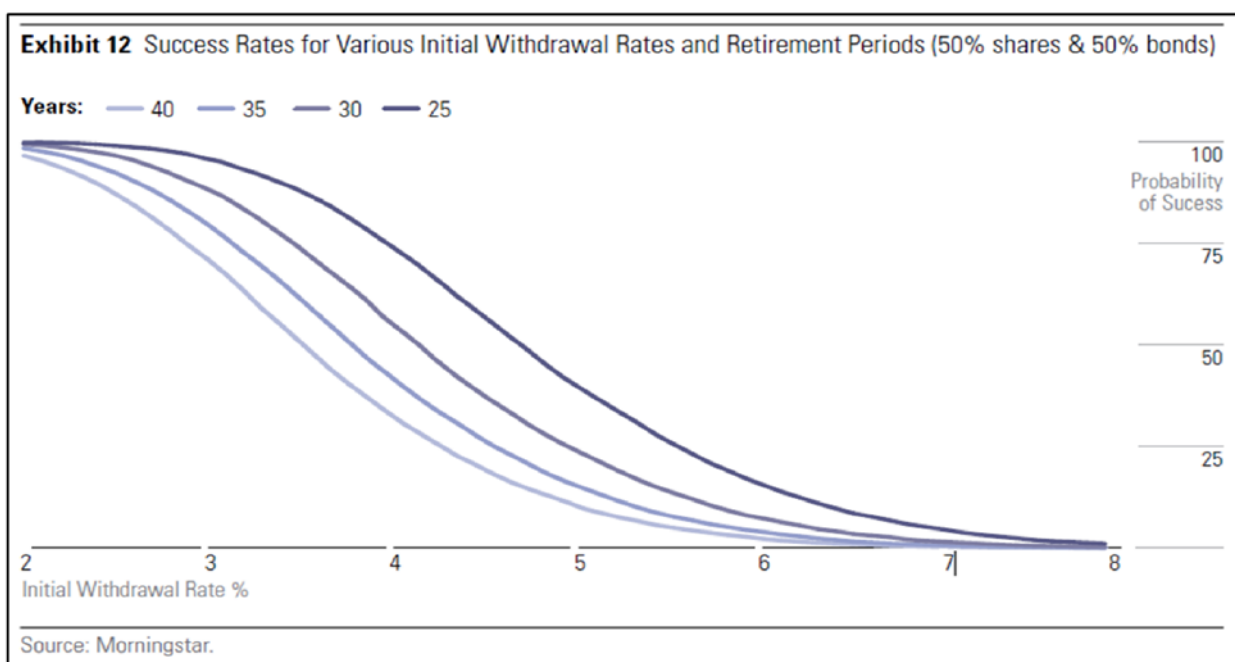
¹⁹ Safe Withdrawal rates for Retirees in the United Kingdom, May 2016

When investing for drawdown income, there is indeed a risk created by the equity part of a portfolio, but the risk is that there is too little equity in the portfolio, not too much.

The issue goes back to our definition of risk. It is only when the asset is sold that the loss is made permanent. The drawdown payments on which the chart below is based are achieved by combining income with capital realisations, i.e. selling assets. The only way investors can mitigate the effects of those sales is by owning other 'risky' assets able to generate the returns needed to swim strongly against this outflow of funds. Typically, that means equities. It seems clear to us that – generally – the higher the proportion of equity in a portfolio, the higher the probability of success (for each given withdrawal rate) in generating long-term income using drawdown.

Morningstar runs the same scenario again but using a portfolio that is 50/50 shares and bonds and comparing not the different percentages of equity but the number of years of required income. One can see the jump where a 4% withdrawal for 30 years has a c.60% probability of success whereas for just 25 years the probability jumps by 25% to a 75% success rate.

How long before the investor dies? Would you like to select 25 or 30 years? It matters.



If one is to consciously reject crystal ball gazing when planning an investor portfolio for 20+ years, it would be wrong to ignore the evidence that over the last 119 years UK equities have outperformed inflation by 4.9% per annum²⁰ whereas gilts were at 1.9%. Finally, in that study Barclays use their

²⁰ Barclays Gilt Equity Study 2019

significant resources and human capabilities to calculate the following table of equity performance and the probability of equity outperformance.

	Number of consecutive years				
	2	3	4	5	10
Equities v cash					
outperform cash	81	83	85	87	100
underperform cash	37	34	31	28	10
total number of years	118	117	116	115	110
Probability of equity outperformance	69%	71%	73%	76%	91%
Equities v gilts					
outperform gilts	80	87	87	83	85
underperform gilts	38	30	29	32	25
total number of years	118	117	116	115	110
Probability of equity outperformance	68%	74%	75%	72%	77%

Source: Barclays Research

7. Seeking new sources of secure and sustainable income

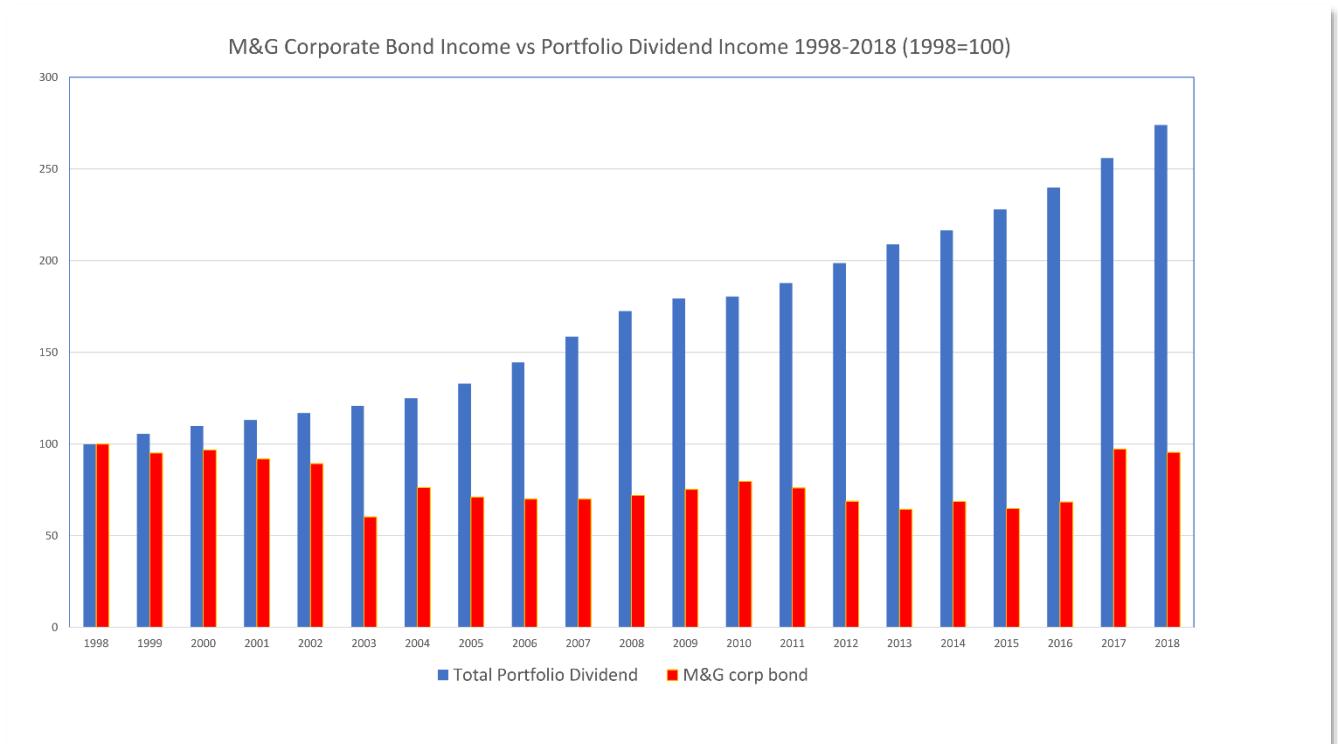
We can only invest in today's assets with today's returns, yesterday's income is all gone. As we have said, the Morningstar research assumes that a drawdown recipient will have to rely on both the annual income provided by their investment portfolio, as well as regular realisations of capital from it. There are clearly two elements to this: 'natural' income provided by interest from bonds and/or dividends from equities, on the one hand, and capital provided by regular sales of the underlying asset, a bond and/or an equity portfolio, on the other. To assess the value of these two elements, we need to look at each in turn.

We have already seen that the natural income provided by M&G's £3.5 billion Corporate Bond Fund over the last 20 years compares unfavourably to inflation over that period. How then would an equity portfolio measure up? For this latter, we chose 30 household-name investment trusts offering broad global equity diversification. The reason for selecting active trusts as the real-life equity proxy is evident in this table:

Total return, 1999 to 2018, inclusive of all fund charges	Charge: ocf	
Murray International	466.35%	0.69%
F&C	406.87%	0.65%
PIGIT	400.57%	0.72%
Temple Bar	351.21%	0.47%
City of London	243.29%	0.41%
Merchants	214.98%	0.58%
FTSE All share index	167.80%	0.00%
FTSE100 index	128.47%	0.00%

Comparing the bond proxy to our equity proxy – a basket of investment trusts – a similar picture emerges, although, in the chart below, the rising nature of a managed dividend income is very visible. Referring back to a client investment objective of long term reliable income the visuals demonstrate that there is clearly more to equity sourced income than the risk warnings of MPT suggest.

As we saw before, the bond fund income has tended to fluctuate, leaving a broadly flat trend. What is notable about the investment trust income is its remarkably smooth progression upwards. In fact, not only has this annual income growth beaten that from bonds, but it has also comfortably surpassed inflation in all three periods we examined, summarised in the table below.

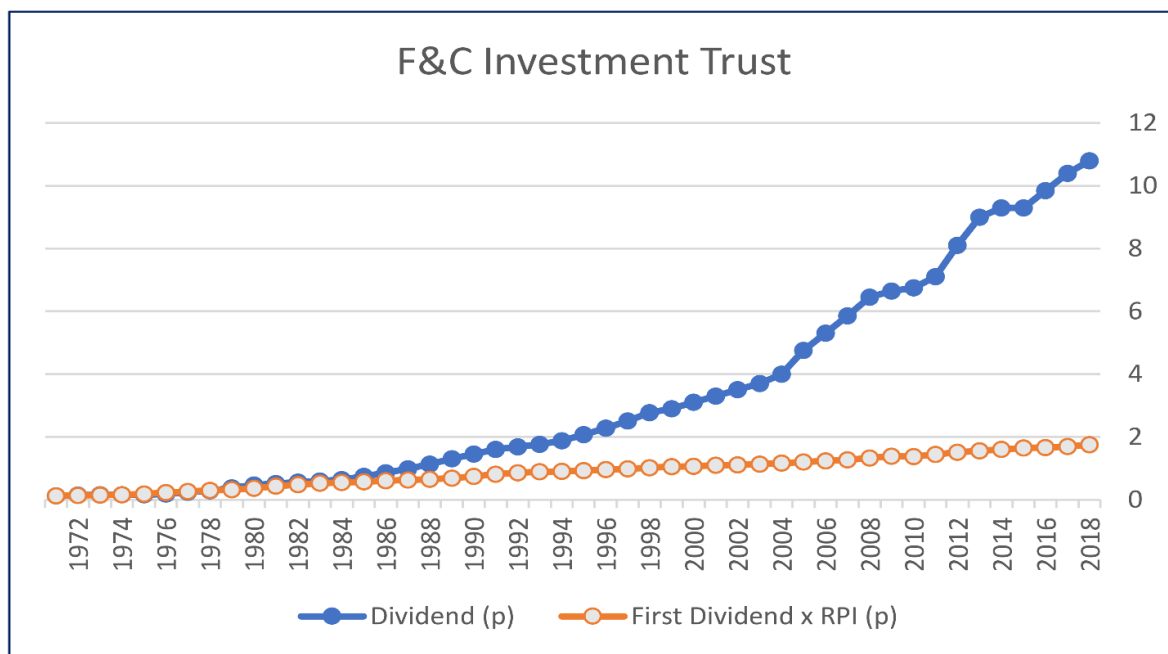


The table below highlights the average **annual increases in dividend income** from the portfolio across the different periods, compared to the **average annual inflation**.

		Trusts	Inflation
1987 - 2018	32 years	6.47%	3.31%
1999 - 2018	20 years	4.21%	2.78%
2009 - 2018	10 years	5.31%	2.76%

We can also cherry-pick trusts with long histories of dividends that have focused on dealing with inflation over the long term (as opposed to selecting those with greatest annual increases or lowest income volatility). A simple example is the world's oldest mutual fund, Foreign & Colonial (which commenced eight years before General Custer fell out with Crazy Horse at the Battle of Little Big Horn). In the chart below the blue line shows the annual dividends and the orange line takes the first dividend in 1972 and then grows it each year by RPI.

We look at income this way because this is precisely the scenario an investor will encounter when commencing drawdown of a pension from their early 60's.



Expanding the F&C example to build a portfolio of trusts, it becomes evident that a well-researched 'buy and hold' equity trust portfolio can produce a pretty solid lifetime income that can outperform inflation. In fact, leaving aside the extreme inflation experienced in the 1970s, our core portfolio of investment

trusts has defeated inflation by a factor of almost 2:1 since 1987. We comment in the box below about why investment trust income has become so reliable.

In trusts we trust

Our research looked at 30 mainstream investment trusts over the period since 1974, one of the most volatile periods in the equity and bond markets since 1929. Not all trusts have been in existence that long, and some that have do not have full records. In total, however, the research analysed 1,236 annual consecutive annual payments. (See Appendix C for further information on how we selected our trusts.)

This analysis found that:

- **a dividend payment was never missed by any trust**
- **the payment was the same or higher than the prior year in 98% of cases**
- **In 91% of cases it was increased.**

The reasons for this consistency are not hard to find. Like the underlying company holdings, the dividends from investment trusts are set and controlled by the directors, and are based on actual cash receipts and liabilities. The directors have a legal responsibility to advise investors throughout the year how the profits and likely dividends are progressing via stock market announcements. Shares in the trusts tend to rise and fall in line with the value of the underlying holdings. However, analysis shows that dividend volatility has no correlation to share price volatility.

Investment trusts maintain revenue and capital reserves on their balance sheets and use these to support a smoothed dividend stream. As listed companies, the balance sheets are available to us for analysis and to monitor progression of items such as dividend /reserve cover.

- By example, the City of London Investment Trust has increased its dividend every year for 52 years, with a further fifteen trusts having increase their annual payments for longer than the 28 year life expectancy calculated by Aviva, the UK insurer, for a 60 year old male.

It is therefore clear that the record of income increases from mainstream investment trusts has demonstrated ability to far outstrip the likely number of years needed by a retiree in drawdown. It should also be remembered that inflation extremes, such as 1974/75 outstrip all non-linked assets.

8. Does the share price matter to investors in equity income?

With a portfolio covering 100+ shares, is income affected by volatility

The certainty that equities can provide for income seekers should go a long way to providing them with peace of mind over the long term, which is, after all, what counts if you are retired. Nonetheless, psychologically, it is still often difficult for those people to see through the everyday 'noise' caused by economic news and events, like changes in interest rates and fluctuations in the stock market. Can they

Misleading yield

One of the barriers to an assessment of the true income from a portfolio is the way dividend yields are expressed. Most commentators and analysts talk about the 'current yield', which is to say the most recent dividend divided by the current share price.

This is fine for those buying the shares anew, but largely irrelevant to those who already own them. For them, it is the current dividend divided by the price they paid for the shares that counts, what we call the 'yield to cost'.

The only way this yield changes for the existing investor is when the annual payment is varied. By the same token, the cash value of that income to the investor is calculated by multiplying the current dividend by the number of shares owned.

Changes in the value of those shares after they have been bought are irrelevant for income purposes except to the extent that a drawdown investor may want to sell some to supplement their 'natural' income. The dividend paid by a board of directors is not dependent on the price of the underlying shares.

be provided with further reassurance on a day-to-day basis?

One way to find out might be to see what effect, if any, the movement in interest rates and share prices has on equity income. In particular, will income fall if rates and share prices fall? (See the box on the left on why the nomenclature doesn't help.)

One way to test this mathematically is using correlation, the extent to which movements in one variable – say, interest rates – relate to movements in another – in this case, equity income. If A moves, will B tend to move by a similar amount? Using correlation, we compared the movement in income from our 30-strong investment trust portfolio with movements in both inflation, represented by the retail prices index, and interest rates. A number closer to one suggests a closer relationship.

In fact, the figures are closer to zero than one, suggesting that the correlation²¹ with these two variables tends to be weak. High-interest rates do not appear to lead to large dividend increases, nor do inflation and interest rates reduce the rate of dividend increases in a corresponding manner. We would argue that one of the reasons that income from investment trusts exhibits this stability is because of their long and strong tradition of maintaining reserves on the balance sheet.

The opposite, of course, may also be true – a low correlation to RPI would indicate that dividends fail to keep up with RPI when it is rising. At risk of antagonising the academics for not covering enough years, to analyse this relationship we converted annual dividend increases of the 30 trusts into five-year rolling averages starting from 1987. We then compared the average annual growth rates to five year rolling RPI measured the same way and compared those averages.

Inflation outstripped the dividends in only one five year period, 2010-14, and by just 0.42% annually. The summary from 1/1/87 to 31/12/18 is:

Correlation of the average rise in dividends from 30 trusts			
related to	→	RPI	Interest rates
over 20 years		0.16	0.34
27 x 5 year rolling averages		0.23	0.24

More importantly, the correlation between the dividend growth rates and the FTSE100 values, ex-dividends, from 1989 to 2018 was 0.20. Statistically this is a ‘weak’ positive.

Extrapolating from the correlation calculations above, admittedly for a single twenty year period, suggests that the growth in the dividends – not the actual payments – is not affected by the volatility of the stock market. Where volatility is used as the proxy for risk, we deduce for the period examined that the incomes from the thirty investment trusts are less risky than the simple movements of the FTSE100. Risk in the latter does not equal risk in the former.

Statistically: although only one twenty year period was used, this period contained two of the worst London equity market events for any retail investor to face - a consecutive series of FTSE 100 falls from

²¹ Technically, we are using Pearson correlation, which involves dividing the covariance (joint variability) of the two variables by the sum of the standard deviations of the two.

6930 to 3287 over 2000 to 2003, then the 47% fall over seventeen months from October 2007 to March 2009. If investment trust income can survive both of those, then there it would suggest their income strategy does work.

The investment trusts recorded a 100% success rate in payment of dividends over the period in question; a correlation calculation versus the FTSE index movements is redundant.

9. Is there a higher risk to capital using equities to create drawdown income?

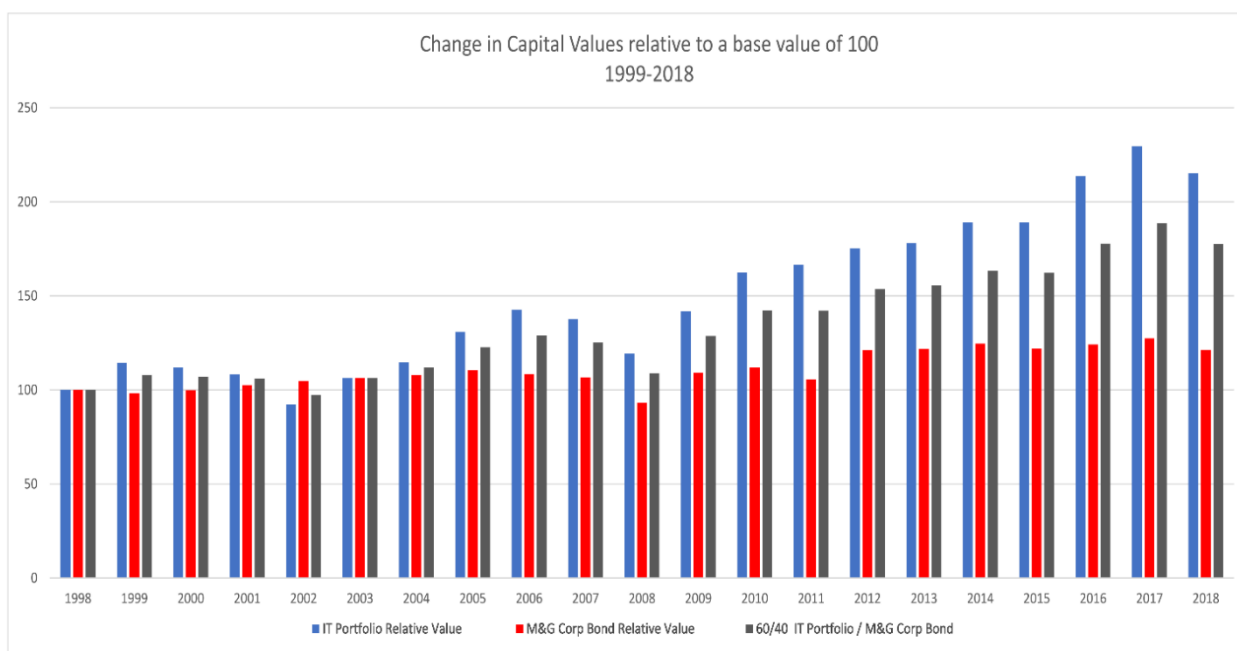
Does an equity /bond portfolio preserve capital better than an investment trust portfolio
The Morningstar data we discussed earlier suggests that increasing the proportion of equities in a portfolio can provide more certainty in generating a drawdown income. But what of capital?

Anyone relying on income needs reassurance that these regular withdrawals are not unduly depleting their savings. To see what the effects of income withdrawals might be on portfolios with different proportions of equities and bonds, we examined three different realistic options for investors.

To represent the two extremes of 100% equities and 100% bonds we again chose, respectively, our portfolio of investment trusts and the M&G Corporate Bond Fund. And this time, to represent the classic MPT 'in-between' approach, we also tested a 60% equity (trusts), 40% bond (M&G) fund mix

We then examined how the capital position of each portfolio had changed over recent periods of ten and twenty years. The results were after deducting fund fees and exclude income, to examine the remainder capital when natural income is being distributed to the investor.

Note: the trusts shown here are not growth specialist vehicles, they are income centric trusts, in an industry started by F & C in the year that Ulysses S Grant was elected PoTUS, 1868.



1999 to 2018	I.T. Portfolio	M&G Corporate Bond	60/40 equity bond mix
CAGR (10 Years)	4.25%	1.73%	3.47%
CAGR (20 Years)	3.91%	1.15%	2.96%
Winner out of twenty years	18	2	0

The 100% equity investment trust portfolio was the clear winner, outperforming the other two in almost every year in question. This would have been a good result in 'normal' markets, but these periods covered the long decline in share prices from 2000 to 2003 and their sudden collapse between 2007 and 2008, two of the most testing times for investors in a generation. One of the events that justifiably frightens long-term investors is the effect that the timing of big market falls like these, whether over short or long periods, can have on their financial security. We wanted to investigate this so-called 'sequence risk' further.

10. Sequences and consequences: don't let the money run out

The spiralling danger in selling shares or units to generate investment income

The order or sequence of annual investment returns is a major concern for any investor, but particularly one who has to rely on their savings over the long term, such as a retired person. 'Sequence' or 'sequence-of-returns' risk can become particularly problematic when a retiree makes withdrawals from a fund's underlying

investments through sales of shares or units to generate income, detailed by Moshe Milevsky in his paper of 2006 with Anna Abaimova²², and further Clare, Seaton, Smith and Thomas in 2017²³

If a high proportion of negative returns occur in the beginning years of a retirement, there will be a lasting impact on the portfolio, reducing the amount of income generated over the lifetime of the retiree. This is the principal concern surrounding sequence risk – severe early losses of capital are rarely caught up later on, leading to future income having to be cut to prevent capital from being exhausted. Our philosophy is to seek to avoid sequence risk. We look for sources of portfolio income that have demonstrated minimal 'down volatility' for thirty years or more, a period that should be sufficient to cover the lifespan of the 'average' retiree.

We again wanted to test a number of portfolios to see how they would stand up to different sequence risks by subjecting them to the same returns but in different orders. The four portfolios we tested were as follows:

- Strategy 1 is a drawdown portfolio based on the FTSE 100 Index, representing the top 100 companies listed in London.
- Strategy 2 is a drawdown portfolio based on the MSCI World Index, representing the leading listed companies in so-called 'developed' markets around the world.
- Strategy 3 is a 60% equities/40% bonds portfolio created using, respectively, the MSCI World Index and the M&G Corporate Bond Fund (which is invested 50% UK, the balance globally).
- Strategy 4 is based solely on dividends derived from a portfolio of eight investment trusts with long-term records of dividend increases selected from our original cohort of thirty trusts.

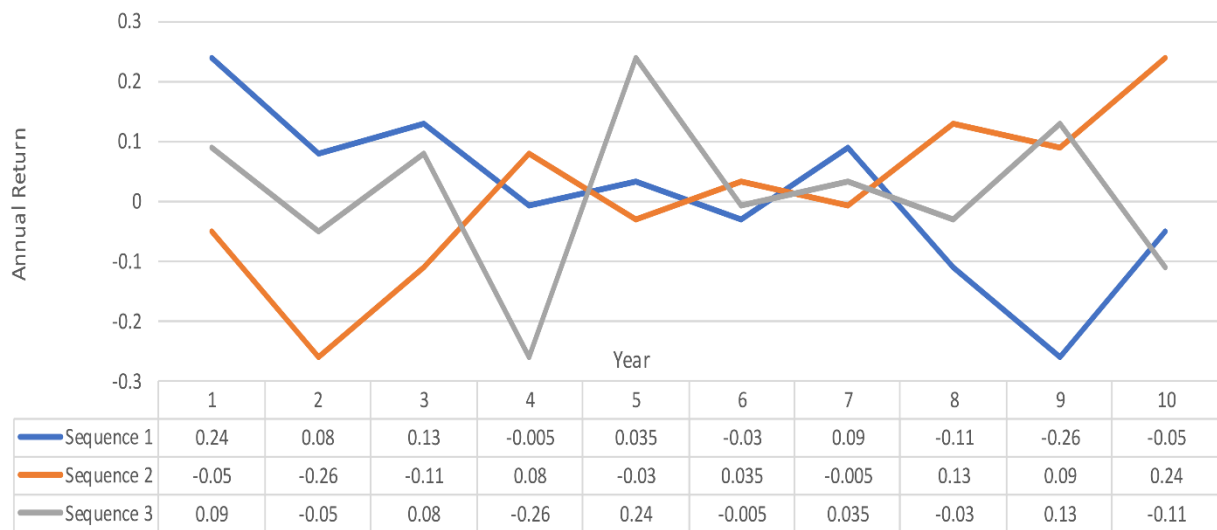
To examine the effect of sequence risk, we assumed an investor started with £100,000 and needed to draw down £4,000 at the start of each year. We then subjected the portfolio to a wide range of random annual returns over a period of 10 years, with a slight skew to the negative.

The next three charts show the simple compound growth or shrinkage of our capital sum that resulted from three different sequences of returns, both assuming no annual withdrawals and then with £4,000 being withdrawn each year. It will be noted that in Sequence 1 the strongest returns happened at the beginning of the period, while in Sequence 2 – which simply reverses the returns – they occurred at the end. Meanwhile, Sequence 3 is a more random mix of positive and negative returns.

²² Retirement Ruin and the Sequencing of Returns, <https://bit.ly/31QslOr>.

²³ Decumulation, Sequencing Risk and the safe Withdrawal Rate, University of York, <https://bit.ly/2IDz7zr>.

Three Sequences of Returns (mean return = 3.09%)



- Sequence 1 returns are identical to those of Sequence 2 but are in reverse sequence
- Sequence 3 returns contain the same annual returns as those for 1 and 2, in a randomised order

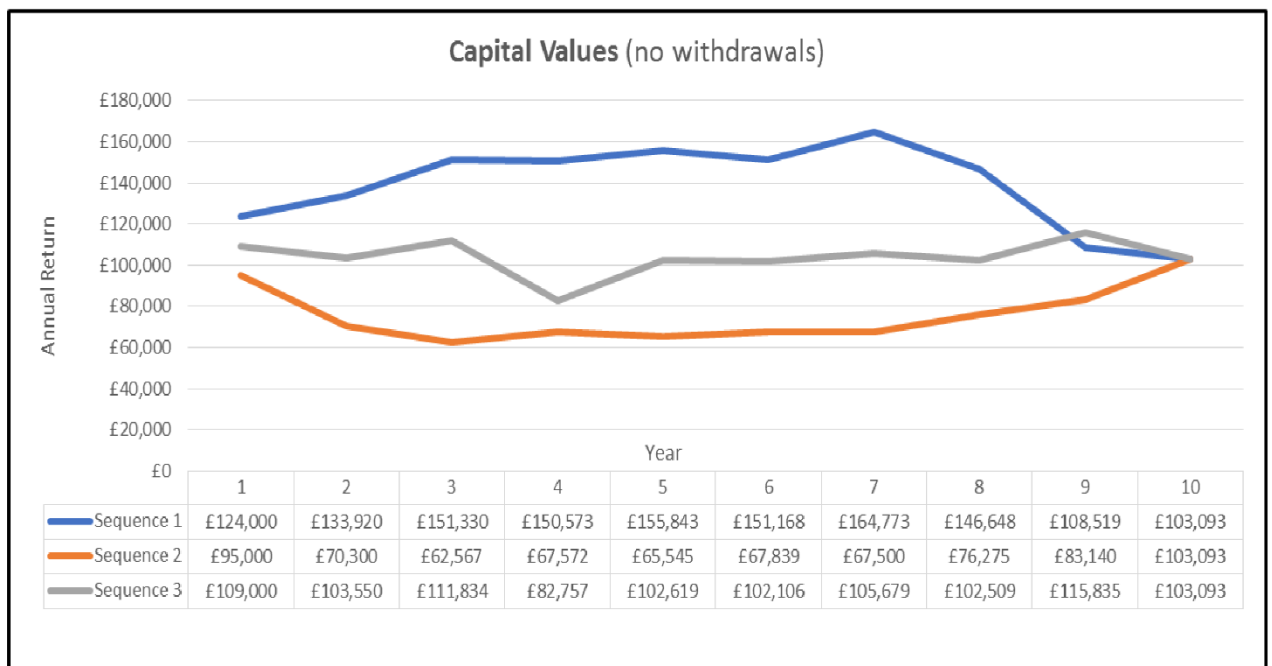
This chart is not cumulative, the lines are intended to emphasise the movement in the range of returns from year to year.

In all three examples above the mean return over the period is 3.09%, however, the visual representation shows several important factors for addressing the behaviour of retail investors:

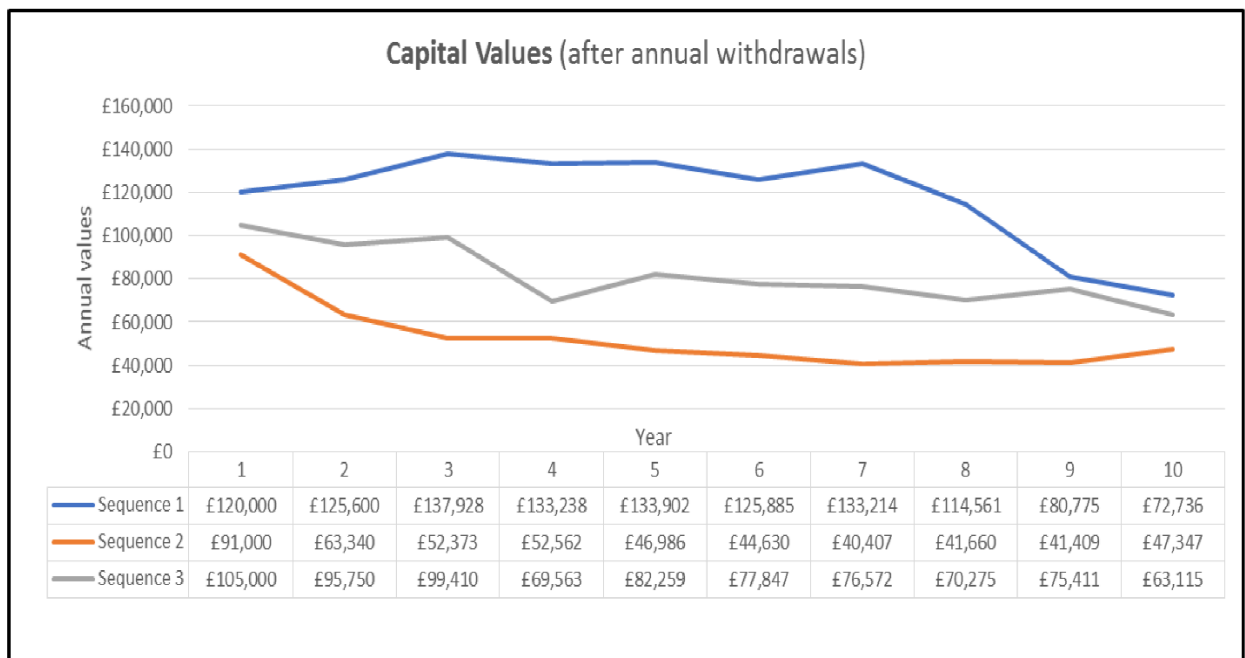
1. The investment timescale can produce very different outcomes for the same averaged return, producing emotional frustration and scepticism in the investor.
2. Great growth returns are only profitable depending on where the investor starts from: a 24% rise is still unprofitable if it was preceded by a 26% fall.
3. Basic maths is a compulsory skill for assessing investment returns and is a prerequisite for financial planners.
4. Marketing departments find it easy to pick and choose investment periods to flatter their funds.

In all three cases the total return is 3.09%, the investment produces the same result if the same annual returns are used in any order.

Capital values with no withdrawals



Capital values with a fixed £4k withdrawal at the end of each year



- Without withdrawals, there was no difference in the final capital value in all three cases, despite the different orders in which the positive and negative returns occurred.

- Big losses required even bigger returns to make up the difference, even when there were no withdrawals. Thus, in Sequence 3, even an outside 24% gain in year five was not nearly enough to make up for the 26% deficit the year before: that would have required almost 44% return.

Year	Sequence 1	Year	Sequence 2	Year	Sequence 3
1	£120,000	1	£91,000	1	£105,000
2	£125,600	2	£63,340	2	£95,750
3	£137,928	3	£52,373	3	£99,410
4	£133,238	4	£52,562	4	£69,563
5	£133,902	5	£46,986	5	£82,259
6	£125,885	6	£44,630	6	£77,847
7	£133,214	7	£40,407	7	£76,572
8	£114,561	8	£41,660	8	£70,275
9	£80,775	9	£41,409	9	£75,411
10	£72,736	10	£47,347	10	£63,115
Change in Capital Value	-27.26%	Change in Capital Value	-52.65%	Change in Capital Value	-36.88%

Income withdrawn in each scenario was £40,000, being £4,000 per year.

Taking withdrawals locks in both losses and lower future profits. Thus, in Sequence 3, even with the same total returns, five years of withdrawals totalling £20,000 left the fund £20,360 worse off in year five than when there were none (£102,619 versus £82,259). Big losses hit hardest when they fell in the early years. Thus, the greatest loss in capital value (-53%) was in Sequence 2, after withdrawals. This is a vital consideration for anyone taking withdrawals from an investment.

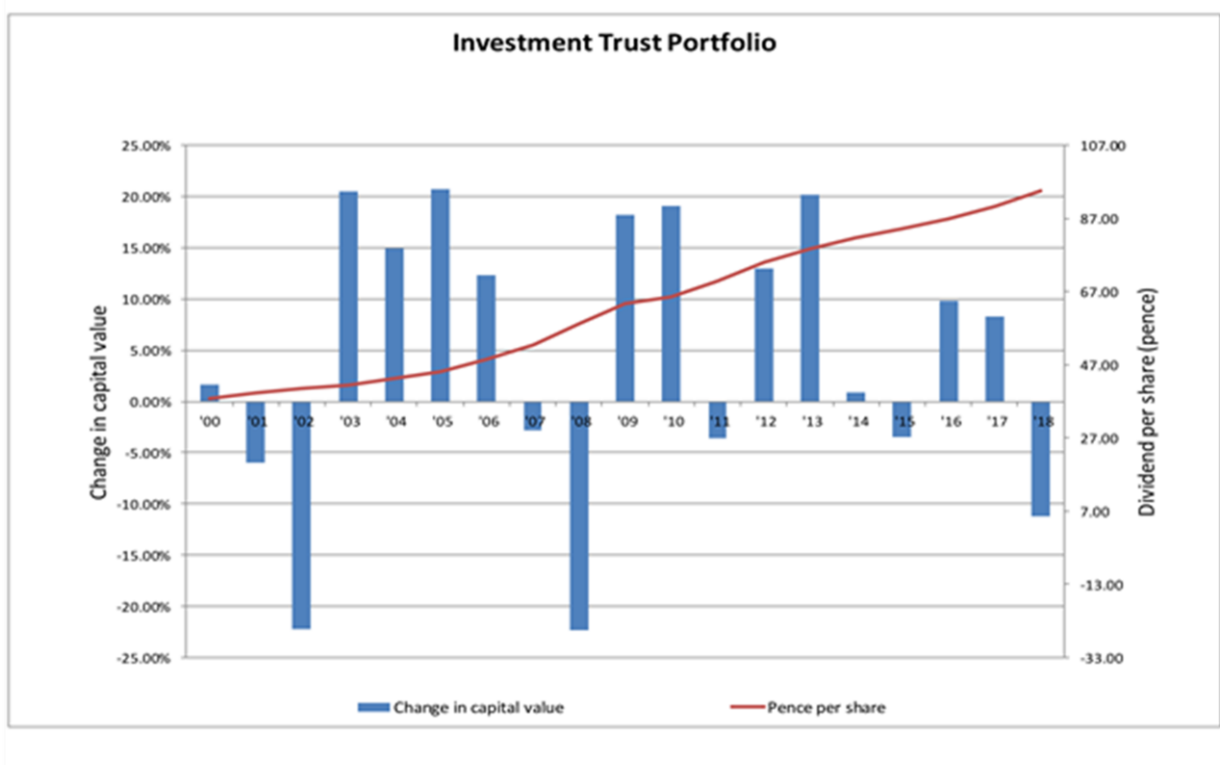
In summary, the order in which returns occur can be more important than the average return over a period of time, particularly where there are regular realisations of capital. It should be pointed out that realisations of capital involve the redemption of shares, which are not there to contribute to the portfolio value when the market eventually rises.

Dividends rule

Sequence risk is largely irrelevant to a retiree deriving income from dividends paid out by a portfolio of investment trusts (Strategy 4). This is because shares in the trust are not being sold to generate income. An investment trust, with its built-in income reserves, provides the board of directors with the ability, in principle, to smooth out volatility of income derived from the underlying assets, regardless of market conditions.

The table below gives a simple example of how a portfolio of investment trusts may suffer the vagaries of share price volatility via the stock market, whilst the trusts' directors deliver income that is uncorrelated to the share prices.

This is a portfolio of six trusts, weighted equally, selected for longevity and stability of dividends, to create a smoothly rising dividend stream. The blue bars are the discrete annual returns of the shares, the red line is the discrete dividend returns.



11. Putting trusts to the test

Evaluating real life income withdrawal from traditional investment solutions

Having looked at sequence risk in the theory, the next test was to see how the different strategies had worked in practice. In particular, we wanted to see how typical drawdown portfolios, Strategies 1 to 3, had fared against our income-only investment trust portfolio, our IT portfolio in Strategy 4. In order to provide realistic tests that a long-term income seeker might apply, we compared:

- the reliability and sustainability of annual income at different pre-determined levels,
- the capital growth,
- the impact of sequence risk on both the income and capital values both during and at the end of the review period (Strategies 1-3) with the income and capital values produced by our portfolio of investment trusts (Strategy 4).

Our test covered 20 years from December 1998 that included a period with some of the biggest rises and falls in markets seen in a generation or two.

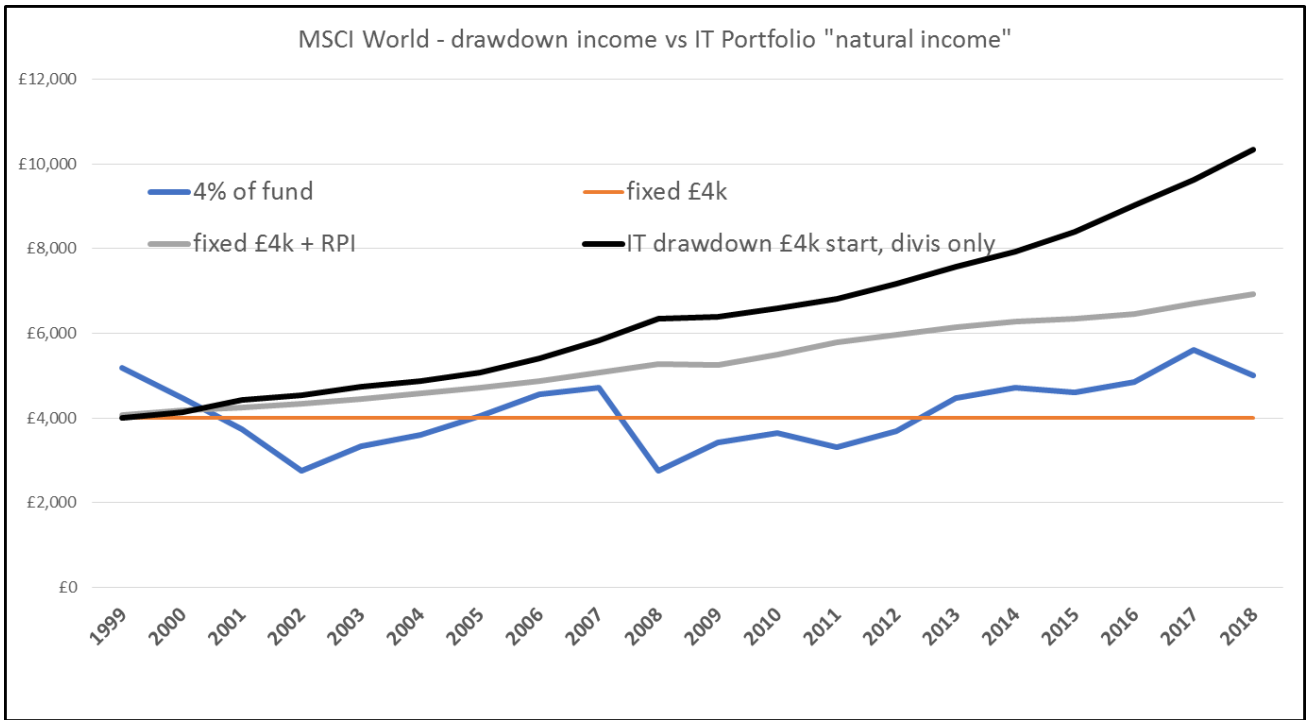
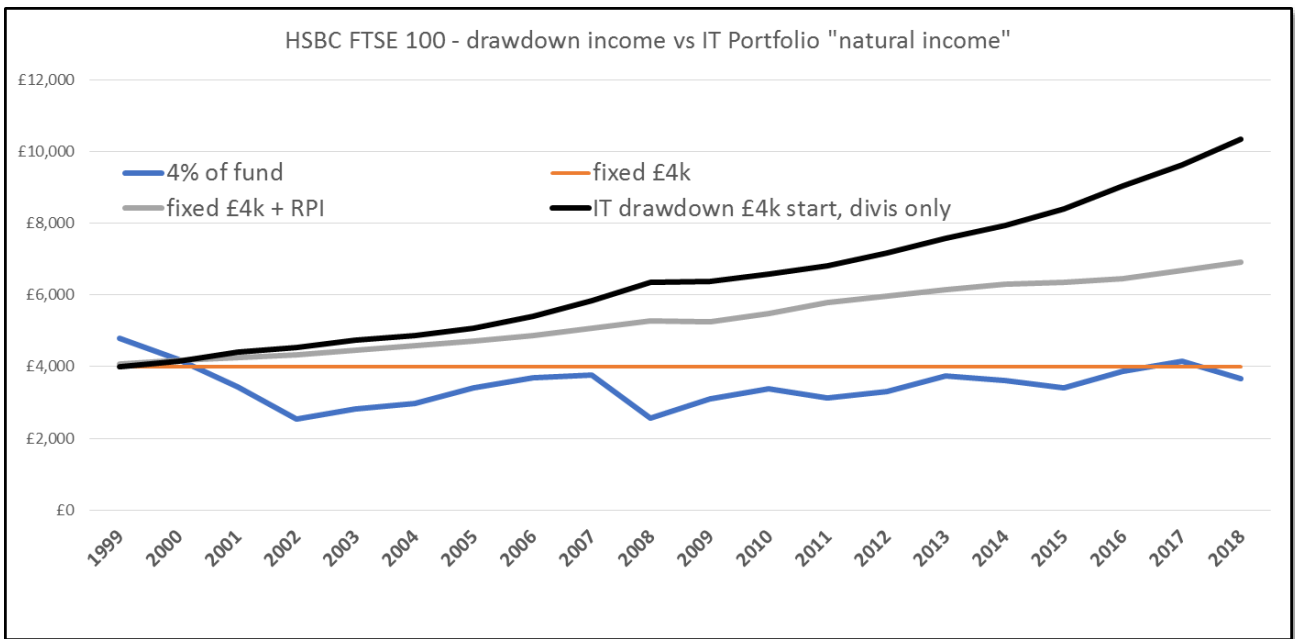
Starting with a portfolio value of £100,000²⁴, we analysed each of Strategies 1 to 3 using four different drawdown approaches:

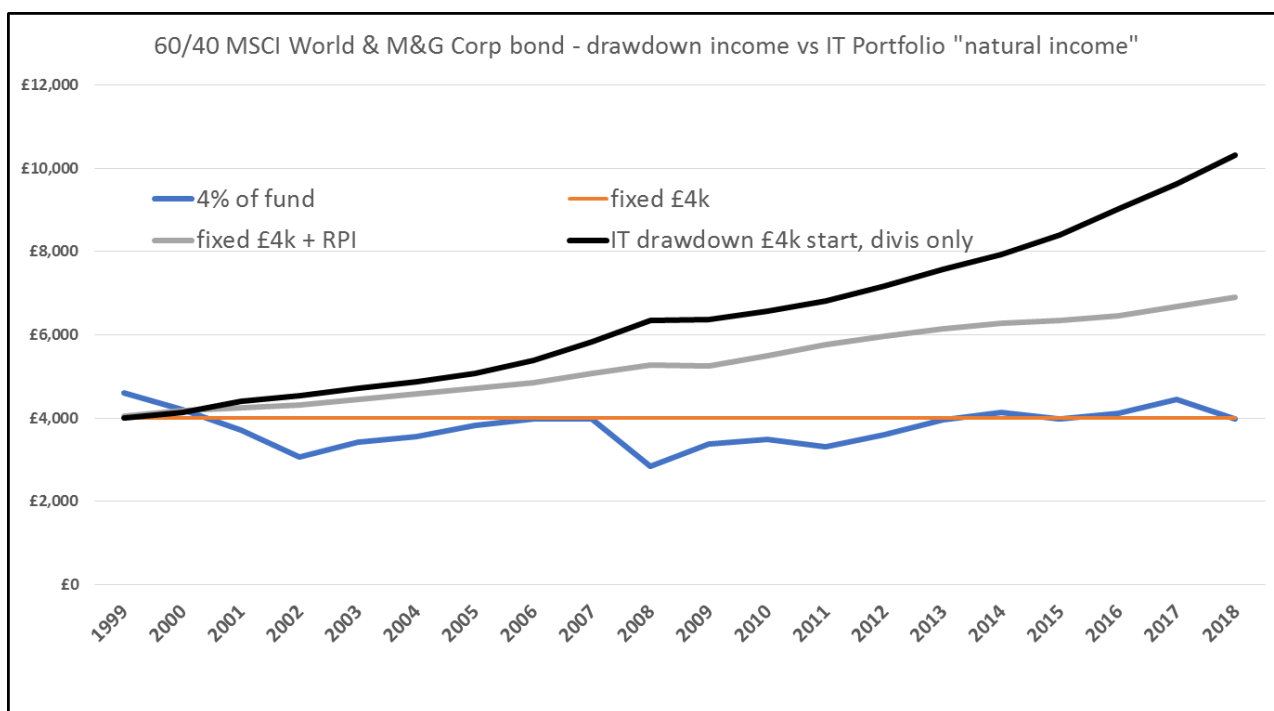
1. A withdrawal of 4% of the fund value
2. A withdrawal of a flat £4,000 a year
3. A withdrawal of a flat £4,000 increased by RPI each year
4. No withdrawals.

In each case, we compared the results against those from our IT portfolio, whose income figure is simply the natural dividend income distributed. Examining the actual dividends paid in year one, we then manipulated the allocations of each trust in the portfolio so that the year one income equalled a fixed £4,000.

The differences were stark, as the following charts show (tables are within the appendices).

²⁴ Transaction costs and other expenses are ignored for the purposes of the analysis. The HSBC FTSE 100 OEIC and the investment trusts all have implicit charges, and returns are net of those charges. One cannot invest in an index. Inflation rate used was the Retail Prices Index.





Capital and Income Summaries: 20 years to Dec 2018			
Source	Method of withdrawal	Income totals	Final capital value
HSBC FTSE100	4% of fund	£69,555	£87,723
	fixed £4k	£80,000	£67,443
	£4k + RPI	£107,101	£25,934
MSCI World	4% of fund	£82,441	£119,931
	fixed £4k	£80,000	£116,339
	£4k + RPI	£107,101	£73,707
60/40/split	4% of fund	£75,628	£95,506
	fixed £4k	£80,000	£86,297
	£4k + RPI	£107,101	£49,348
IT portfolio	natural income	£129,142	£234,520
RPI annuity		£164,875	£0

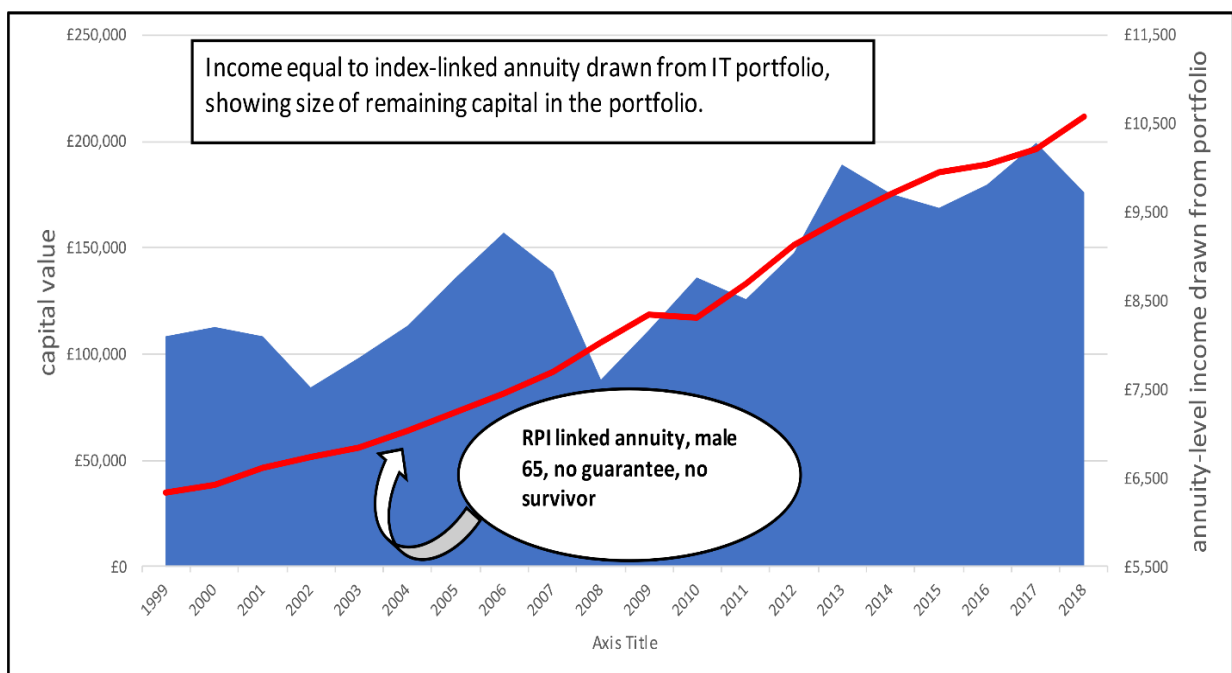
No matter how the withdrawals were taken, it is clear that the IT portfolio far outpaced every drawdown portfolio, both in terms of capital and income. We have added the total income from an RPI linked annuity for the same sum and same period as the baseline reference for an adviser. The total reflects both annuity yields and RPI over the period, and also reminds us that the capital is spent on day one.

12. Annuity matching

Comparing the income guarantee versus income growth in drawdown

Finally, we examined the difference between the guaranteed incomes of an index-linked annuity against the flexible options of a drawdown. Having already examined and concluded that an actively managed investment trust portfolio – over the periods researched – significantly outperformed the passive tracker and standard 60/40 equity/bond split, we tested the annuity against just the IT portfolio.

The annuity selected was for a 65-year male, index-linked, no guarantees or spouse's benefit, no medical uplift, with a £100,000 purchase price. The initial annuity was £6,330 per annum using 1999 rates, based on a University of Exeter Business School study²⁵



The chart above demonstrates the position if the same income as the RPI linked annuity is drawn from the IT portfolio, by means of natural income and share sales.

²⁵ <https://core.ac.uk/download/pdf/12824658.pdf>

13. Conclusion

Too often financial advisers and fund managers make assumptions about investors' attitudes to risk based on insubstantial evidence. Clearly, volatility is a valid measure of risk, however that risk is not one of the fluctuations, it is a risk of any adverse behaviour. Seeing the value of their savings fluctuate will make any investor anxious, but even the risk-averse may prefer some turbulence to the possibility that they may not have enough income to live on in retirement. Believing that a downward fluctuation in diversified savings will create to a loss is irrational, albeit an enormously strong emotional belief.

The evidence we have gathered certainly suggests that equity volatility is a risk well worth taking, particularly if the asset class is represented by a well-chosen portfolio of investment trusts. Moreover, based on the evidence of recent decades, the investor may face less volatility of income with such a portfolio than they would with a classical MPT-based portfolio of 60% equity and 40% bonds. There is no guarantee that the future will repeat the past, but our research shows that investors in such an IT portfolio would have ended up with substantially more income and capital at the end of the period.

The evidence displays that there is no correlation between the volatility of investment trust shares and the dividends they pay to investors. It is, therefore, wrong to assess the risk of the trusts to an income investor as that within the share prices, as that error excludes investors from perhaps the strongest investment solution available to them.

Modern Portfolio Theory is not applicable for individual income planning at retirement, other than to ensure diversification. Risk in income is not the same as risk in capital. It is wrong to apply fund management techniques to individual cashflow plans, at retirement. U.S. investment data spawns U.S. drawdown conclusions that do not apply to the U.K. investor.

Sequence risk is the most destructive risk when an investor is drawing income, and that risk is removed by using natural income.

Having had institutional risk descriptors as the backbone of the definition of retail investor risk for so long, it is not appropriate to miss out an interactive discussion about expectations, risk to income, risk to capital, emotional decisions and timescales, between adviser and investor.

We think the simplicity of the natural income approach is more predictable, more valuable and – ultimately – more reassuring for investors, particularly those retired. It meets what is required by most pension drawdown investors – an income for life, rising each year to counter inflation, with a good degree of certainty. The outcomes meet investor expectations.

14. Appendix A

Comparing confidence levels for investor income

Further, we also measured how certain the investor could be that they would receive the expected income from each of the portfolios. This 'confidence' level we defined as the percentage of years out of 20 when the income met or exceeded the target level of £4,000. The results are set out in the following charts.

Confidence levels are an important method of conveying meaning to retail investors who have an understanding of percentages. Retail investors have expectations of financial outcomes though are frequently not competent at articulating those expectations.

Strategy 1: HSBC FTSE 100 Index tracker fund with 4% fund drawdown



Strategy 2: MSCI World Index with 4% fund drawdown



Strategy 3: 60/40 blend of MSCI World Index/M&G Corporate Bond Fund with 4% fund drawdown



Strategy 4: Investment trust dividend portfolio with natural dividend income alone



We can summarise our findings as follows:

- Out of Strategies 1-3, number 3, the MSCI World portfolio was the strongest performer: the greater the growth of the underlying fund, the greater the income was at the 4% level.
- Strategy 4, the IT portfolio, generated the most income and the portfolio had a capital value that was significantly higher at the end of the time period. The capital value was greatest not due to excessive growth because – excluding income - the underlying growth for the MSCI index was 3.88%pa and the portfolio was lower at 3.77%. With income the index was 5.79% versus 7.66% - the greater natural

income meant no shares were ever sold. Note this also demonstrates that strong income defeats sequence risk.

- Finally, strategy 4, the IT portfolio, produced a steadily rising annual income growing at an annualised rate of 5.6% versus an average RPI of 2.78%.

15. Appendix B

Comparing actual income and capital returns of different investment strategies

Strategy 1 vs Strategy 4 – Using a FTSE 100 Index tracker as the investment engine:

Year end	HSBC FTSE 100 oeic acc			4% of fund		fixed £4k		fixed £4k + RPI		IT drawdown £4k start, dividends only		
	return	RPI	value	value	income	value	Income	value	income	value	% return	income
1999	19.96%	1.53%	£119,960	£115,162	£4,798	£115,960	£4,000	£115,960	£4,000	£110,869	10.87%	£4,000
2000	-8.81%	2.96%	£109,386	£100,810	£4,200	£101,739	£4,000	£101,983	£4,119	£117,457	5.94%	£4,140
2001	-14.98%	1.76%	£93,002	£82,282	£3,428	£82,500	£4,000	£83,144	£4,191	£115,613	-1.57%	£4,418
2002	-23.25%	1.67%	£71,377	£60,624	£2,526	£59,317	£4,000	£60,541	£4,261	£92,042	-20.39%	£4,539
2003	16.40%	2.89%	£83,083	£67,744	£2,823	£65,045	£4,000	£65,367	£4,385	£109,188	18.63%	£4,729
2004	9.78%	2.98%	£91,205	£71,392	£2,975	£67,404	£4,000	£66,800	£4,515	£128,906	18.06%	£4,876
2005	19.11%	2.84%	£108,638	£81,636	£3,401	£76,287	£4,000	£74,037	£4,643	£156,790	21.63%	£5,078
2006	13.18%	3.18%	£122,954	£88,698	£3,696	£82,341	£4,000	£78,372	£4,791	£183,884	17.28%	£5,396
2007	5.94%	4.29%	£130,253	£90,205	£3,759	£83,228	£4,000	£77,731	£4,996	£164,526	-10.53%	£5,829
2008	-28.76%	3.97%	£92,796	£61,694	£2,571	£55,294	£4,000	£51,677	£5,195	£106,189	-35.46%	£6,346
2009	26.05%	-0.51%	£116,966	£74,652	£3,111	£65,696	£4,000	£58,623	£5,168	£136,653	28.69%	£6,377
2010	13.04%	4.63%	£132,218	£81,011	£3,375	£70,263	£4,000	£60,155	£5,407	£169,665	24.16%	£6,577
2011	-3.68%	5.19%	£127,352	£74,909	£3,121	£63,677	£4,000	£52,462	£5,688	£159,362	-6.07%	£6,815
2012	10.34%	3.19%	£140,518	£79,347	£3,306	£66,260	£4,000	£51,410	£5,869	£188,774	18.46%	£7,163
2013	18.15%	3.05%	£166,026	£90,000	£3,750	£74,288	£4,000	£53,596	£6,048	£244,521	29.53%	£7,570
2014	0.21%	2.36%	£166,372	£86,580	£3,608	£70,443	£4,000	£47,504	£6,191	£228,918	-6.38%	£7,929
2015	-1.24%	0.98%	£164,313	£82,089	£3,420	£65,572	£4,000	£40,742	£6,252	£222,120	-2.97%	£8,389
2016	18.00%	1.78%	£193,882	£92,987	£3,874	£73,371	£4,000	£40,565	£6,363	£238,126	7.21%	£9,027
2017	11.78%	3.57%	£216,714	£99,779	£4,157	£78,012	£4,000	£37,976	£6,590	£264,874	11.23%	£9,619
2018	-8.42%	3.34%	£198,467	£87,723	£3,655	£67,443	£4,000	£28,542	£6,810	£234,520	-11.46%	£10,326
Average	4.64%	2.85%	£2,645,483	£87,723	£69,555	£67,443	£80,000	£28,542	£105,482	£234,520		£129,142

Strategy 2 vs Strategy 4 – Using the MSCI World Index as the investment engine:

Year end	MSCI World (tr)			4% of fund		fixed £4k		fixed £4k + RPI		IT drawdown £4k start, divis only		
	return	RPI	value	value	income	value	Income	value	income	value	% return	income
1999	29.83%	1.53%	£129,830	£124,637	£5,193	£125,830	£4,000	£125,830	£4,000	£110,869	10.87%	£4,000
2000	-10.50%	2.96%	£116,198	£107,088	£4,462	£108,618	£4,000	£108,499	£4,119	£117,457	5.94%	£4,140
2001	-12.96%	1.76%	£101,139	£89,481	£3,728	£90,541	£4,000	£90,247	£4,191	£115,613	-1.57%	£4,418
2002	-23.10%	1.67%	£77,776	£66,058	£2,752	£65,626	£4,000	£65,139	£4,261	£92,042	-20.39%	£4,539
2003	26.36%	2.89%	£98,277	£80,133	£3,339	£78,925	£4,000	£77,925	£4,385	£109,188	18.63%	£4,729
2004	12.05%	2.98%	£110,120	£86,197	£3,592	£84,435	£4,000	£82,799	£4,515	£128,906	18.06%	£4,876
2005	17.45%	2.84%	£129,336	£97,189	£4,050	£95,169	£4,000	£92,605	£4,643	£156,790	21.63%	£5,078
2006	17.04%	3.18%	£151,374	£109,200	£4,550	£107,386	£4,000	£103,594	£4,791	£183,884	17.28%	£5,396
2007	7.68%	4.29%	£163,000	£112,883	£4,703	£111,634	£4,000	£106,553	£4,996	£164,526	-10.53%	£5,829
2008	-39.17%	3.97%	£99,153	£65,920	£2,747	£63,907	£4,000	£59,622	£5,195	£106,189	-35.46%	£6,346
2009	29.97%	-0.51%	£128,869	£82,249	£3,427	£79,060	£4,000	£72,322	£5,168	£136,653	28.69%	£6,377
2010	11.07%	4.63%	£143,135	£87,700	£3,654	£83,811	£4,000	£74,921	£5,407	£169,665	24.16%	£6,577
2011	-5.96%	5.19%	£134,604	£79,174	£3,299	£74,816	£4,000	£64,767	£5,688	£159,362	-6.07%	£6,815
2012	16.54%	3.19%	£156,867	£88,579	£3,691	£83,191	£4,000	£69,611	£5,869	£188,774	18.46%	£7,163
2013	26.17%	3.05%	£197,920	£107,289	£4,470	£100,962	£4,000	£81,779	£6,048	£244,521	29.53%	£7,570
2014	9.89%	2.36%	£217,494	£113,184	£4,716	£106,947	£4,000	£83,676	£6,191	£228,918	-6.38%	£7,929
2015	1.81%	0.98%	£221,430	£110,624	£4,609	£104,883	£4,000	£78,939	£6,252	£222,120	-2.97%	£8,389
2016	9.66%	1.78%	£242,821	£116,458	£4,852	£111,015	£4,000	£80,202	£6,363	£238,126	7.21%	£9,027
2017	20.40%	3.57%	£292,356	£134,606	£5,609	£129,662	£4,000	£89,973	£6,590	£264,874	11.23%	£9,619
2018	-7.19%	3.34%	£271,336	£119,931	£4,997	£116,339	£4,000	£76,694	£6,810	£234,520	-11.46%	£10,326
Average	6.85%	2.85%	£271,336	£119,931	£82,441	£116,339	£80,000	£76,694	£105,482	£234,520		£129,142

Strategy 3 vs Strategy 4 - Using a 60/40 equity/bond portfolio as the investment engine:

Year end	60% MSCI World 40% M&G Corp bond			4% of fund		fixed £4k		fixed £4k + RPI		IT drawdown £4k start, divis only		
	return	RPI	value	value	income	value	Income	value	income	value	% return	income
1999	15.45%	1.53%	£115,446	£110,829	£4,618	£111,446	£4,000	£111,446	£4,000	£110,869	10.87%	£4,000
2000	-5.31%	2.96%	£109,317	£100,747	£4,198	£101,529	£4,000	£101,411	£4,119	£117,457	5.94%	£4,140
2001	-8.05%	1.76%	£100,522	£88,936	£3,706	£89,361	£4,000	£89,061	£4,191	£115,613	-1.57%	£4,418
2002	-13.98%	1.67%	£86,468	£73,441	£3,060	£72,867	£4,000	£72,348	£4,261	£92,042	-20.39%	£4,539
2003	16.75%	2.89%	£100,951	£82,313	£3,430	£81,073	£4,000	£80,082	£4,385	£109,188	18.63%	£4,729
2004	7.91%	2.98%	£108,932	£85,267	£3,553	£83,482	£4,000	£81,897	£4,515	£128,906	18.06%	£4,876
2005	11.95%	2.84%	£121,953	£91,642	£3,818	£89,461	£4,000	£87,044	£4,643	£156,790	21.63%	£5,078
2006	8.91%	3.18%	£132,815	£95,811	£3,992	£93,428	£4,000	£90,005	£4,791	£183,884	17.28%	£5,396
2007	3.97%	4.29%	£138,090	£95,632	£3,985	£93,139	£4,000	£88,584	£4,996	£164,526	-10.53%	£5,829
2008	-25.47%	3.97%	£102,923	£68,426	£2,851	£65,420	£4,000	£60,830	£5,195	£106,189	-35.46%	£6,346
2009	23.50%	-0.51%	£127,112	£81,128	£3,380	£76,794	£4,000	£69,958	£5,168	£136,653	28.69%	£6,377
2010	7.95%	4.63%	£137,212	£84,071	£3,503	£78,897	£4,000	£70,109	£5,407	£169,665	24.16%	£6,577
2011	-1.46%	5.19%	£135,204	£79,527	£3,314	£73,742	£4,000	£63,395	£5,688	£159,362	-6.07%	£6,815
2012	13.19%	3.19%	£153,033	£86,413	£3,601	£79,466	£4,000	£65,885	£5,869	£188,774	18.46%	£7,163
2013	14.56%	3.05%	£175,317	£95,037	£3,960	£87,038	£4,000	£69,431	£6,048	£244,521	29.53%	£7,570
2014	8.89%	2.36%	£190,902	£99,346	£4,139	£90,775	£4,000	£69,412	£6,191	£228,918	-6.38%	£7,929
2015	-0.03%	0.98%	£190,851	£95,346	£3,973	£86,751	£4,000	£63,142	£6,252	£222,120	-2.97%	£8,389
2016	7.93%	1.78%	£205,989	£98,793	£4,116	£89,632	£4,000	£61,788	£6,363	£238,126	7.21%	£9,027
2017	12.67%	3.57%	£232,081	£106,855	£4,452	£96,985	£4,000	£63,024	£6,590	£264,874	11.23%	£9,619
2018	-6.90%	3.34%	£216,076	£95,506	£3,979	£86,297	£4,000	£51,868	£6,810	£234,520	-11.46%	£10,326
Average	4.62%	2.85%	£216,076	£95,506	£75,628	£86,297	£80,000	£51,868	£105,482	£234,520		£129,142

16. Appendix C

Selecting investment trusts to examine

Our selection has been made on the back of our regular use of, and research into, income-producing assets and investment trusts since 2007. By virtue of the data available through proprietary platforms such as Financial Express, and the excellent database of the Association of Investment Companies (the AIC), an income-seeking professional adviser can quickly whittle down the investment trust universe to a number of trusts worthy of serious consideration. That said, this paper and the selections made within are not intended as a recommendation for the retail investor to make an investment in these or any other investment trust.

Applying both computer filtering and human analysis, we examined the following characteristics of a universe of investment trusts to create a list of 30 investment trusts to use for our research:

- reliability of rising income;
- sufficient revenue reserves and balance sheet clarity;
- satisfactory manager interviews;
- substantial market capitalisation;
- adequate public shareholding (to exclude quasi-private trusts).

Once selected, tables were compiled of the trusts' annual dividend payments from 1975 onward, or from the year the trust started or the records became available, if later. The dividend records were cross-referenced to Companies House accounts, the trusts' own published figures on their websites and the database of the AIC. In analysing these dividend records, we manually removed special dividends as they could not be relied on as part of a regular income stream.

We used the MSCI World Index as the comparator for the annual volatility of capital. This index was selected because of its global coverage and the length of its available record. We used the M&G Corporate Bond Fund as the comparator for the annual volatility of fixed income. This was selected because, at £3.5 billion, it is the 'fund of choice' for many retail investors, through their advisers, and it has visible income payments for at least twenty years. The Barclays Global Aggregate Bond Index would have been a less subjective choice, but we were unable to find income distribution records for it. Moreover, this paper is an attempt to assess the risk to long-term income as experienced by real investors, so we believe it relevant to use investment choices they might be able to use. The M&G fund is clearly investible and although the MSCI index is not, there are tracker funds available that mimic it.

Unlike some other investment vehicles, investment trusts very simply separate their income from their capital value (represented by the share price, which is in turn underpinned by their net asset value). The

income payments are transparent, mainly made quarterly, traceable via the annual corporate accounts and assessable within the parameters of the balance sheet. As listed companies, investment trusts' historical accounts are available online, free of charge.

17. Appendix D

Statistical significance

Academics and statisticians want to see statistical significance in the results of any research. This creates a problem for researchers into equity income, as few funds that a retail investor can access today have been around long enough to keep the academics happy, while even fewer have records of income and historical share prices. For instance, even though Foreign & Colonial and Scottish Mortgage are both well over 100 years old, their income payment records do not stretch anything like that far back.

Investment returns of 100 years are normally the minimum required to be statistically relevant. We believe that to be an excessively onerous hurdle, for the following reasons:

1. The timespan of an average drawdown investor is 28 years, on the basis of the Aviva longevity tables referred to earlier (male, 60, healthy non-smoker).
2. The way equity investment is viewed has changed significantly. In 1919, for instance, stocks were held for much longer periods than today, in part because to sell involved a laborious and lengthy process involving a broker who then confirmed the price with jobbers who made the market. Online trading has introduced real-time pricing and trading to retail investors, who can now measure holding periods in fractions of a second.
3. Certain taxes have tumbled in 100 years. Both company profits and personal income were taxed at 30% in 1919, whereas in 2020 UK corporation tax will fall to 17%. The percentage of profit available for distribution as dividends has therefore changed quite markedly.
4. The cost of retail investing has collapsed over the same period. Not only is this evident in the actual cost of trading shares, but charges attaching to retail financial 'products' have tumbled since giant insurance companies dominated the scene in the 20th century. Indeed, the demise of such institutions in the 21st century must be in part due to the severe (and warranted) reductions in these product costs.
5. Out of the ten largest falls in the London stock market over the last 100 years, three were in the 1930s, and seven in the last forty-five years. Recent years have been riskier, ergo current period analysis is harsher on outcomes (a positive in rounding risks up).
6. Today's drawdown investor can only invest in today's drawdown assets. Arguably, therefore, the further back in time you go, the less relevant are the investments to today's investor. This

paper researches the solutions available today, 2019, in a post QE world of yields never seen before so options of a different economic period will always be inaccurate.

7. Since the removal of most currencies' fixed pegs to gold in the 20th century, most things with a monetary value, including stock market investments, have come to be subject to the vagaries of government money printing. This has been starkly evident in the rise in the value of assets since central banks started effectively flooding the markets with currency as a result of quantitative easing policies. This means that there is a political interference in investment volatility that was not present a hundred years ago.

18. Appendix E

A note on asset selection used

We selected the funds used for the following reasons:

- The HSBC FTSE 100 tracker OEIC has a price history going back to 1998 and is a low-cost proxy for the FTSE 100. It is a passive investment with an OCF of 0.18%.
- The MSCI World Index is a broad global equity index that represents large and mid-cap equity performance across 23 developed markets countries. The data series goes back to 1969.
- A 60/40 equity/bond portfolio using the MSCI World Index and the M&G Corporate Bond Fund (B7513S5) was chosen as the commonly recommended 'balanced' portfolio, stemming from Professor Harry Markowitz's 1950s research²⁶. The £3.5 billion M&G Corporate Bond Fund is a fixed income fund commonly used by retail investors and their advisers and has an OCF of 0.91%.
- The investment trusts that make up the portfolio were specifically selected to provide reliable income over the time period; capital growth characteristics were ignored in the selection process.
- The trusts chosen, along with their respective allocations in the portfolio, were specifically selected to generate an annual dividend income of £4,000 for the year 1999.

²⁶ https://www.math.ust.hk/~maykwok/courses/ma362/07F/markowitz_JF.pdf