Retirement income: The impact of market risk

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Background

A very popular approach for individuals who have saved during their working lives for retirement and now need to withdraw money from their accumulated funds to provide a pension is income drawdown.

The advantages and disadvantages of this approach compared with others (e.g., annuities) have been well documented, and we do not repeat them here. In this note, we aim to explore, in relatively simple terms, the potential impact of two different facets of market risk, namely:

- General volatility of market prices
- Sequence risk arising from market falls that are both significant and prolonged

After this, we consider some approaches that can be used to help mitigate these risks and how techniques can be combined to provide better outcomes for retirees.

We are undertaking further research in this area. Please look out for further releases on this topic later in the year.

General volatility

Specifically, general volatility refers to the typical rises and falls in market prices that occur on an everyday basis. Volatility of returns is generally assessed as the standard deviation of returns over some historical period, and this varies between asset classes.

While volatility creates uncertainty for individuals in terms of portfolio values, volatility can be helpful when money is being paid into an investment fund (accumulation phase). Many people are familiar with the concept of pound cost averaging, whereby more units or shares are purchased when prices fall and fewer when prices rise. The result is a reduction over time in the effective average price paid to buy assets, which increases returns.

Unfortunately, what is helpful when accumulating funds becomes unhelpful when we start to draw funds down to provide a pension. In this case, the pound cost averaging effect goes into reverse reducing the average price received for assets sold and thus increasing the cost of providing pension income.

Consider a simple example: An individual with an accumulated fund of £250,000 taking an annual income of \pounds 12,500 (5% of the initial fund) in monthly instalments. For simplicity, we ignore inflation and the specifics of the assets chosen to back the fund but focus solely on the impact of volatility over an assumed retirement period of 20 years. The key results are shown in Figure 1.

FUND	COMPOUND AVERAGE GROWTH RATE (P.A.)	VOLATILITY	FINAL FUND (£)	INCOME TAKEN (Y/N)	AVERAGE PRICE RECEIVED FOR ASSETS SOLD (PENCE)	COST OF PROVIDING INCOME (£)
A —	6.3%	18%	251,366	Y	156	593,868
	6.3%	18%	845,234	Ν		
в –	6.3%	10%	310,341	Y	174	534,893
	6.3%	10%	845,234	N		

FIGURE 1: IMPACT OF VOLATILITY ON COST OF PROVIDING DRAWDOWN INCOME

In Figure 1, we consider two funds that have the same average return over 20 years of retirement but where Fund A is more volatile¹ (18%) compared to Fund B (10%). For both funds, the cost of providing income over the retirement period can be assessed by comparing the final fund for the case where income is taken to that where no income is drawn. Some points to note are:

- When no income is taken, the final funds are equal. This is as expected; in this case, only the returns matter, and these are equal for both funds.
- When income is taken, Fund B, with a lower volatility, produces a higher final fund. This arises due to the higher average price received when assets are sold, which makes it cheaper to provide the income required. In this example, the savings are almost £60,000.²

We acknowledge that this is a simplified example which implies a 'free lunch' (Fund B has the same return as Fund A but a lower volatility. Nevertheless, the point is that when taking an income from invested funds, volatility is not the retiree's friend, and it can pay to explore approaches that reduce and control volatility even when in the real world there will be a trade-off in terms of return. In our example, Fund B could offer an average return as low as 5.7% p.a. and still provide a higher final value than Fund A.³

Sequence risk

Sequence risk differs from general market volatility in that it arises from a prolonged market decline. In a decumulation context, both the extent of the decline and its duration are significant because these determine the total amount of income likely to be taken (and thus assets sold) at depressed market prices. A good example of a sequence risk event is the global financial crisis (GFC) of 2008–2009. In the Figure below, we can see that looking forward from January 2008, it took approximately four years for prices to recover their initial level. Thus, an individual starting their retirement in January 2008 would have drawn four years of income from their accumulated funds at depressed prices.



FIGURE 2: PRICE IMPACT OF THE GFC AND SUBSEQUENT EXPERIENCE

Fund asset allocation: 60% global equity (MSCI World), 17.5% UK gilts, 17.5% UK sterling corporate bonds and 5% cash (1-month LIBOR). No fees modelled.

^{1.} Calculated as the annualised standard deviation of returns over the 20-year period.

^{2.} The exact figure is £593,868 – £534,893 = £58,975.

^{3.} For some quantified examples, see Huang, V. (22 June 2021). Sequencing risk ... quantified. Milliman.com. Retrieved 21 May 2025 from https://frm.milliman.com/en/insight/Sequencing-risk-quantified.

When considering sequence risk events like the GFC, it is useful to consider the factors which determine the likely extent of the damage they will cause. The key factors are identified in Figure 3.

FIGURE 3: FACTORS INFLUENCING THE IMPACT OF A SEQUENCE RISK EVENT

FACTOR	ІМРАСТ
Depth (the extent of the fall in market prices)	Greater decline. Assets are sold at a greater discount to deliver income. Higher impact, other things equal.
Duration (the length of time taken for the market to rea	Longer duration. When it takes longer to recover, more income payments are made, and thus more assets are sold at depressed prices. Higher impact, other things equal.
Income rate (the level of income being taken relative t accumulated fund)	o the Higher income rate. A higher proportion of fund assets are sold at depressed prices. Higher impact, other things equal.
Post-event experience (what happens to markets in th years following the sequence risk event)	Post-event bull market. If more positive returns follow the event, assets sold miss out on more future growth. Higher impact, other things equal.

To illustrate the impact of a sequence risk event, we consider again a simple example:

- An initial fund of £250,000
- An annual income £12,500 (5% of initial fund) increasing with inflation at 2% p.a. (we are optimists!)
- Our retiree's fund experiences the returns shown in Figure 2.

To gauge the impact of sequence risk, we now consider three different scenarios of returns. Each of these scenarios has the same total return but orders the returns differently across the period.

- Scenario 1: We consider the returns from the start of 2008 to the end of 2021 for the 60/40 fund illustrated in Figure 2. This period considers a sequence risk event of depressed prices to begin (due to the GFC) with a comparative equity bull market thereafter (prior to the severe market falls of 2022).
- Scenario 2: We repeat Scenario 1 but move the period of depressed prices so that it occurs in years 5–8 of retirement—i.e., as a scenario starting with returns from 2018 to 2021 and then following with returns from 2008 to 2017.
- Scenario 3: We repeat Scenario 1 but move the period of depressed prices so that it occurs in years 9–12 of retirement—i.e., as a scenario starting with returns from 2014 to 2021 and then following with returns from 2008 to 2013.

We consider the residual fund at the end of these scenarios after taking a regular income. In each case, we compare the residual fund for the defined scenario with a modified version where the effect of the depressed prices has been removed—i.e., a flat return has been assumed. These three sets of scenarios are illustrated by the graphs below.



FIGURE 4: SCENARIOS ILLUSTRATING DIFFERENT TIMINGS OF A SEQUENCE RISK EVENET



FIGURE 4: SCENARIOS ILLUSTRATING DIFFERENT TIMINGS OF A SEQUENCE RISK EVENET (CONTINUED)

For illustrative purposes only. This Figure does not represent the performance of any actual investment or portfolio and should not be viewed as a recommendation to buy/sell.

The cost of the sequence risk event is defined by the fall in the final residual fund when comparing the depressed prices scenario to the nondepressed prices scenario. In the Figure below, we show the result for two different income rates—5% p.a. and 6% p.a.

FIGURE 5: IMPACT OF A SEQUENCE RISK EVENT

SCENARIO	SEQUENCE RISK EVENT OCCURS IN YEARS	IMPACT OF SEQUENCE RISK EVENT (PERCENT REDUCTION IN FINAL RESIDUAL FUND) WITH 5% INCOME	IMPACT OF SEQUENCE RISK EVENT (PERCENT REDUCTION IN FINAL RESIDUAL FUND) WITH 6% INCOME
1	1–4	10%	18%
2	5–8	6%	10%
3	9–12	5%	7%

From Figure 5, we can see that the higher the level of income taken, the greater the adverse impact a sequence risk event is expected to have. To put this into context, in Figure 6 we consider retirement income data for 2023 to 2024 from the UK Financial Conduct Authority.⁴ For pots exceeding £250,000, we can see that 44% of plans have withdrawal rates above 4% and 22% have withdrawal rates more than 6%, which makes sequence risk events a very real risk for many retirees.

INCOME RATE	NUMBER OF PLANS	PERCENTAGE OF PLANS
Less than 2%	32,276	26%
2–3.99%	36,654	30%
4–5.99%	26,766	22%
6–7.99%	12,997	10%
More than 8%	15,165	12%

FIGURE 6: REGULAR WITHDRAWAL RATES BY POT SIZE IN 2023-2024

Returning to Figure 5, we also observe the adverse impact of a sequence risk event is greatest when it occurs in years 1–4 of retirement. The key reason for this is the prolonged, almost unbroken, bull market which follows from year 5 onwards (see Figure 2). Thus, the higher volumes of assets sold to provide income in years 1–4 miss out on substantial subsequent growth. However, we note:

- The impact of the sequence risk event remains nontrivial even when it occurs later in retirement, as shown in Figure 5 by Scenarios 2 and 3. Indeed, over a realistic retirement period of 25–30 years, it is quite possible that individuals could experience multiple sequence risk events, further increasing the impact.
- The results are based on a single historical period of returns, and different patterns of returns will undoubtedly deliver different results.

Given that sequence risk represents a potentially serious and persistent threat to a retiree's objective of receiving a stable and sustainable pension, we now consider some approaches to managing the risk.

Managing the risk with multiple pots

In this section, we consider the risk management approach of dividing the retiree's fund into multiple pots. We then move on to illustrate how a dynamic hedging strategy can be added to complement this to enhance outcomes for the retiree. Once again, we use simplified examples to illustrate these concepts.

To manage sequence risk, the retiree's £250,000 investment fund is split into two pots:

- Cash pot will be set to a value of several years of the retiree's anticipated income needs, and the retiree will draw income from this pot in the first instance.
- Investment pot will include the balance of the retiree's fund and will be invested in a mix of equity and fixed income assets aligned to the customer's risk profile. The investment pot may periodically be partially encashed to top up the cash pot. If the cash pot is exhausted, then income will be taken from the investment pot.

In setting up the approach outlined above, several key design choices must be considered.

Design choice 1: How to use the cash pot

- Dynamic: Income payments are only drawn from the cash pot when investment markets are deemed to be in stress. Such an approach feels intuitively reasonable but requires retirees or their advisers to devise and monitor effective early warning indicators of market stress and action changes to the source of their income accordingly. Developing reliable rules is not easy and likely to be highly challenging for advisers with hundreds of clients.
- Static: Income needs are always met from the cash pot, with the investment pot used solely to top up the cash pot (i.e., a waterfall system). This is much simpler, and we understand is a common approach adopted in practice.

^{4.} Retirement income market data 2023/23. (26 September 2024). Financial Conduct Authority. Retrieved 14 March 2025 from https://www.fca.org.uk/data/retirement-income-market-data-2023-24.

Note that the use of a cash pot to provide income is not equivalent to the traditional use of cash as a defensive asset class within a multi-asset strategy. The key reason is that rebalancing trades between the investment and cash pots only flow one way, from investment to cash.

Design choice 2: How many months of income to hold in cash

This design choice requires a consideration of the income requirements and risk appetite of the individual retiree. The retiree, or their adviser, may also need to take a view on the length of time that asset prices in investment markets can remain depressed. There is no easy answer to this, as the following Figure illustrates.



For illustrative purposes only. This Figure does not represent the performance of any actual investment or portfolio and should not be viewed as a recommendation to buy/sell. Data source: Bloomberg

Longer periods of income provided in cash offer scope to ride out more prolonged market corrections. However, depending on the approach to pot management, when the cash pot needs to be topped up, the trade executed will be more material in relation to the overall portfolio, therefore making the timing of top-ups more critical to retiree outcomes. Furthermore, the greater the allocation to the cash pot, the higher the potential drag on overall portfolio returns.

Design choice 3: When to replenish the cash pot

- No replenishment: This approach involves setting an initial period (e.g., four years) within which income can be provided from the cash pot to help protect the retiree from a sequence risk event early on in their retirement. However, once the cash pot is exhausted, income must be taken from the investment pot with the understanding that at this point, the retiree will have exposure to later sequence risk events, should they emerge.
- Periodically (e.g., annually): In this case, the cash pot may cover a shorter period of income (e.g., two years) but be regularly topped up to provide a degree of protection against sequence risk events throughout retirement. This can enable the retiree to avoid encashing the investment pot for income during a short-term market stress event, such as the 'Dash for Cash' that occurred in the spring of 2020. However, unless pot replenishment can be dynamically managed in a robust way (a similar challenge to design choice 1), it is possible that the annual replenishment point for a retiree could occur while markets remain significantly depressed. Consequently, when considering the timing of replenishment events in relation to market conditions, whether a replenishment approach driven solely by a set frequency performs better or worse than simply drawing income from the investment pot is a matter of luck.

To illustrate multi-pot approach, we consider three simple strategies for each of the three investment scenarios we defined earlier. The three strategies are:

- No cash pot: All of our retiree's income is taken from the investment pot.
- Initial cash pot: The cash pot at outset is set to four years of anticipated income needs, with income taken from the cash pot over that period.⁵ Beyond four years, income needs are met from the investment pot.
- Rolling cash pot: The cash pot is initially set to two years of anticipated income needs, with income taken from the cash pot. Whenever the cash pot approaches exhaustion, it is topped up from the investment pot sufficient to meet a further two years of expected income.

Figure 8 below sets out the results where income is taken monthly at a rate of 5% of the retiree's initial fund, increasing with inflation at 2% p.a.

In Figure 8, our sequence risk event (the GFC period) is marked in light blue to illustrate clearly where it occurs during retirement. The figures in the two rightmost columns provide a summary of the impact of the selected cash pot strategy relative to the outcome with no cash pot:

- "End GFC" results are calculated as (residual fund with cash pot strategy / residual fund without) 1 as at end 2011, end 2015 and end 2019 for scenarios 1 – 3 respectively.
- "End of 2021" presents the same metric at the end of the projection period.

Positive values indicate where the cash pot approach improved the residual fund for our retiree and vice versa for negative values.

The initial cash pot approach improves the outcome for our retiree where the sequence risk event coincides with the initial cash pot period (Scenario 1) but otherwise results in a slightly poorer outcome.

The rolling cash pot approach can provide some benefit during the sequence risk event, but the reduced returns from the cash allocation means that by the end of 2021, this approach provides a poorer outcome across all three scenarios.

^{5.} Note that we assume the cash pot receives interest in line with Bank of England base rates.

FIGURE 8: COMPARISON OF SIMPLE STRATEGIES

		RESIDUAL FUNDS AT YEAR-END							
	SCENARIO 1			SCENARIO 2			SCENARIO 3		
	NO CASH	CASH	I POTS:	NO CASH	CASH	POTS:	NO CASH	CASH	POTS:
YEAR	РОТ	4Y INITIAL	2Y ONGOING	РОТ	4Y INITIAL	2Y ONGOING	РОТ	4Y INITIAL	2Y ONGOING
2007	£250,000	£250,000	£250,000	£250,000	£250,000	£250,000	£250,000	£250,000	£250,000
2008	£165,504	£180,947	£171,844	£222,847	£225,536	£223,753	£262,682	£258,169	£260,796
2009	£187,797	£199,588	£194,503	£254,625	£250,884	£253,996	£254,342	£249,130	£252,118
2010	£191,929	£203,111	£197,613	£267,683	£262,210	£265,642	£262,732	£255,598	£258,825
2011	£175,204	£186,256	£180,840	£295,455	£288,402	£291,769	£284,393	£275,720	£278,792
2012	£186,365	£199,225	£190,445	£190,574	£185,792	£195,737	£253,659	£245,523	£249,524
2013	£208,467	£223,891	£211,246	£224,922	£218,875	£229,354	£290,601	£280,802	£283,492
2014	£215,168	£232,195	£216,199	£231,246	£224,619	£233,735	£306,886	£295,998	£297,657
2015	£204,411	£221,724	£205,083	£210,571	£204,129	£213,261	£338,423	£325,868	£326,169
2016	£206,655	£225,491	£203,753	£226,068	£218,675	£227,656	£225,907	£217,070	£224,119
2017	£218,450	£239,818	£213,492	£255,734	£246,841	£254,930	£259,794	£248,948	£255,705
2018	£190,618	£210,677	£186,707	£267,934	£258,050	£264,358	£268,515	£256,615	£263,240
2019	£212,783	£236,944	£205,017	£256,747	£246,702	£252,695	£247,383	£235,735	£242,465
2020	£218,345	£245,190	£200,725	£261,746	£250,834	£254,567	£266,645	£253,292	£259,366
2021	£234,326	£265,281	£211,708	£279,801	£267,413	£269,658	£302,186	£286,172	£290,346
Benefit of cash pot:									
End of GFC		6%	3%		-3%	1%		-5%	-2%
End of 2021		13%	-10%		-4%	-4%		-5%	-4%

How dynamic risk management can help retirees and their advisers

WHAT DO WE MEAN BY DYNAMIC RISK MANAGEMENT?

Dynamic risk management involves hedging techniques to dynamically change the balance of investment exposure between cash and an investment portfolio in response to prevailing measures of market risk.

At a given point in time, depending on the level of market risk, the following balance between cash and an investment portfolio may be considered optimal.

FIGURE 9: PHYSICAL RISK-BASED ASSET ALLOCATION



If your investments are liquid on a daily basis (e.g., ETFs), you could do this by regularly buying and selling cash and investments, to move to these positions. However, for many types of investment the transaction costs can be comparatively high, and it is also impractical to trade on a frequent basis.

An alternative approach is to use a short futures position to synthetically manage exposure. A short futures position is an obligation to pay an investment exposure in the future that in effect cancels out against a holding in that investment exposure.

FIGURE 10: SYNTHETIC RISK-BASED ASSET ALLOCATION



In all cases, the underlying investment stays untouched, and by changing an allocation to short futures, the same effect can be achieved. This approach has the following advantages:

- Investment and risk management act independently: Your investment manager focuses on their job of delivering returns; your futures manager focuses on the job of managing your risk exposure.
- Low transaction costs: Futures typically have lower transaction costs compared to trading the underlying investment portfolio.
- Highly liquid: Futures are highly liquid and can be traded comparatively quickly intraday, making them ideal to respond very rapidly to a changing risk position.

The key challenge for dynamically managing exposures is to be able to 'move with the markets,' and not 'behind the market.' Moving behind the market results in buying after prices have increased significantly and selling after markets have fallen significantly, thereby creating a negative P&L over time. By moving with the markets, these costs are limited. Therefore, a frequently assessed and managed strategy (e.g., daily or real-time) is preferred, and a strategy that is driven by a model also helps to remove subjectivity.

The are several different model strategies that can help rebalance the risk between cash and investment portfolios. We provide a brief description of three models below, including the metric they use to determine prevailing risk and how they could be implemented.

The risk metric is also important because it helps to predict the future risk position. There are two key metrics: current price level and forecast volatility of returns.

FIGURE	11: DYNAMIC	RISK MANA	GEMENT STRA	TEGIES

STRATEGY NAME	STRATEGY DESCRIPTION		IMPLEMENTATION OPTIONS
Constant Portfolio Protection Insurance (CPPI)	Match a future defined guaranteed level with cash, assuming that equity markets can only fall by a maximum amount	Current price movement	Physical rebalancing only
Volatility management	Target a fixed volatility of returns, and adjust in/out of the investment portfolio and cash to meet that target	Expected volatility of price movements	Physical rebalancing or futures overlay
Option matching or option replication	Match the sensitivity of a put option for a future guaranteed level on the investment portfolio, and use option-pricing theory to determine the allocation between cash and investment portfolio	Current price movement	Physical rebalancing or futures overlay

We take the view that futures-based strategies work best. Combining two strategies together that use different risk metrics can also make strategy performance more robust over a wider range of scenarios. The cost of option matching is driven by volatility, and another advantage for combining volatility matching with option matching is that it can help stabilise the cost of the option matching. These are the key motivating factors for developing the Milliman Managed Risk Strategy (MMRS).

How MMRS can help a retiree (and their adviser)

VOLATILITY RISK

As we saw earlier, heightened volatility increases the cost of providing an income. Over time, a retiree may be unlucky and draw an income at a time of market stress. The Figure below shows how much volatility increased during 2001, 2008, 2020 and 2022 for a typical 60/40 investment portfolio.





For illustrative purposes only. This Figure does not represent the performance of any actual investment or portfolio and should not be viewed as a recommendation to buy/sell.

Volatility management helps to stabilise volatility of investment returns over time, reduce the increase in volatility during periods of market instability and reduce the cost of income provision during these times.

There is another type of product in the UK called the Smoothed Managed Fund, which is a technique used by insurance companies to also limit the volatility of daily price movements. This product typically provides a dampening effect in normal markets, but there is a limit as to how much insurers are willing to provide protection in extreme markets, such as in 2008. If market movements are sufficiently large, the fund pricing incorporates resets that push this volatility and associated cost back to the retiree. Thus, protection in scenarios where an increase in volatility was severe, such as 2008, may be limited.

As we noted above, a strategy like volatility management comes with an associated cost. The key is whether the impact of this cost on reducing investment return outweighs the benefit of the reduced volatility when considering the cost of providing an income. If the strategy is designed to enhance overall risk-adjusted returns, the trade-off will likely be beneficial for the retiree, and the net effect could be a reduced cost of providing an income.

SEQUENCE RISK

Option matching can be an effective way to deal with sequence risk. A put option exposure is designed to take out the worst of a market downturn and so reduce its impact when taking an income during this period.

To illustrate this impact, we repeat the prior results with the Milliman Managed Risk Strategy included. The values shown in the brackets are those from Figure 5 without MMRS.

FIGURE 13: IMPACT OF A SEQUENCE RISK EVENT WITH MMRS

SCENARIO	SEQUENCE RISK EVENT OCCURS IN YEARS	IMPACT OF SEQUENCE RISK EVENT (PERCENT REDUCTION IN FINAL RESIDUAL FUND) WITH 5% INCOME	IMPACT OF SEQUENCE RISK EVENT (PERCENT REDUCTION IN FINAL RESIDUAL FUND) WITH 6% INCOME
1	1–4	0.2% (10%)	0.4% (18%)
2	5–8	0.1% (6%)	0.2% (10%)
3	8–11	0.1% (5%)	0.2% (7%)

In this example, the sequence risk cost is all but eliminated. In the following Figure, Scenario1 returns are restated with and without depressed prices—but with the Milliman Managed Risk Strategy applied. During the first two years, with the benefit of the dynamic risk management protection, there is initially a small residual loss followed by a small profit in the latter two years. The small loss is offset by the small profit, resulting in a zero cost.



FIGURE 14: FUND PRICE SERIES WITH DYNAMIC RISK MANAGEMENT USING MMRS

For illustrative purposes only. This Figure does not represent the performance of any actual investment or portfolio and should not be viewed as a recommendation to buy/sell.

Again, it should be noted that option matching can come at a cost over time if markets are continually going up; however, the retiree benefits when markets go down. This therefore acts to narrow the range of potential outcomes, which ultimately may be preferable for someone in retirement who typically becomes more risk averse with age.

MULTI-POT APPROACH

When considering a multi-pot approach, a key design decision is how much of an allocation to hold in cash or gilts, i.e., how much income to match to begin. Too little income means there is the risk of being forced to sell when markets are depressed for a prolonged period once all cash used to match income has been depleted. Too much income means holding a high cash allocation and a larger reduction in overall investment performance of the portfolio.

The dynamic risk management approach can help with this trade-off and help make a multi-pot approach more efficient. Dynamic risk management requires a physical cash allocation to help support the collateral payments needed on the futures contracts. A typical level can be about 5% of the fund. The advantage of short futures hedges is that they pay out cash when markets fall. Therefore, they provide additional cash in a scenario when market prices are depressed and help to support income payments, ultimately deferring the time when investments need to be sold to replenish the cash pot.

This effect means that a smaller cash pot can be held while still being resilient during a severe and prolonged market correction scenario. A multi-pot approach helps to reduce the reduction in overall portfolio return from the cash allocation, which can then be used to offset against the expected cost from the dynamic hedging strategy. Therefore, implementing this strategy around the investment portfolio can potentially provide much valued resilience in a very cost-effective manner.

We compare such iterations in risk management strategy for Scenario 1 in the following Figure.

SCENARIO 1	RESIDUAL FUND VALUE			
STRATEGY DESCRIPTION	START	END 2011	END 2021	
No cash pot	£250,000	£175,204	£234,326	
Four-year cash pot topped up over time	£250,000	£186,256	£204,685	
Two-year cash pot topped up over time with MMRS applied	£250,000	£216,689	£240,219	

FIGURE 15: MULTILAYERED RISK MANAGEMENT—COMBINING A MULTIPOT APPROACH WITH MMRS

For illustrative purposes only. This Figure does not represent the performance of any actual investment or portfolio and should not be viewed as a recommendation to buy/sell.

As shown in Figure 15, without risk management, taking 5% income from the £250,000 60/40 fund leaves a $\pm 175,000$ residual fund at the end of 2011 due to the impact of the GFC. This would have recovered to £234,000 by the end of 2021. Applying a four-year cash pot that gets topped up on depletion results in a higher fund of $\pm 186,000$ by the end of 2011 but a lower accumulated fund of $\pm 205,000$ by the end of 2021.

Reducing the cash pot from four years to two years and applying the Milliman Managed Risk Strategy has two benefits:

- It helps increase the residual fund at end of 2011 to £217,000.
- The benefit of less cash more than offsets the cost of the Milliman Managed Risk Strategy by increasing the accumulated fund to £240,000 by the end of 2021, and in fact it leads to a higher fund than without any risk management applied.

Conclusion

Retirees face considerable challenges in managing both general market volatility and sequence risk, when drawing income from an invested fund.

The multi-pot approach to deliver income is common in the market, but our analysis indicates it may leave both the retiree and their adviser open to some significant residual risks in times of high market volatility. The benefit of this approach may be psychological in nature and could be seen as behavioural risk protection. Investors may gain comfort from having a cash pot that helps them stay confident while remaining invested with the rest of their portfolio.

Dynamic risk management using hedging can be a useful complement to enhance this approach with scope to improve retiree outcomes. This strategy may provide an effective way to significantly mitigate risk, adding much valued resilience to a portfolio that is used to provide an income.

We are conscious that this note only scratches the surface and plan to undertake further research to explore this topic in greater depth. Stay tuned for further insights to come.

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