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Could DC pension default investment strategies better meet the needs of members?

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danielle@pensionspolicyinstitute.org.uk

The future is ever changing,
but the PPI remains a constant
"Voice of Reason"
in the ongoing debate on the
future of retirement in the UK.

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This report has been authored by:

Bob Collie – Research Associate

Bob Collie has led consulting practices and research teams in the US and the UK at some of the world's leading investment consulting firms. An Actuary by training, he has specialised in investment for almost thirty years, in roles that have included asset allocation specialist, general investment consultant, business leadership and strategic research. He is currently Principal at Collie ESG Ltd, which advises investment organisations on best practice in ESG and sustainable investing.

Bob has made notable contributions in ESG, in liability-driven investing and in defined contribution design, including, with Don Ezra and Matthew X. Smith, the 2009 book *The Retirement Plan Solution: The Reinvention of Defined Contribution* (John Wiley & Sons). He has a first-class degree in Mathematics from the University of Oxford. He has also conducted work for the Pensions Policy institute, and was the lead author on the 2021 PPI report: *How do UK pension schemes approach investment into overseas assets?*

Chetan Jethwa – Policy Modeller

Chetan Jethwa joined the PPI modelling team in April 2018 as a Policy Modeller. He is responsible for maintaining and developing PPI models as well as producing modelling results and undertaking analysis to feed into the PPI's research.

Chetan has a BSc in Actuarial Science from the London School of Economics.

Daniela Silcock – Head of Policy Research

Daniela is Head of Policy Research at the Pensions Policy Institute (PPI) and leads the Policy Research team. She has a wealth of experience in conducting quantitative and qualitative research into all aspects of state and private pensions policy, writing articles for journals and national press, and presenting to a variety of domestic and international audiences, including radio and television appearances.

Daniela originally joined the PPI in 2008 and took a short break in 2012 to work as a Committee Specialist for the Work and Pensions Select Committee.

Prior to working in research and policy Daniela was a social worker with vulnerable adults and children. Daniela has an MSc in Social Policy and Planning from the London School of Economics.

Tim Pike – Head of Modelling

Tim is the Head of Modelling of the PPI responsible for delivering the models and modelling to support the PPI's current research program. He joined the PPI in July 2015 and since then has analysed the projected implication of pension policies upon many significant groups. These have included the self-employed, women, younger generations, and the Exchequer.

Tim has worked alongside academics and other researchers on collaborative projects including WHeRL and CASPeR. These projects bring multidisciplinary research to widen the research scope to give a more complete view of the implications of interacting areas of policy.

Prior to joining the PPI Tim worked for Legal and General where he spent nearly ten years contributing to a wide variety of actuarial modelling projects, from financial reporting to annuity pricing.

Tim has an MA (Cantab.) having studied mathematics at Fitzwilliam College Cambridge.

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A Pensions Policy Institute report

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Could DC pension default investment strategies better meet the needs of members?

Executive Summary

This report explores the extent to which the investment of Defined Contribution (DC) pension scheme assets in the default investment strategy could be redesigned to better meet the needs of certain groups of scheme members who do not fall into the typical member profile, and possible responses. This summary covers the main points of the report and acts as the conclusion.

Default investment strategy: The investment strategy (collection of funds) in which members will automatically have their contributions invested if they do not make a choice.

- DC scheme members' contributions are invested through a default investment strategy unless members make an active choice
- People with particular characteristics may benefit from an increased focus on enhanced returns or reduced volatility than found in standard DC default investment strategies, though it is not possible to quantify the proportion of people who fit into these categories
- There are several policy options for ensuring that DC default investment strategies meet the needs of a wider range of members
- Increasing asset allocation to alternatives could enhance returns while also increasing diversification, potentially benefiting all members
- However, there are cost and resource issues involved with tailoring investment strategies to different members and a lack of member data can also make identification difficult
- Default investment strategies also carry behavioural benefits, such as not requiring people to make active choices, which could be lost in more tailored strategies

This report does not highlight the proportions of members who would fit into each characteristic, as many members will benefit from staying in the default investment strategy and some members will fit into several categories. Instead, the examples illustrate the types of characteristics which may be associated with members who might benefit from having their contributions invested in a strategy which seeks higher returns or lower volatility than the average found in default investment strategies.

As more people are now saving into DC schemes, the default investment strategy design will affect the future retirement incomes of more people

Membership of DC default investment strategies has increased as automatic enrolment has brought an additional 10 million people into pension savings, most of whom have remained in their schemes' default investment strategy; 90% of those enrolled in master trust/multi-employer schemes are in the default investment strategy.[1]

Within Defined Benefit (DB) schemes, members contribute into a single fund, designed to support scheme liabilities towards current and future pensioners. Within DC schemes, members have individual pots and it is they (rather than the plan sponsor or company) who bear the investment risk. As a result of this difference, default investment strategies within DC schemes are designed with the principle of best meeting the needs of individual members, rather than focusing on the combined cash flow needs of the scheme as a whole.

The majority of DC pension scheme members do not select an investment strategy for themselves, but rather depend on the scheme's default investment strategy.

Default investment strategies are generally selected based on the needs and circumstances of representative, or typical, scheme members

The default investment strategy design is the responsibility of the scheme's trustee board or investment manager, based on expert advice. The default investment strategy determines the extent of the market risk that is taken on and, hence, of the potential for enhanced investment returns in the long run.

> **Market risk:** the collection of investment-based risk which those invested in pension savings may face, including currency risk, inflation risk, insolvency risk, and investment risk.[2]

The design of a default investment strategy is generally based on the modelling of projected risk and return outcomes under various alternative investment approaches.

In selecting an investment strategy that best meets the needs of the scheme membership as a whole, trustee boards and investment managers must weigh various factors. Some of these factors relate to the nature of the available investments: the potential for strong returns, the volatility of the asset values, the potential for significant losses in value and practical considerations such as cost, liquidity and ease of access.

The assumptions about members relate to their circumstances (such as income level or period of contributing), assumed objectives (such as desired method of access to pension savings) and preferences (such as how much investment risk is tolerable).

Investment strategy design involves trying to find the right balance between risk and return

Finding the appropriate balance between these two contrasting goals, higher returns and lower risk, is a key challenge when setting the high-level asset allocation strategy. Since a default investment strategy applies to a wide cross-section of scheme members, it cannot be tailored to each member's individual circumstances and preferences. Rather, the best possible fit must be found to a diverse range of needs.

This means that, for members who do not fit the typical or representative profile on which the default investment strategy is based, better solutions may exist. And, in broad terms, those solutions will involve either (a) more focus on the maximisation of return or (b) more focus on the management of risk, either in the default investment strategy, or in alternative, self-select or other pre-packaged strategies which could be offered alongside main default asset allocation strategies.

1 Wilkinson *et. al.* (PPI) (2020)

2 See glossary for definitions of individual market risks

Previous PPI research has also explored the way that improving governance and increasing asset allocation to illiquid and alternative or Environmental, Social and Governance (ESG)-compliant assets could increase member pot sizes at State Pension age (SPa).[3]

Some people with particular characteristics may benefit from an increased focus on enhanced returns or reduced volatility than found in standard DC default investment strategies

Those particularly likely to benefit from a focus on enhanced returns include:

- **People who work for longer (past SPa) and higher earners –** who have a higher level of income and savings, and can withstand greater volatility, because losses are unlikely to impact overall retirement income less significantly than for those dependent on a smaller amount of DC savings.
- **Those who accumulate marginal amounts of savings -** whose pot is unlikely to represent a significant increase in retirement income; there is less need to ensure that the capital is preserved, and therefore less requirement to focus on reduced volatility.
- **Those with patchy work and contribution patterns -** because the majority of the retirement provision for these individuals comes from other sources, mainly State Pension provision and benefits, which puts a floor beneath the potential impact of poor investment returns.
- **Those with DB savings in addition to DC savings –** those savers whose DC arrangement is additional to a DB pension and can, therefore, afford to have less regard to risk, since the DB benefit acts as an underpin to the State Pension.

Those particularly likely to benefit from a focus on reduced volatility include:

- **People who stop contributing at younger ages (before SPa) -** because they are more dependent on their DC income to support them up until SPa, and volatility could lead to a lower income both before and after SPa.
- **People who use uncrystallised funds pension lump sums (UFPLS) or purchase an annuity –** as their need to take an income from their pot, or apply it to the purchase of an annuity, without re-investing it in a return-seeking product (such as drawdown) means that they are likely to be more sensitive to increases in volatility which will affect either the amount available to withdraw (UFPLS) or the annuity rate.
- **Those without supplementary savings –** those with no other supplementary savings, but sufficient DC savings to make a difference to their retirement income, will be more sensitive to, and potentially negatively affected by, volatility in their investments, which affect the overall pot size at retirement and as a corollary retirement income levels.

There are several policy options for ensuring that DC default investment strategies meet the needs of a wider range of members

1. Increasing asset allocation to alternatives could enhance returns while also increasing diversification, potentially benefiting all members
2. Using existing data on members, such as pot size, in order to provide prompts about using non-default (self-select) investment strategies
3. Gathering more data on members in order (a) to make DC default investment strategies more tailored or (b) to provide prompts about non-default (self-select) investment strategies

Alternatives could enhance returns while also increasing diversification

Expanding the range of assets used in a default investment strategy may be done either with the goal of enhancing returns, or reducing risk, though many alternatives offer both increased diversification and potentially higher returns - potentially allowing for both.

Part of the reason many DC default investment strategies have a limited range of asset exposure is the increased costs associated with this, which could translate into higher member charges. Higher charges may result in a loss for some members, particularly for members of smaller DC

3 Silcock *et al* (2019)

schemes which may not have the scale to reduce administrative costs as a way of freeing up extra investment budget.

In considering the effect of expanding the range of assets used in default investment strategies, it is important to look at the portfolio-level impact, rather than the characteristics of the alternative asset class in isolation. Assets which, considered in isolation, offer volatile return patterns may nonetheless serve to reduce a portfolio's overall volatility, provided they diversify existing exposures.

Previous PPI work found that, net of fees, a median earner contributing throughout their working life into a pension with 10% to 15% of funds in illiquids could have a pension pot at retirement around 2% to 3% higher than if their pension was not invested in any illiquids.[4]

Using existing data on members, such as pot size, in order to provide prompts about using non-default (self-select) investment strategies, or choosing between a number of pre-packaged strategies

At present, lifestyling means that most default investment strategies vary with the age of the member. Where more information is available (e.g., account balance data is available to the scheme) those additional data points could be used to achieve greater customisation even without direct member engagement. As technology advances, such greater customisation is likely to become more feasible in practice.

For example, those with a high account balance might be regarded as having more to gain from more customised investment approach, be able to afford higher member charges, and bear more risk, so that group might receive targeted communications about their options. Though some of those with high account balances may still be highly dependent on their DC income or have a low risk-appetite, so any communications will need to be carefully designed. Schemes or employers informing members about appropriate investment strategy could also be seen as giving advice, which is a regulated service. Therefore, some form of protection for the provider of the prompt would need to be built into the system.

Gathering more data on members in order to make DC default investment strategies more tailored or to provide prompts about non-default (self-select) investment strategies

Scheme data is currently constrained by the data that employers gather on their employees before enrolling them. Alongside this, some schemes or employers may conduct surveys or data gathering exercises, but these are not consistent between schemes. In order to better understand the profiles of scheme members, additional data could be gathered covering income level, gender, ethnicity, ability, caring responsibilities, other savings and assets, and attitudes to risk. Gathering additional data could make customising the default investment strategy simpler, as well as making it easier for schemes to identify members who may not be best served by remaining in the default investment strategy. However, there would be additional costs and privacy issues involved in a data gathering exercise of this kind. In order to be rolled out, it would require the investment and support of both the Government and industry in order to ensure policies are clear and straightforward, and that cost and privacy concerns are dealt with in a way which does not pose a threat to members, employers or schemes.

Alternative asset class exposures can potentially enhance returns

The primary driver of returns within most default investment strategies is the listed equity market. In order to enhance returns without increasing the concentration in this asset class (and the attendant risk), higher returns might be sought elsewhere. For example:

- **Private markets –** assets not publicly listed
- **Real estate –** property and property development
- **Other alternative assets –** for example, commodities, infrastructure and hedge funds
- **Selected parts of the fixed income market –** privately listed debt and credit

4 Silcock *et al* (PPI) (2019)

These assets are typically more volatile and/or less liquid than listed equities or listed fixed income (such as bonds and gilts), and generally cost more to invest in - while also requiring higher levels of due diligence and ongoing monitoring.

Alternative asset class exposures can increase diversification, reducing volatility

The power of diversification means that expanding the range of asset class exposures can lead to potentially better portfolios, not only in a context of seeking higher returns, but also to reduce risk. Most default investment strategies are heavily dependent on global equity market performance as the primary driver of investment returns; to the extent that other sources of return can be brought in to sit alongside and supplement this exposure, so the concentration of risk can be reduced.

Practical considerations take on greater importance for alternative assets

Although investment strategy is generally based on industry modelling of projected outcomes, this cannot, however, incorporate every relevant consideration, such as income levels and the way that needs and resources might change throughout working life and retirement. Practical implementation issues can arise, so that an approach appearing attractive on paper is less appealing in reality. For example:

- Projection risk is greater for alternative assets
- Not all schemes have equal access to investment opportunities
- Poor timing can be a drag on performance
- Liquidity needs may constrain exposure to alternative asset

The role of fees and other investor costs is particularly important, and trustees and investment managers tend to place considerable weight on fees as a decision factor.[5] Fees are an easy way to justify decisions and to divert potential criticism. This can lead to fees being dominant in decision-making, with less weight being placed on other factors that are more opaque or difficult to interpret, even where this does not lead to the best outcomes for scheme members.

An over-emphasis on cost, rather than value, may be a particular hindrance to the consideration of alternative asset classes.

Default investment strategies also carry behavioural benefits which could be lost in more tailored strategies

Default investment strategies carry behavioural benefits, such as not requiring people to make active choices or engage when they do not have the support or financial capability to make informed decisions. Default investment strategies can also be designed in a way which targets people with specific behavioural characteristics, such as the NEST default strategy which reduces volatility in the first few years of saving in order to encourage those with low risk appetites to remain contributing. Thought will need to be given to how to avoid losing the advantages of these benefits if more tailored strategies are pursued.

5 PPI (2021)

Introduction

This report explores the extent to which the default investment strategies of Defined Contribution (DC) pension scheme assets could be redesigned to better meet the needs of certain groups of scheme members who do not fall into the typical member profile, and possible responses.

Within the private sector, DC has replaced Defined Benefit (DB) as the main source of pension provision, as funding deficits within DB schemes have grown. DC was given a significant boost by the introduction of automatic enrolment, rolled out from 2012, under which every employer in the UK must enrol eligible employees into a workplace pension scheme and contribute towards it, unless employees opt out. 98% of those automatically enrolled have been enrolled into DC schemes.[6] In 2020 there were around 14.6 million active members in DC schemes, compared to around 6.7 million active members in DB schemes (including the public sector).[7]

The emergence of DC as the predominant form of provision in the private sector changes the nature of the pension investment challenge. Specifically, within DC schemes (unlike DB schemes) default investment strategies are designed with the principle of best meeting the needs of individual members, rather than focusing on the combined cash flow needs of the scheme as a whole. The most common approach is to invest most of the assets into a single default investment strategy that is chosen to best meet the needs of typical scheme members, allowing those who prefer different strategies, currently around 9%[8] of members, to opt out of the default investment strategy if they choose.

This report explores how certain groups of scheme members may be being less well served by this approach, and possible policy responses.

Chapter one describes the role of the default investment strategy in a DC pension scheme.

Chapter two examines how default investment strategies for DC schemes are determined.

Chapter three explores the variations between the needs, circumstances and preferences of different categories of pension scheme member, and describes options that might be considered in order to better meet the needs of the full breadth of members - including the possible role of an expanded range of asset class exposures.

6 Wilkinson *et. al.* (PPI) (2020)

7 PPI aggregate modelling

8 Wilkinson *et. al.* (PPI) (2020)

Chapter One: What is the role of the default strategy?

This Chapter describes the role of the default investment strategy in a Defined Contribution (DC) pension scheme.

The default investment strategy is a critical element of DC scheme design

Although pensions are traditionally defined as an income stream throughout retirement, in practice the majority of UK retirement saving is no longer through traditional Defined Benefit (DB) schemes built around the provision of a particular level of retirement income, but rather through DC schemes, in which the contribution is known and not the retirement income.

Within DB schemes, members contribute into a single fund, designed to support scheme liabilities towards current and future pensioners. Within DC schemes, members have individual pots and it is they (rather than the plan sponsor or company) who bear the investment risk. As a result of this difference, default investment strategies within DC schemes are designed with the principle of best meeting the needs of individual members.

When setting a strategy, it is unrealistic to attempt to equip every member to select the most appropriate strategy for themself. Instead, DC scheme design focuses on designing a default investment strategy that is an appropriate fit for the average scheme member. A one-size-fits-all strategy is, by its nature, a better fit for some than for others.

The emergence of DC schemes changes the nature of the pension investment challenge

People saving into pensions in 2021 in the UK are far more likely to be members of a DC scheme than a DB scheme, though current pensioners still receive more income from DB pensions on average. In 2019/20, pensioners received on average 30% of income from occupational pensions, which are mainly DB, and 3% from personal pensions, which are all DC.[9] In the future, pensioners are likely to receive a higher level of income, on average, from DC savings than from DB savings.

There are a few key differences between DB and DC:

- Within DB schemes, investment strategy is designed to meet the needs of several generations of pensioner members; within DC schemes, default investment strategy is designed to meet the needs of the typical member.
- Within DB schemes, the sponsor (employer) makes a commitment to pay the member a certain proportion of their salary in retirement for every year they work and contribute; in DC schemes, the amount saved depends on contribution levels, charges and investment returns, and the eventual income depends on the timing and method of access.
- Within DB schemes, the sponsor bears the market risks such as poor investment performance or the risk of members living longer than expected; within DC schemes, individual members bear these risks.

9 DWP (2021), Table 2.1

Within DC schemes, members have individual pots

Because it is the benefit, not the contribution, that is fixed under DB, assets do not need to be assigned to individual scheme members. Instead, contributions are made into a single investment pool for the whole scheme, with benefits paid out of that pool as they fall due. Under DC, however, every pound that is contributed is associated with a particular scheme member, and each member in effect has their own pool of assets, which will be referred to in this report as a pension pot.

> **Pension pot:** the amount of money held in a DC pension savings account by an individual at any given time.

In DC, members bear the investment risk

A second key difference between DB and DC lies in who gains or loses from the variation in investment returns. In a DB scheme, investment returns affect the cost of the scheme, so it is the sponsor who is most directly impacted by the investment experience. In a DC scheme, investment returns are applied to each individual's pension pot and ultimately affect the benefit that is paid, so it is the member who is most directly impacted. These differences carry important implications for investment strategy.

DC investment strategy is generally determined by member risk tolerance

Within DB schemes, members contribute into a single investment strategy, designed to support scheme liabilities towards current and future pensioners. Within DC schemes, members have individual pots and it is they (rather than the plan sponsor or company) who bear the investment risk. Because the member is directly impacted by the investment experience, it is the sponsor's perception of the member's ability and willingness to tolerate risk that is the key input to the process.

Automatic enrolment

Automatic enrolment requires UK employers to automatically enrol eligible employees[10] into a pension scheme, and to contribute to it.

Although employees are able to opt out of a scheme, experience to date has been that most do not; opt outs within a month of being automatically enrolled average around 9% every year.[11] As a result, there are now more than 10 million pension scheme members in the UK who are in the scheme not because they chose to join, but because they did not choose to leave.[12]

Automatic enrolment has changed the average characteristics of members. In particular, people with, on average, lower incomes, lower levels of engagement and financial capability than previously saved in workplace pensions have now been brought into pension saving.

Automatic enrolment is based on the premise that an effective pension programme can be based on member inertia

If the member is not expected to take any action in order to join the scheme, then it is unrealistic to expect them to necessarily take action to select an investment strategy once they have joined. And few members do. In 2020, 10% of master trust/multi-employer, 20% of stakeholder and 30% of Group Personal Pension (GPP) scheme members chose a strategy other than the default - with master trust/multi-employer schemes the most commonly used for automatic enrolment.[13]

10 Those aged between 22 and State Pension age and earning £10,000 or more from each employer

11 Wilkinson *et. al.* (PPI) (2020)

12 TPR (2021)

13 Wilkinson *et. al.* (PPI) (2020)

Conclusions

A one-size-fits-all investment strategy fits some better than others

The majority of DC pension scheme members do not select an investment strategy for themselves, but rather depend on the scheme's default investment strategy. In master trust/ multi-employer schemes, which are most commonly used for automatic enrolment, 90% of members remain in the default investment strategy.

Chapter Two: How are default strategies determined?

This chapter examines how default investment strategies for DC schemes are determined.

Default investment strategies are generally selected based on the needs and circumstances of representative, or typical, scheme members

The default investment strategy decision is the responsibility of the scheme's trustee board or investment manager (in the case of contract-based schemes), based on expert advice

Responsibility for a scheme's investments ultimately rests with the trustee board, or in the case of contract-based DC schemes, the investment committee or manager. In undertaking this role, trustees and managers are expected to obtain advice, delegate tasks and decisions where appropriate to, for example, third-party asset and investment managers, to ensure that the requisite knowledge and experience are applied. Recognising the significance of these decisions, considerable effort is typically put into ensuring that appropriate strategies are selected.

The default investment strategy determines the extent of the market risk that is taken on and, hence, the potential for enhanced returns in the long run

The balance between risk and return lies at the heart of investment. Because of its central role, trustees and investment managers typically draw on specialist advice and expertise as part of their determinations.

Trustees and investment managers may select and implement a strategy themselves. In many cases, however, the strategy decision will be combined with other considerations into the choice of pre-made investment products and strategies offered by a third party. In those cases, the details of strategy design lie with the investment management firm, and trustees and managers select from among the available products. This is a more practical and cost-effective approach for smaller and mid-sized schemes, although potentially limits the range of choice.

Asset allocation is central to managing the trade-off between risk management and the pursuit of returns

A hierarchy of decision-making is necessary when setting a pension investment strategy:

- The scheme will begin with a high-level idea of the proportion of funds it intends to allocate to asset types, such as global equities, gilts or bonds.
- Then, the scheme must conduct more granular decision making within those categories - for example, between different types of equity such as private and listed equity, and type of company.

Return-focused strategies involve greater risk

At one end of the spectrum would be a strategy focused on finding investment opportunities that are expected to deliver the highest returns. This may lead to significant allocations to global equity markets, as well as to private markets, certain types of real estate, other alternative asset classes, and the more speculative sectors of the fixed income markets. The returns from these investments can be volatile and uncertain, with the likelihood of significant fluctuations in value and the potential for long-term capital loss. Hence, a strategy focused only on growth and on the

maximisation of return is suitable only where the investor has a relatively high capacity to tolerate risk, or an unusually long time horizon for investment.[14]

Global equity markets: investment into UK and overseas company shares.

Alternative asset classes: assets that are not part of conventional investment types, such as equities, bonds and cash. Alternative asset classes include private equity, hedge funds, property, commodities and infrastructure.

Fixed income: investments which pay income as fixed interest payments until the maturity of the asset.

Low-risk strategies generally yield lower returns

At the other end of the spectrum would be a strategy focused on certainty, on stable returns and on the preservation of capital. This would typically involve large holdings of short-term assets and fixed income with the highest credit ratings. Although attractive for their risk profile, the long-term returns from these assets are typically lower compared to returns from other forms of investment.

Investment strategy design involves trying to find the right balance between risk and return

Finding the appropriate balance between these two contrasting goals, higher returns and lower risk, is a key challenge when setting the high-level asset allocation strategy.

Many schemes use an asset allocation strategy that varies with the member's age, an approach known as lifestyling. This reflects the changing impact of investment volatility as the member ages and the pension pot grows; the effect of investment losses is greatest around the point of retirement, and allocations to lower-risk assets tend to be highest at that point.

However, other than by age, it is difficult to tailor a default investment strategy to each member's individual circumstances and preferences, and in practice the same default strategy is applied to a wide cross-section of scheme members. The best possible fit must be found to a diverse range of needs.

This means that for members who do not fit the typical or representative profile on which the default investment strategy is based, better solutions may exist. And, in broad terms, those solutions will involve either (a) more focus on the maximisation of return or (b) more focus on the management of risk.

Alternative asset class exposures can be used to enhance returns

The mathematics of a portfolio's expected return are quite straightforward: For a new asset class exposure to increase the portfolio's total return, it must simply offer a higher return than the asset that it replaces.

The primary driver of returns within most default investment strategies is the listed equity market. In order to enhance returns without increasing the concentration in this asset class (and the attendant risk), higher returns might be sought elsewhere.[15] For example:

- **Private markets.** Private markets are generally expected to deliver higher returns than public listed markets, due to an illiquidity premium - though there are increased costs associated with accessing private markets, and some private market assets are more risky than publicly listed assets. The growing importance of private equity markets is especially notable in the US, where the number of listed companies fell from a peak of over 8,000 in 1996 to little more than half of that number by 2017.[16]

14 Silcock, D. (PPI) (2019)

15 Silcock, D. (PPI) (2019)

16 https://fred.stlouisfed.org/series/DDOM01USA644NWDB

- **Real estate.** A significant share of global wealth is related to real estate. The accessibility, risks, and potential returns of real estate assets vary considerably, and certain sectors of this market are another potential source of enhanced returns.
- **Other alternative assets.** Alternative assets can include global infrastructure (which the Government is encouraging pension schemes to invest into)[17], hedge funds, currency, commodities and other less traditional assets. As financial markets develop, the list of possible investments continues to broaden.
- **Fixed income.** Although the highest-rated (most secure) fixed income assets do not generally offer the highest expected returns, opportunities exist in the more speculative parts of the fixed income market, such as emerging market debt or high-yielding corporate credit. However, there is a higher chance of default and capital loss, which leads to volatility in the potential returns from investing in these assets.

These assets are typically more volatile or less liquid than listed equities or fixed income, and generally cost more to invest in, while also requiring higher levels of due diligence and ongoing monitoring from schemes. There are also issues of accessibility when applied to smaller schemes who may mainly have access to daily traded and valued funds on investment platforms.

However, this does not necessarily lead to greater risk at the portfolio level. The key to this effect is the relationship between the returns from the alternative asset class and the rest of the portfolio (i.e., to what degree these assets increase and decrease in value alongside those on the listed market): the weaker that relationship, the more appealing the alternative asset class. Diversification means that a small allocation to volatile assets that have only a weak correlation to the main listed markets can reduce the volatility of a portfolio. The lower the correlation, the greater the allocation that can be made. Illiquid and alternative assets generally have lower correlation with global bonds and equities than traditional pension scheme investment assets, and can offer higher returns. For example, global hedge funds offer higher returns than global bonds, but lower volatility and correlation than global equities. Low correlation means that these assets can maintain value when public market assets lose value, and lose value when public market assets are doing well, thereby balancing out portfolios (Figure 2.1).

17 www.gov.uk/government/publications/a-challenge-letter-from-the-prime-minister-and-chancellor-to-the-uks-institutional-investors. In this report, we have approached the question from the perspective of the scheme member, rather than of any benefit that might be gained for the broader economy from a change in investment practices across schemes in general.

Figure 2.1:[18] projected returns, volatility and correlation levels of different asset classes, nominal and gross of fees (low positive figures and negative figures represent low correlation with global equities and/or Government bonds)

	Expected returns, gross of charges, from September 2021				Long-term expected volatility	Long-term correlation	
Asset	5 years	10 years	15 years	20 years		Global equities	Global Government bonds
Liquid assets							
UK Government bonds all maturities	-0.0%	0.8%	1.6%	2.0%	7.2%	-21%	76%
UK corporate bonds (10+ years)	-1.6%	0.1%	1.7%	2.7%	11.1%	24%	47%
Global high yield bonds	2.3%	3.0%	3.6%	3.9%	8.1%	68%	-3%
Global large capital equities	7.4%	7.6%	7.6%	7.5%	16.1%	85%	-15%
Global Government bonds (excluding UK)	0.3%	0.9%	1.4%	1.7%	3.7%	-28%	100%
Illiquid and alternative assets							
Global private equity (buyout)	15.3%	15.3%	15.1%	14.9%	29.2%	85%	-22%
Global direct lending	8.9%	8.8%	8.6%	8.5%	11.5%	57%	-12%
Global infrastructure equity	5.4%	6.1%	6.6%	6.9%	17.0%	57%	7%
Real estate mezzanine debt	3.9%	4.6%	5.2%	5.5%	9.9%	53%	17%
Hedge funds (global)	3.7%	4.4%	4.9%	5.3%	7.8%	81%	-29%
Global core real estate	2.9%	3.7%	4.4%	4.8%	11.2%	56%	17%

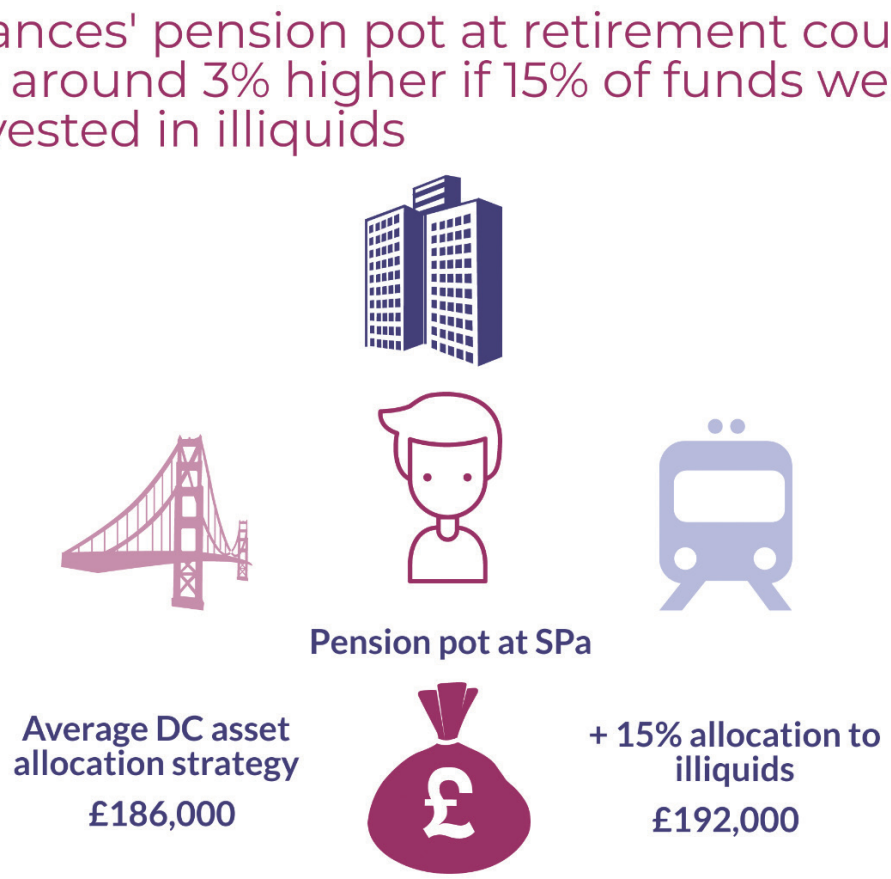
Previous PPI work examining the potential effect of investing in illiquid alternative assets has noted growing appreciation among investors of the potential advantages of illiquid and alternative assets, and that such assets could generate a return above those realised by more liquid assets. Based on estimates of the potential increased return from investing in illiquids, net of fees, a median earner contributing throughout their working life into a pension with 10% to 15% of funds in illiquids could have a pension pot at retirement around 2% to 3% higher than if their pension was not invested in any illiquids.[19] Frances, a median earner (referred to later in this report) who contributes 8% of salary to pension scheme between ages 22 and State Pension age (SPa), could have a pension pot worth around £186,000 by SPa if invested in line with the average asset allocation in DC schemes. If 10% to 15% of funds had been invested in illiquid assets, and assuming these had performed in line with projected illiquidity premia, Frances' pension pot at retirement could instead be worth between £190,000 and £192,000 (Figure 2.2).

The diversifying benefits of alternative assets outlined above mean that this increase in average pot size is not necessarily accompanied by increased volatility or uncertainty. The long-term correlations with global equity markets of various illiquid and alternative assets in Figure 2.1 range from 53% to 85%. Where a combination of alternative assets is used, the benefits of diversification are greater.

18 Sourced 07.09.2021: return expectations based on past performance (geometric, gross of fees) www.blackrock.com/institutions/en-gb/insights/charts/capital-market-assumptions?cid=emc:CMAQ42018:GB:DM-6540&elq_mid=26759&elq_cid=820403&elq_cmp=8102;

19 Silcock *et al* (PPI) (2019)

Figure 2.2



Alternative asset class exposures can enhance diversification

The mathematics of investment volatility are more complex than those of expected return. This is because the behaviour of the portfolio as a whole depends not only on the behaviour of its constituents, but also on the interaction between those constituents. A portfolio that is concentrated in a small number of investments, or in investments that tend to behave similarly to one another, is likely to be more volatile and riskier than a portfolio which is well diversified.

The power of diversification means that expanding the range of asset class exposures can lead to potentially better portfolios, not only in a context of seeking higher returns, but also in a context of seeking to reduce risk, as balancing occurs between assets when one does poorly, but another does well at the same time. Most default investment strategies are heavily dependent on global equity market performance as the primary driver of investment returns: to the extent that other sources of return can be brought in to sit alongside and supplement this exposure, this concentration of risk can be reduced.

This means that trustees might consider alternative asset allocations that offer similar (or perhaps even slightly lower) expected returns than equities, provided those allocations are driven by different economic factors than global equity markets.

Practical considerations take on greater importance for alternative assets

Although investment strategy is generally based on projected outcomes, it cannot incorporate every relevant consideration. In particular, practical implementation issues can arise, so that an approach appearing attractive on paper can be less appealing in reality.

While alternative assets are likely to improve investment outcomes within the context of investment models, suitable assets with the right characteristics can be difficult to find and access in practice.

- **Future return projection risk is greater for alternative assets -** There are several decades of reliable historical return data available for listed equity and fixed income, on which to build future return assumptions. However, the quality and length of available data on alternative asset classes is not the same. Even the historical data that is available may be an imprecise guide to future experience, since investment markets and the global economy are constantly evolving.
- **Not all schemes have equal access to investment opportunities -** Some investment opportunities may be difficult to access. Direct access to private markets is difficult for any but the very largest of investors, requiring considerable resources to manage, and presenting challenges in building a broad portfolio. Indirect access depends on suitable and affordable agents and investment vehicles being available. Agents and vehicles are likely to vary in accessibility, cost and the level of commitment required. There is also the question of implementation. DC schemes that do not have large asset bases, in particular, may find it more difficult to deal with liquidity issues and to calibrate and balance asset allocations, as these schemes will generally access funds through investment platforms which use a daily pricing, trading and valuation model.
- **Poor timing can be a drag on performance -** Interest in many alternative asset classes tends to be highest following periods of strong returns. To the extent that this leads to greater levels of new investment when valuations are at their highest, it results in investors achieving lower returns in practice. This effect is not limited to alternative assets,[20] but has greater impact in the context of new allocations.
- **Liquidity needs may constrain exposure to alternative assets -** The primary asset classes in which most DC schemes invest are highly liquid, i.e., selling is generally inexpensive, easy and fast. This is less true of many alternative assets, so the degree of exposure to these assets must account for the possibility of an unexpected liquidity demand.[21]

An additional complication arises for some alternative asset classes which have performance fees attached. This adds complexity, introducing uncertainty and the potential for higher fees, and can create difficulties for complying with the charge cap, though the Government is working with industry to make it easier for DC schemes to include assets with performance fees in their default investment strategies. Previous PPI work on illiquid and alternative assets explores the potential advantages and risks associated with investment in illiquid assets in more detail.[22]

The use of illiquids and alternative assets is growing in all DC scheme types, though a significant proportion of this allocation is invested via listed alternatives, such as indices, which are relatively liquid and unlikely to capture the illiquidity premium in full.

Factors that are considered in default investment strategy design include projected outcomes, financial variables and participant circumstances and objectives

The design of a default investment strategy is generally based on projected outcomes under various alternative approaches. In some cases, the selected strategy may be based solely on a set of assumptions regarding the member and future investment returns. In some cases, however, projected outcomes guide rather than dictate the final decision, which might also reflect practical considerations that are not formally included in the modelling.

Financial variables for which assumptions are needed include interest rates, inflation, returns on global listed equity and bond markets, and returns on any other asset classes that are under consideration, such as real estate, private equity and other alternative assets. These assumptions need to account not only for the uncertainty inherent in each of these variables (i.e., the range of possible outcomes), but also their co-dependency (in particular, the degree to which they tend to rise and fall together).

20 www.thebalance.com/why-average-investors-earn-below-average-market-returns-2388519

21 In practice, problems arising from illiquidity are often associated with placing a fair value on assets rather than the process of selling

22 Silcock (PPI) (2019)

Assumptions about members can be separated into those that relate to their circumstances and those that relate to their objectives and characteristics:

- **Objectives:** include the targeted level of retirement income and the tolerance for variation in account value (specifically, for drops in value) both pre- and post-retirement.
- **Characteristics:** include the length of working career, salary, salary growth, savings rate, other sources of income (such as State or other private pensions), other assets (including home ownership) and expected longevity.

Key risks and considerations in the selection of a default investment strategy include:

- **Sequential (or sequence-of-return) risk.** The potential impact of investment risk is not evenly spread across a scheme member's life, so it is not only the overall level of investment return that matters, but also the timing of that return. At younger ages, pot sizes are smaller and substantial amounts of pension contributions remain to be made. This means that the risk associated with a poor investment return increases throughout a member's working lifetime, reaching its highest level around the point of retirement.
- **Diversification.** Investing across a range of asset classes tends to deliver a less volatile return pattern, as the variation in returns on one asset may offset the variation in another.
- **Sensitivity to fees.** Total charges are subject to a cap. Because fees are relatively stable, predictable, visible and easy to understand, they are generally given significant weight in allocation decisions.
- **Peer group risk.** Although the strategies adopted by others are not usually part of the formal analysis, a comparison against the results of others will, in practice, be one of the ways in which the success of a strategy is judged. As a result, decision-makers will generally at least be aware of the ways in which their chosen approach deviates from that of peers.[23]

Some types of variation between scheme members may not be fully understood

Although there is a long history of analysis of financial variables, the role of the assumptions regarding scheme member characteristics – other than age – in the choice of strategy has not been examined to the same extent, partly due to a lack of data on member characteristics available to schemes.

In choosing a single approach to apply across a range of circumstances, it must be expected that this approach will differ, to a greater or lesser degree, from that which would be chosen based on the situation of any particular scheme member. This report explores those variations, highlighting those categories of scheme member for whom that difference is most significant.

Default investment strategies also carry behavioural benefits

Default investment strategies carry behavioural benefits, such as not requiring people to make active choices or engage when they do not have the support or financial capability to make informed decisions. Default investment strategies can also be designed in a way which targets people with specific behavioural characteristics, such as the Nest default strategy which reduces volatility in the first few years of saving in order to encourage those with low risk appetites to remain contributing (Figure 2.3). Thought will need to be given to how to avoid losing the advantages of these benefits if more tailored strategies are pursued.

Figure 2.3

One example of a behavioural consideration in default investment strategy design is seen in the approach taken by Nest, a master trust established by the Pensions Act of 2008 in order to facilitate automatic enrolment. Because many of Nest's members are unaccustomed to retirement saving and investment markets, the Nest default investment strategy includes an initial foundation phase, lasting roughly five years, during which exposure to volatile assets is kept relatively low. The aim of this approach is to develop a pension saving habit and avoid sharp drops in value during the early years which could lead to members deciding not to continue saving into their pension.[24]

23 TPR (2019), Section 4

24 www.nestpensions.org.uk/schemeweb/nest/aboutnest/investment-approach/nest-retirement-date-funds.html

The default investment strategy decision balances return potential against risk and other practical considerations

Finding an appropriate balance between risk and return is a particularly difficult part of the strategy design process, as it is ultimately a subjective judgement. There is a strong relationship between the risk associated with an investment and the return that it may be expected to deliver. This relationship is a result of natural supply and demand considerations, with the higher demand for low-risk investments pushing up the price that investors pay, in turn reducing the potential for future returns. Equivalently, it can be said that investors demand higher returns to compensate for higher risk.[25]

The most desirable trade-off between risk and return can be sensitive to the underlying assumptions, especially those regarding the member's ability and willingness to tolerate variations in account value.

This report therefore concentrates on the relative value to various categories of scheme member of (a) enhanced investment returns and (b) reduced investment volatility.

Default investment strategies are generally selected based on the needs and circumstances of representative, or typical, scheme members, as well as by age

Default investment strategies are normally designed around the needs of representative scheme members. Therefore, those who do not fit the typical profile, either in terms of their circumstances or their preferences, may have the most to gain by pursuing different strategies.

Asset allocation also varies by scheme type. On average, in 2020, master trust default investment strategies allocated more than two thirds (69%) of assets to equities 20 years before a member's retirement date, and Group Personal Pension (GPP) schemes allocated around 66%.[26]

Due to the changing of investment time horizon over a working life, most default investment strategies vary asset allocation according to the member's age, typically moving over time into more stable income-producing assets, such as Government bonds or corporate bonds. By a member's retirement date, master trusts invest around 26% of funds in equities (Figure 2.4 and 2.5).[27]

25 www.investopaper.com/news/higher-risk-higher-return/

26 Wilkinson *et.al.* (PPI) (2020)

27 Wilkinson *et.al.* (PPI) (2020)

Figure 2.4[28]

By a member's retirement date, average allocation to equities in a master trust's default fund has reduced from more than two thirds to a quarter

Average allocation to different asset types in master trust default strategy by 20 years to and at retirement

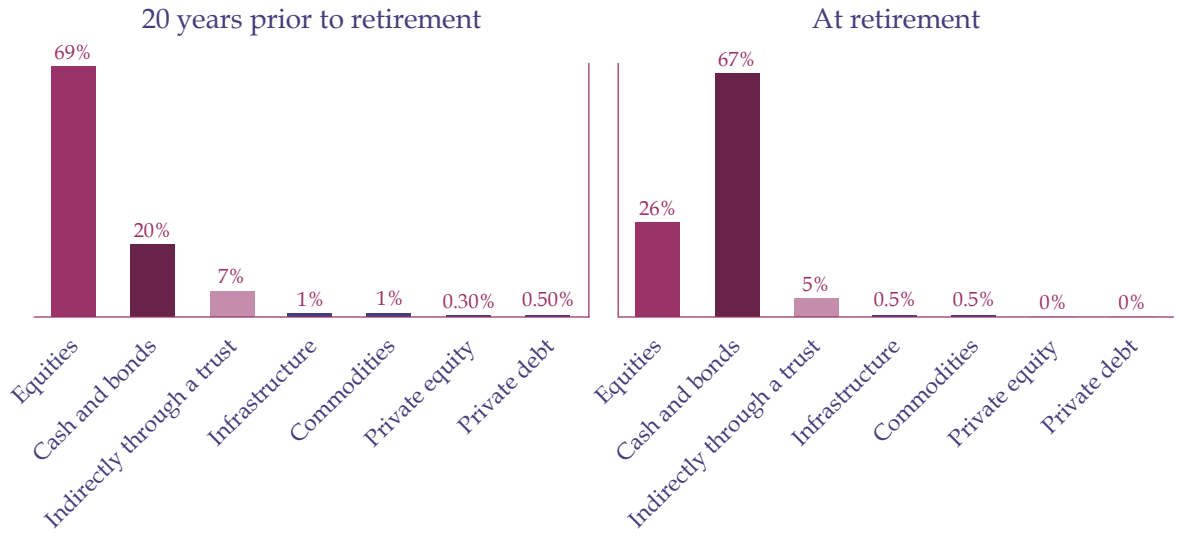


Figure 2.5[29]

Stakeholder and GPP default strategies follow a similar asset allocation pattern to master trusts, although with a slightly higher average allocation to equities at retirement

Average allocation to different asset types in Stakeholder and GPP default strategy by 20 years to and at retirement

28 PPI 2021 DC Assets Allocation Survey

29 PPI 2021 DC Assets Allocation Survey

Fees are important, but may be overemphasised in some decision contexts

The role of fees and other investor costs is a particularly important aspect of default investment strategy design. These costs include annual management charges and any other professional fees and administration costs that are additional to those charges. Increased costs directly reduce the net return earned by the member.

In practice, trustees and investment managers tend to place considerable weight on fees as a decision factor. Among the reasons for this are:[30]

- Fees are often highlighted as an advantage when competing for employer business.
- There is a regulatory emphasis on fees (including a 0.75% charge cap for default investment strategies in schemes used for automatic enrolment), in part because some investments have represented poor value for money in the past.
- Reputational risk if high fee options are selected.
- Trustees may be cautious about the case that is made for higher fees as a route to higher returns.
- Fees are controllable by trustees and investment managers, while investment returns are uncertain.

As a result, fees are an easy way to justify decisions and to divert potential criticism. This can lead to fees being dominant in decision making, with less weight being placed on other factors that are more opaque or difficult to interpret, even where this does not lead to the best outcomes for scheme members by increasing return and/or reducing volatility.

An over-emphasis on cost, rather than value, may be a particular hindrance to the consideration of alternative asset classes. The greater the differences between the options, the greater the need to consider all relevant factors, rather than to rely simply on cost. For example, the difference in the value to the portfolio of two products that adopt similar strategies within the same asset class is likely to be much less than the difference in the value of two products that invest in totally different types of assets. As a result, it is appropriate to place greater weight on costs as a decision factor in the former case than in the latter.

Sustainability preferences and the growth of ESG investing are changing the nature of the challenge

At present, there is considerable activity and development in the field of environmental, social and governance (ESG) investing. In part, this growth in interest is due to greater understanding of the financial implications of ESG considerations. It is being fuelled also by a greater desire on the part of investors to recognise that investment activity, like all economic activity, is interconnected with broader society, and has environmental and social impacts that extend beyond simply the financial outcomes achieved. To what extent, and how, such impacts should be considered in the design of investment strategy is currently the subject of considerable attention within the investment industry.[31]

Just as a default investment strategy design must select a risk preference that is judged to be appropriate across a wide range of individuals, so a suitable one-size-fits-all sustainability preference is needed. Alternative assets may offer access to investments which deliver the broader goals of beneficiaries in relation to climate change or other environmental or social outcomes. Examples of strategies that may serve to these ends include renewable infrastructure or impact funds.

30 PPI (2021)

31 Wilkinson, L. (PPI) (2021)

Conclusions

Default investment strategies are designed to meet the needs of typical or representative scheme members

In selecting an investment strategy that best meets the needs of the scheme membership as a whole, trustee boards and investment managers must weigh various factors. Some of these factors relate to the nature of the available investments: the potential for strong returns, the volatility of the asset values, the potential for significant losses in value and practical considerations such as cost, liquidity and ease of access.

Other factors relate to the nature and the needs of the scheme membership.

Chapter Three: How can variations in scheme member need be recognised and responded to?

Chapter three explores the variations between the needs, circumstances and preferences of different categories of pension scheme member and describes options that might be considered in order to better meet the needs of the full breadth of pension scheme members.

- People with particular characteristics may benefit from an increased focus on enhanced returns or reduced volatility than found in standard Defined Contribution (DC) default investment strategies, though it is not possible to quantify the proportion of people who fit into these categories
- There are several policy options for ensuring that DC default investment strategies meet the needs of a wider range of members
- Increasing asset allocation to alternatives could enhance returns while also increasing diversification, potentially benefiting all members
- However, there are cost and resource issues involved with tailoring investment strategies to different members and a lack of member data can also make identification difficult

This Chapter explores the characteristics of DC members who might benefit from higher returns or lower volatility than in a base case scenario. These include:

Who might benefit from higher returns?	Who might benefit from lower volatility?
• People who work for longer (past SPa)	• People who stop contributing at younger ages (before SPa)
• Higher earners	• People who use Uncrystallised Funds pension Lump Sums (UFPLS)
• Those who accumulate marginal amounts of DC savings	• People who purchase an annuity
• Those with patchy work and contribution patterns	• Those without supplementary savings
• Those with Defined Benefit (DB) savings	

There are several policy options for ensuring that DC default investment strategies meet the needs of a wider number of members:

1. Exploring ways of increasing the allocation to alternative assets within DC default investment strategies, which has the potential to increase returns while decreasing volatility.
2. Using existing data on members, such as pot size, in order to provide prompts about using non-default (self-select) investment strategies.
3. Gathering more data on members in order to make DC default investment strategies more tailored or to provide prompts about non-default (self-select) investment strategies.

Exploring ways of increasing the allocation to alternative assets within DC default investment strategies

Expanding the range of assets used in a default investment strategy may be done either with the goal of enhancing returns, or reducing risk, though many alternatives offer both the potential for increased diversification and potentially returns.

Part of the reason many DC default investment strategies have a limited range of asset exposure is the increased costs associated with this, which could translate into higher member charges. Higher charges may result in a loss for some members, particularly for members of schemes with relatively small asset bases, which may not have the scale to reduce administrative costs as a way of freeing up extra investment budget.

In considering the effect of expanding the range of assets used in default investment strategies, it is important to look at the portfolio-level impact, rather than the characteristics of the alternative asset class in isolation. Assets which, considered in isolation, offer volatile return patterns may nonetheless serve to reduce a portfolio's overall volatility, provided they diversify existing exposures.

Using existing data on members, such as pot size, in order to provide prompts about using non-default (self-select) investment strategies

At present, lifestyling means that most default investment strategies vary with the age of the member. Where more information is available (e.g., account balance data is available to the scheme) those additional data points could be used to achieve greater customisation even without direct member engagement. As technology advances, such greater customisation is likely to become more feasible in practice.

For example, those with the highest account balances might be regarded as having more to gain from a more customised investment approach, as being able to afford higher member charges, and as able to bear more risk, so that group might receive targeted communications about their options. Though some of those with high account balances may still be highly dependent on their DC income or have a low risk-appetite, so any communications will need to be carefully designed. Schemes or employers advising members about appropriate investment strategy could also be seen as giving advice, which is a regulated service. Therefore, some form of protection for the provider of the prompt would need to be built into the system.

Gathering more data on members in order to make DC default investment strategies more tailored or to provide prompts about non-default (self-select) investment strategies

Scheme data is currently constrained by the data that employers gather on their employees before enrolling them. Alongside this, some schemes or employers may conduct surveys or data gathering exercises, but these are not consistent between schemes. In order to better understand the profiles of scheme members, additional data could be gathered covering income level, gender, ethnicity, ability, caring responsibilities, other savings and assets and attitudes to risk. Gathering additional data could make customising the default investment strategy simpler as well as making it easier for schemes to identify members who may not be best served by remaining in the default investment strategy.

Additional data gathering would also allow the construction of additional packaged solutions to offer to members for whom the default strategy is not regarded as a good fit. In this case, those who opt out of the default would not necessarily be required to construct a complete investment strategy from scratch: rather, they might, for example, be offered a pre-packaged "lower risk" and a "higher risk" option.

However, there would be additional costs and privacy issues involved in a data gathering exercise of this kind, as well as the possibility of higher costs for other scheme members due to loss of scale in the default fund. In order to be rolled out, it would require the investment and support of both the Government and industry in order to ensure policies are clear and straightforward, and that cost and privacy concerns are dealt with in a way which does not pose a threat to members, employers or schemes. Employers and schemes may also be worried that steering people towards certain options may be considered to be "advice". Therefore, a system of assessment and guidance may need to be built in which would protect schemes and employers from potential legal repercussions.

How might asset allocation affect people with different characteristics?

This chapter uses PPI modelling to compare potential retirement outcomes for people with varying circumstances, under different asset allocation strategies. There are some key assumptions and caveats (Figure 3.1).

Figure 3.1 PPI Modelling

PPI Modelling

The modelling approach used in this report focuses on the differences between scheme members. The PPI modelling utilises vignettes of representative individuals and tests how their circumstances and behaviours interact with the investment strategy to determine their potential outcomes in retirement. These illustrations are controlled to isolate key features and identify the particular impact of variations in a theoretical environment.

Although this report has considered several ways in which individual scheme members differ from one another, it is not exhaustive. In particular, different preferences have not been modelled. In other words, two individuals may follow identical career paths, yet may differ in their attitude to the desired trade-off between the pursuit of investment returns and the protection against losses. Because the default investment strategy is designed to apply in the absence of specific input, differences in individual risk preference cannot be incorporated. Where members are known to have different risk preferences from that assumed in the default investment strategy design, consideration should be given to encouraging them to select a different strategy that better fits these preferences.

Individuals are all assumed to have the typical incomes for their age and percentile, averaged between genders. This is intended to show the average impact for individuals without differentiating between genders, as the below characteristics could apply to anyone, though some may apply more commonly to one gender than another. Therefore, the analysis describes named individuals as they, rather than she or he.

Stochastic modelling

The modelling utilises the PPI's Individual Model linked to an Economic Scenario Generator to undertake a stochastic projection reflecting the uncertainty of the outcome. This takes account of historical economic performance with a future outlook derived from the Office for Budget Responsibility's (OBR) long-term economic determinants.

Base investment strategy

The central investment return has been set to 5.3% in line with the OBR forecast of asset yields from the Economic and Fiscal Outlook (EFO).[32] Asset allocations are based on the average asset allocation used in default funds in industry. This gives an allocation of 69:19:12 equity: bond: cash, commodities and property investment ratio. A 10-year de-risking glide path was modelled. This is based on a linear progression between the default funds and retirement funds currently available in the pensions industry.

32 Office for Budget Responsibility (2021), Economic and Fiscal Outlook – March 2021

Optimality of the default strategy

While this report looks in depth at how investment strategy might vary for different types of individual, it does not consider the question of whether the typical default investment strategy is itself a good fit. That question has been, and continues to be, extensively examined - not only as a question of theory, but also as a question of practice. In effect, every choice of a default strategy implies an opinion about what the optimal strategy looks like. Since the investment landscape is highly dynamic, this will remain an area for ongoing work, but is beyond the scope of this report.

Measures of impact

The stochastic modelling generates a range of potential outcomes which reflects the uncertainty of future economic conditions. The range of outcomes is described using key statistics of the distribution, and this report uses three key statistics to describe the distribution of the outcomes of the stochastic modelling:

- **Mean:** this metric represents the average of the projected outcomes
- **Standard deviation:** this metric represents the spread of the projected outcomes, and reflects the inherent uncertainty of the outcome. A low standard deviation indicates the outcomes are clustered close to the mean, while a high standard deviation indicates the outcomes are spread over a wider range
- **Gradient of trade off:** this metric explores the relationship between returns and volatility, and how much changes in one affect the other. Within the analysis, the base case, Frances, is given the gradient of 100%.
  - Asset allocation scenarios which achieve a gradient of more than 100% mean that when return is enhanced for the individual in question, volatility is reduced by a lower amount than in the base case scenario. **Individuals with a gradient of over 100% are considered to benefit more from enhanced returns than reduced volatility.**
  - Asset allocation scenarios which achieve a gradient of less than 100% mean that when return is enhanced for the individual in question, volatility is reduced by a higher amount than in the base case scenario. **Individuals with a gradient of less than 100% are considered to benefit more from reduced volatility than enhanced returns.**

Measures of adequacy

Income adequacy targets are used to compare outcomes from different asset allocation scenarios

In order to understand the implications of different asset allocation strategies, this report examines the probability of meeting different adequacy targets afforded to members with different characteristics. Adequacy targets range from a minimum level of adequacy (which provides for a minimally acceptable standard of living within the UK) to a moderate level of adequacy (which allows for some discretionary spending, for example, holidays and eating out occasionally). The chance of meeting the adequacy target is calculated by the expected income from State and DC pensions, unless otherwise specified.

1. The JRF MIS refers to the Joseph Rowntree Foundation's Minimum Income Standard. This is a measure of the income required to meet a minimum socially acceptable standard of living, determined through surveys of the general public.[33] For 2021, this is set at £10,669 a year for a single person, or £16,529 a year for a couple (After Housing Costs). The base case, Frances, is a homeowner, living outside London.

33 More details are available at www.jrf.org.uk/income-benefits/minimum-income-standards

2. An alternative retirement income target is provided by the Pensions and Lifetime Savings Association (PLSA). The PLSA's Retirement Living Standards[34] have three levels: minimum, moderate and comfortable. This modelling uses the moderate measure which shows the average amount that a UK household may require to have all of their minimum needs met, with some discretionary spending (£20,732 a year for a single person, £29,867 a year for a couple).

The gradient of the risk-return trade-off

Improving investment returns increases retirement pot sizes; reducing investment volatility narrows the uncertainty of pot size

The trade-off between risk and return is of particular interest in the design of default investment strategy. To allow exploration of this trade-off, this analysis considers the difference to member outcomes, assuming all else, including fees, remains equal, that would hypothetically result if it were possible to:

(a) increase investment return by an additional 1% each year with no change in investment volatility, or

(b) reduce investment volatility by one-quarter with no change in the average level of investment returns.

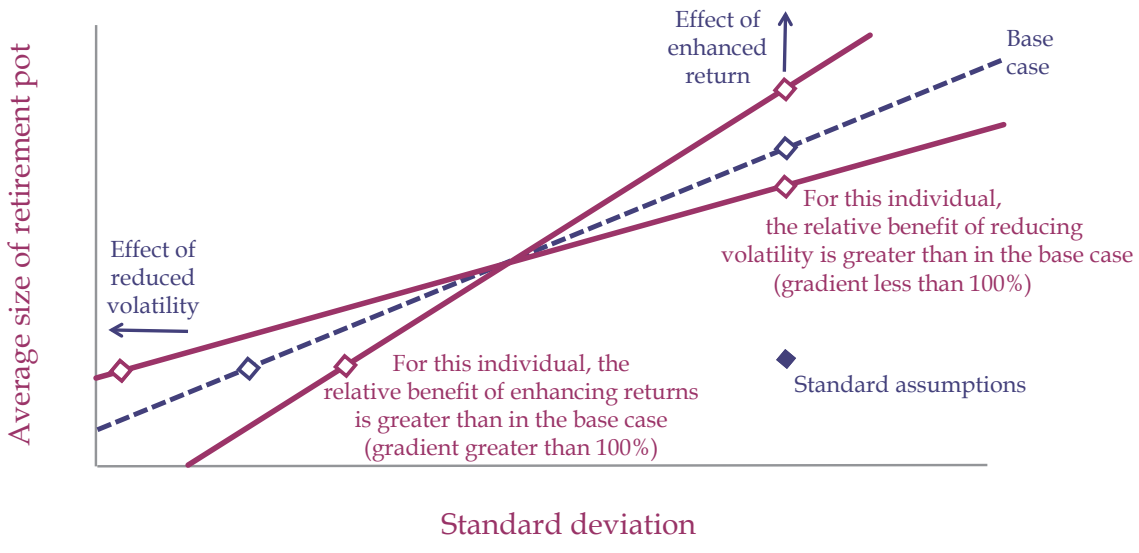
Each of these theoretical changes would be beneficial for retirement savers. The additional investment return would lead to larger pot sizes, while the reduced volatility would narrow the range of outcomes, reducing the uncertainty associated with market returns. The relative benefit of the two changes, however, is not the same for everyone.

The relative benefit of each change for a particular individual can be illustrated by the trade-off in retirement outcomes, i.e., the gradient of the risk-return trade-off compared to the gradient of that same trade-off for a base case individual representing the "typical" scheme member on whose circumstances the default investment strategy has been based.

What does the steepness of the risk-return trade-off mean?

The trade-off between enhancing returns and reducing volatility is not the same for everyone

Enhancing returns improves the average outcome, while reducing volatility results in a lower standard deviation. Which of these is relatively more beneficial for a particular individual depends on the gradient of the trade-off.



34 More details are available at www.retirementlivingstandards.org.uk

In risk-return charts such as the figures above, the y-(vertical) axis measures the expected outcome, while the x-(horizontal) axis measures the risk, or uncertainty, associated with that outcome. Strategies designed to increase returns can lead to better outcomes, but the extent to which outcomes are improved by a given increase in the assumed level of return varies depending on the scheme member's circumstances. Similarly, if investment volatility is reduced then the uncertainty in the outcomes is also reduced, but once again the extent of that reduction is not the same for everyone.

By calculating (or simply drawing) the steepness of the trade-off between enhanced returns and reduced volatility, it is possible to compare scheme members in terms of the benefit to them arising from either enhancing returns or reducing risk: a steeper trade-off implying that enhancing investment returns is (relatively) more beneficial, and a less-steep trade-off implying that reducing investment volatility is (relatively) more beneficial.

- Individuals with a gradient of over 100% are considered to benefit more from enhanced returns than reduced volatility.
- Individuals with a gradient of less than 100% are considered to benefit more from reduced volatility than enhanced returns.

Frances: the base case scenario

This analysis uses a member with a full working and saving history as a base case for comparison purposes

Various differences in member characteristics are compared to a base case of an individual with a full history of work and contributions, "Frances" (Figure 3.2).

Figure 3.2: Frances' working-life and contribution patterns

- Works from age 22 to State Pension age (SPa),
- Earns at median levels for their age, averaged between genders,
- Contributes 8% of total salary to their pension each year between age 22 and SPa,
- Is aged 55 in 2021,
- Retires at SPa (age 67 in this case),
- Withdraws 25% tax-free lump sum and spends it, and
- Draws down a pension income from that date from an income drawdown vehicle at a rate of 3.5% of the original amount (uprated each year by the Consumer Price Index (CPI)).[35]

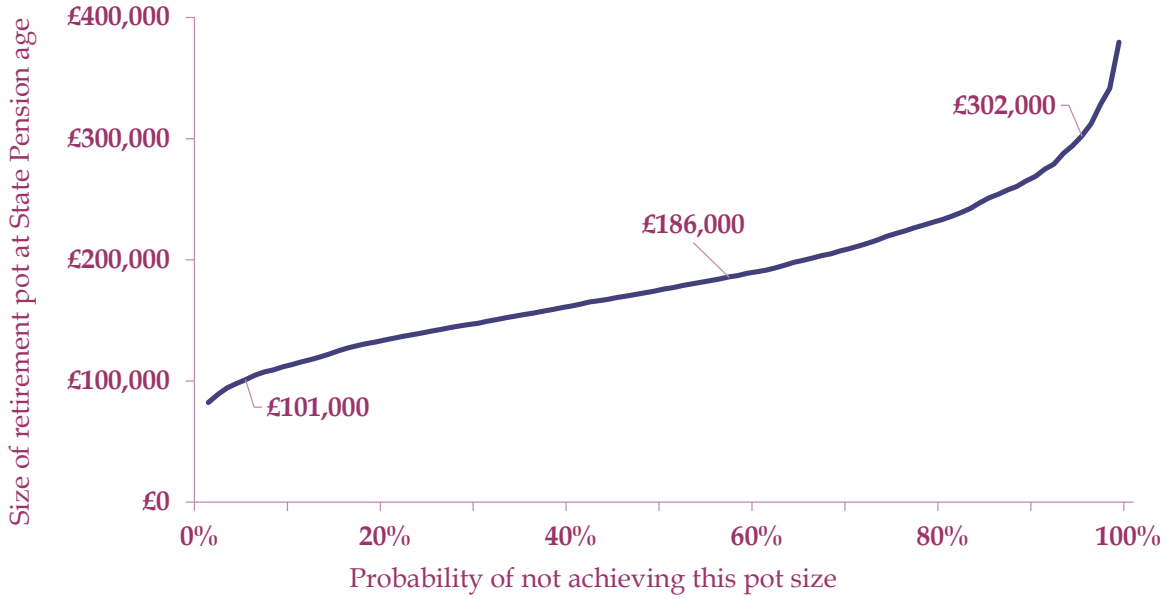
35 The average asset allocations are taken from the various fund factsheets of typical retirement funds. The investment return follows the same distribution throughout an individual's working life

Under the above assumptions, Frances' pot size at SPa would average around £186,000 (2021 earnings terms). If the range of potential future economic scenarios is considered (and the best and worst 5% of scenarios are excluded) Frances' pot size at SPa could range from £101,000 to £302,000 (2021 earnings terms, 5th percentile to 95th percentile) after the 25% tax-free lump sum is taken (Figure 3.3).

Figure 3.3[36]

Frances could achieve an average pot size of around £186,000 by State Pension age (2021 earnings terms)

Range of potential pot sizes at SPa for median earner who contributes 8% of total salary to their pension each year between age 22 and SPa



Frances draws down an income at a rate of 3.5% pa from their pension pot which, along with their State Pension, produces a total income averaging £15,900 a year (2021 earnings terms). The probability that Frances achieves the minimum income standard of £10,669 a year is close to 100%.[37]

There is only a 2% probability that Frances will achieve the moderate retirement income target of £20,732 a year. Among the 98% of cases where Frances does not reach this level of income, the average shortfall was around £5,000 a year (Figure 3.4).

Figure 3.4: Frances' outcomes under a range of economic scenarios[38]

Average (mean) pot size at SPa	£186,000
Standard deviation	£63,400
Average total annual income at SPa from private and State Pension	£15,900
Standard deviation	£1,900[39]
Probability of failing to achieve JRF MIS	<1%
Average shortfall below JRF MIS	n/a
Probability of failing to achieve PLSA moderate income for a single person	98%
Average shortfall below PLSA mod	£5,000

36 PPI Individual Model and Economic Scenario Generator

37 Frances' average outcome is slightly higher than this because the average includes a small number of very good outcomes, if investment markets are very strong, which bring the average up

38 PPI Individual Model and Economic Scenario Generator

39 Part of the income is essentially guaranteed by the state through the State Pension which would reduce the Standard Deviation

Improving investment returns could increase Frances' pot size; reducing investment volatility narrows the uncertainty of pot size

As described above, Frances serves as a base case against which to compare other scheme members in terms of the relative benefit obtained by the impact that hypothetically would result from:

(a) increasing investment return by an additional 1% each year with no change in investment volatility, or

(b) reducing investment volatility by one-quarter with no change in the average level of investment returns.

Each of these changes could benefit Frances. The additional investment return could lead to larger pot sizes, while the reduced volatility would narrow the range of outcomes, reducing the uncertainty associated with market returns, though no investment strategy can guarantee these outcomes (Figure 3.5). Which of these two different effects is more beneficial for Frances will depend on their specific circumstances and preferences.

Figure 3.5: The effect of changes to the investment return assumptions (Frances' pot size at SPa)[40]

	Standard assumptions	Enhanced return	Reduced volatility
Average outcome	£186,000	£218,000	£186,000
Standard deviation	£63,400	£71,300	£38,300

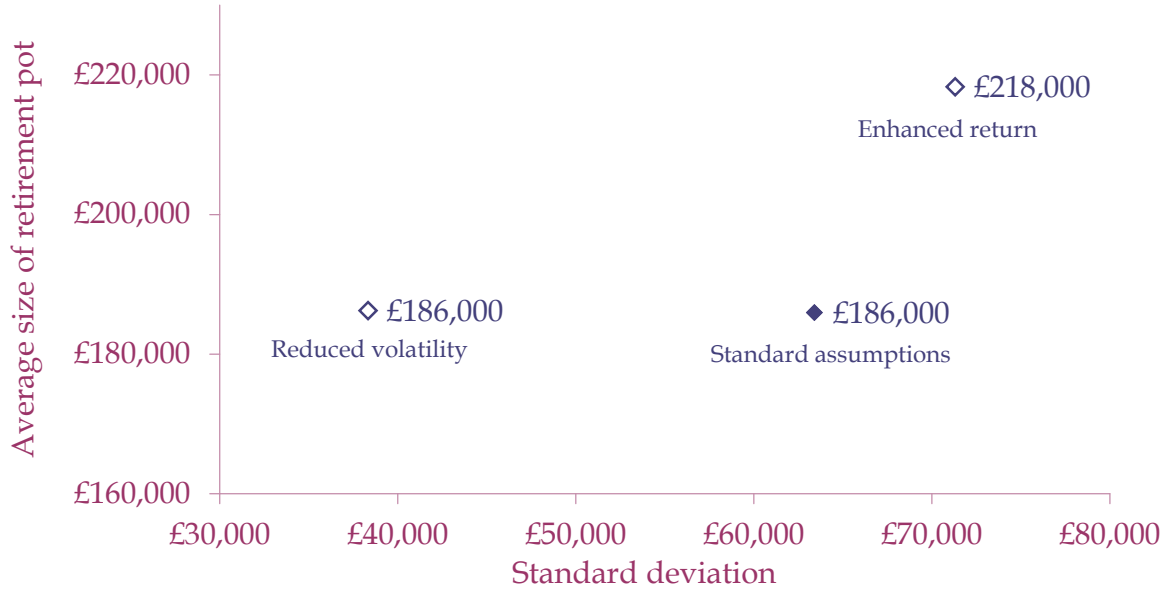
A strategy designed to enhance returns by 1% a year could increase Frances' pot size at retirement by around 17% on average, while also increasing the uncertainty (i.e., measured using the standard deviation of the projected pot values) by around 12%, meaning that the difference between the best and the worst outcomes is magnified.

Reduced investment volatility has little impact on the average outcome, but significantly reduces the range of uncertainty around the average, with the standard deviation in this case falling by 40% (Figure 3.6). This means that, while Frances' pot would not be as large in the event of strong investment markets, the bottom of the range of outcomes increases significantly from £101,000 to £130,000.

Figure 3.6[41]

Strategies aimed at higher returns can increase uncertainty by around 12%, while lower volatility reduces it by around 40%

Potential average pot sizes at SPa for median earner who contributes 8% of total salary to their pension each year between age 22 and SPa under investment strategies aimed at increasing return or reducing volatility



40 PPI Individual Model and Economic Scenario Generator

41 PPI Individual Model and Economic Scenario Generator

Frances' results serve as a base case to allow comparison between the needs of different categories of scheme member. This analysis will focus on the relative benefit to be gained from either enhanced investment returns or reduced investment volatility (which represent allocation to different asset types within a strategy).

Alex – continuing to work beyond SPa

This analysis now considers the impact of seeking higher returns on an individual who works longer, Alex, in some detail, before showing a comparison of those with other characteristics.

Figure 3.7: Alex's working-life and contribution patterns

- Works from age 22 to SPa
- Earns at median levels for their age, averaged between genders,
- Contributes 8% of total salary to their pension each year between age 22 and SPa,
- Is aged 55 in 2021,
- Retires five years after SPa, during which time they continue contributing and work part-time,
- Withdraws 25% tax-free lump sum and spends it,
- Draws down a pension income from SPa for the first five years, sufficient to top up earnings and State Pension income to the level of their earnings during working life,
- From five years after SPa takes an annual income from a drawdown vehicle at a rate of 3.5% of the original amount (uprated each year by CPI).

Because Alex continues to work after reaching SPa, they withdraw less from their pension pot than they would have if they had ceased work altogether, instead withdrawing an amount required to top up State Pension and earnings income to meet the relevant adequacy target.

Alex is in a stronger financial position than Frances (who did not continue to work part-time after SPa). As with Frances, however, the position can potentially be improved either by enhancing returns or by reducing the volatility of the returns. In this case, it is notable that Alex reaches both the JRF Minimum Income Standard (MIS) and the PLSA Retirement Living Standards Moderate Income Target in every instance (Figure 3.8).

Figure 3.8: Alex's outcomes compared to Frances' under a range of economic scenarios[42]

Individual	Frances	Alex
Average (mean) pot size at five years after SPa (assuming 25% tax-free lump sum was withdrawn at SPa)	£162,000	£169,000
Standard deviation	£61,400	£72,200
Average total annual income at five years after SPa from private and State Pension	£15,500	£17,100
Standard deviation	£1,900	£2,500
Probability of failing to achieve JRF MIS	<1%	<1%
Average shortfall below JRF MIS	n/a	n/a
Probability of failing to achieve PLSA mod	98%	92%
Average shortfall below PLSA mod	£5,305	£4,134
Gradient (% of base case)	100%	98.3%

42 PPI Individual Model and Economic Scenario Generator

Like Frances, higher returns or reduced investment volatility would each be beneficial for Alex (Figure 3.9).

Figure 3.9: The effect of changes to the investment return assumptions for Alex on pot size five years after SPa (who works part-time post-retirement)[43]

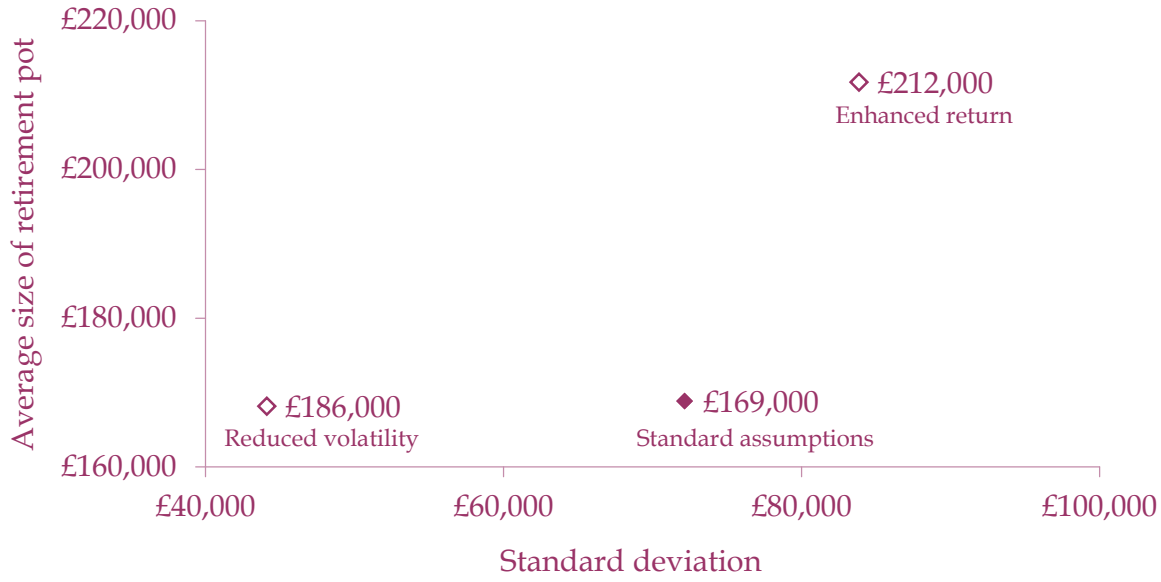
	Standard assumptions	Enhanced return	Reduced volatility
Average outcome	£169,000	£212,000	£168,000
Standard deviation	£72,200	£83,900	£44,100

In Alex's case, the increase in pot size resulting from a 1% a year return enhancement is around 25%, which is larger than the corresponding result for Frances (Figure 3.10).

Figure 3.10[44]

Both higher return and reduced uncertainty strategies achieve an increased effect for those working longer

Potential average pot sizes at five years after SPa for median earner who contributes 8% of total salary to their pension each year between age 22 and Spa, and then works an extra five years part-time, under investment strategies aimed at increasing return or reducing volatility



A comparison of the relative benefits of enhanced returns or reduced volatility is created by viewing Frances and Alex's outcomes side by side.[45] The gradient of the potential trade-off between risk and return is shallower for Alex than for Frances, highlighting that the benefit of reducing volatility is (relatively) greater in Alex's case. The difference in the gradients in this case is 1.7%, with Alex's gradient at 98.3% compared to Frances' 100%.

43 PPI Individual Model and Economic Scenario Generator

44 PPI Individual Model and Economic Scenario Generator

45 With the scales normalized and the results using the standard assumptions aligned

Who might benefit most from enhanced returns?

Scheme members who will benefit most from higher investment returns

While all scheme members would generally benefit from increased returns or reduced volatility, some might receive more potential benefit from one strategy over another. These include: those who work for longer, both higher and lower earners, those with patchy work and contribution records, home owners and those with DB savings.

Although Alex (who worked for longer) benefited relatively more from reduced volatility, there are several other key characteristics which could mean that people will benefit from a strategy geared more towards enhanced returns. Combinations of characteristics are not modelled, so the effect of each characteristic can be isolated:

- Higher earners,
- Those who accumulate marginal amounts of savings,
- Those with patchy work and contribution patterns,
- Home owners, and
- Those with DB savings.

In order to illustrate the impact of different asset allocation scenarios on individuals with the above characteristics, this analysis shows the gradient of outcomes achieved by those who might benefit from an asset allocation strategy focused on enhanced returns, rather than reduced volatility. This report does not highlight the proportions of members who would fit into each characteristic, as many members will benefit from staying in the default investment strategy and some members will fit into several categories. Instead, the examples illustrate the types of characteristics which may be associated with members who might benefit from having their contributions invested in a strategy which seeks higher returns or lower volatility than the average found in default investment strategies.

The individuals modelled share the same working and contributing history as Frances, the base case, except for in the noted ways.

Sam is a higher earner, earning at the 95th percentile for their age, averaged between genders, and has a gradient of 105.4%[46]

Sam's pension pot at retirement, after taking a 25% tax-free lump sum, could be around £447,000 (2021 earnings terms), compared to around £186,000 for Frances, the base case. Sam has an 80% probability of achieving the PLSA's moderate living standard income target. Sam is in a stronger financial position, with a larger pot size, and is able to tolerate a greater degree of risk within their investment portfolio. This, in turn, allows a higher level of return to be pursued than for Frances.

Jordan is a lower earner, earning at the 35th percentile for their age, accumulates marginal amounts of savings and has a gradient of 100.1%, marginally above the base case[47]

Jordan's pension pot at retirement, after taking a 25% tax-free lump sum, could be around £154,000 (2021 earnings terms), compared to around £186,000 for Frances, the base case. Jordan has 0% probability of achieving the PLSA's Moderate Living Standard Income Target. Although Jordan is in a weaker financial position than Frances, reducing the level of risk in the portfolio can be counter-productive, since it comes at the cost of a reduction in expected returns in a relatively small pot. As Jordan's pot is unlikely to represent a significant increase in retirement income, there is less need to ensure that the capital is preserved, and therefore less requirement to focus on reduced volatility. The modelling implies that the risk-return trade-offs for Jordan and Frances (i.e., for the low- and the median-earner) are very similar.

46 See Appendix 2 for more details

47 See Appendix 2 for more details

Eli and Billie have patchy work and contribution patterns[48] and have gradients of 103.6% and 105.0% respectively, while Jules leaves work at age 49, and has a gradient of 98.4%[49]

Eli and Billie have smaller pension pots at SPa, of £64,000 and £53,000 respectively (2021 earnings terms, after the 25% tax-free lump sum has been withdrawn). Jules, who works for a longer time in total, reaches SPa with a pot of £148,000. In each of these situations, retirement pots are smaller than in the base case. This is to be expected, since in each case there is a period where no retirement saving is occurring. The late-career break (which may be precipitated, for example, by the need to care for an older relative, such as a parent) has a smaller impact than the other two situations considered because it takes place after the key early- and mid-career retirement saving years. Contributions to the pension pot in those years have longer to generate investment growth. In the late-career break scenario, the investment case relatively favours a focus on risk reduction rather than on return maximisation.

For both the individual who leaves the workforce between ages 26 and 42 (which represents the average age at which parental leave is taken, and the average duration of such leave) or who joins it late, the average pot size in our model reaches barely one third of the base case scenario. Retirement income targets are unlikely to be met. For these individuals, the investment case supports a greater focus on generating higher investment returns, rather than on reducing risk.

At first sight, this may appear at odds with the pattern among the other results, in which less wealth and a higher probability of failing to reach retirement income goals have tended to be associated with a reduced capacity to tolerate investment risk. For these individuals, however, whose average pot sizes are the smallest of all the scenarios considered in this report, our modelling implies that a greater emphasis on return is appropriate. This is because the majority of the retirement provision for these individuals comes from other sources, mainly State Pension provision and benefits, putting a floor beneath the potential impact if investment returns are poor. For the smallest pension pots, as well as the largest, the upside from investment risk can outweigh the downside.

Dorian has the national average of DB entitlement, and DC savings (for those with both), and has a gradient of 318.1%[50]

For the purposes of comparison, this analysis explores the gradients of income between Dorian and George, who has the average level of DC savings for their cohort and a gradient of 183.1%. At retirement, Dorian's annual income is £13,100, compared to £11,800 for George. Neither Dorian nor George have a chance of achieving the PLSA's Moderate Living Standard Income Target.

DC savings that supplement a DB pension entitlement present a different investment situation than savings which are the sole or primary form of retirement saving. A DB pension provides a stable, predictable source of income. A DC arrangement which is additional to a DB pension can afford to have less regard to risk, since the DB benefit acts as an underpin to the State Pension. Therefore, Dorian's preference within the investment strategy is for a greater focus on enhancing returns, rather than on reducing risk.

Who might benefit from reduced volatility?

There are also several key characteristics which could mean that people will benefit from a strategy geared more towards reduced volatility than enhanced returns:

- People who stop contributing at younger ages (before SPa),
- People who use UFPLS,
- People who purchase an annuity, and
- Those without supplementary savings.

48 Eli withdraws from the employed workforce at age 26, return to work part-time at age 42 and subsequently restart pension contributions at age 50. Billie works casually or is self-employed until age 45 and then joins the employed workforce and starts contributing to their pension.

49 See Appendix 3 for more details

50 See Appendix 4 for more details

In order to illustrate the impact of different asset allocation scenarios on individuals with the above characteristics, this analysis shows the gradient of outcomes achieved by those who might benefit from an asset allocation strategy focused on reduced volatility rather than enhanced returns.

The individuals modelled share the same working and contributing history as Frances, the base case, except for in the noted ways.

Ali leaves work and stops contributing at age 55, at which point they start drawing down from their pension; they have a gradient of 93.5%[51]

As a result of taking their private pension early, Ali's pot size at SPa (after the 25% tax-free lump sum is taken) is £104,000, 44% smaller than it would have been had they worked and contributed until SPa. Ali has a less than 1% probability of achieving a moderate standard of living in retirement as a result of taking their pension pot early. Ali is less likely to achieve income adequacy targets than those who work to SPa or above. Like them, however, higher returns or reduced investment volatility could both help improve Ali's chances of achieving an adequate retirement income. Higher contributions while in work and/or changes to means-tested benefits could also help Ali, though these are not considered in the analysis. The relative benefits of reduced investment volatility (rather than of enhanced investment returns) are greater in Ali's case because they are more dependent on their DC income to support them up until SPa, and volatility could lead to a lower income both before and after SPa. The gradient of the trade-off for Ali is less steep than the gradient of the trade-off for Frances, highlighting that the benefit of reducing volatility is (relatively) greater in Ali's case.

Val uses UFPLS to take their pension and has a gradient of 94.9%, while Chris purchases an annuity after withdrawing their 25% tax-free lump sum and has a gradient of 99.6%[52]

This comparison is based on the level of income that the participant receives 10 years after retirement. 10 years after SPa, Val's annual income from State and private pensions on average is £17,100 and Chris' is £16,300. They have 9% and 5% chance of meeting the PLSA Moderate Income Target, respectively.

Val and Chris both have gradients just under 100%, in comparison to Frances, and therefore are more likely to fare better with an asset allocation strategy aimed at reducing volatility, although the difference is marginal in Chris' case. Their need to take an income from their pot, or apply it to the purchase of an annuity, without re-investing it in a return-seeking product (such as drawdown) means that they are likely to be more sensitive to increases in volatility which will affect either the amount available to withdraw (UFPLS) or the annuity rate.

The relative effect of reducing volatility compared to enhancing returns is very similar for Chris and Frances, meaning that the expectation regarding whether or not a scheme member will purchase an annuity on reaching retirement may not be a significant consideration in investment strategy while working. Unlike Chris, Val may prefer greater emphasis on reducing investment volatility relative to the base case of Frances.

George has DC savings at the national average level for their age, no other supplementary savings, and a gradient of 183.1%[53]

Those solely saving into a DC scheme will generally have lower retirement incomes than those with both DB and DC savings, as contributions into and incomes from DB schemes tend to be higher. George's total annual income at SPa is £11,800, compared to an individual with average entitlement and savings for both DB and DC (Dorian). George has less than 1% chance of achieving the PLSA Moderate Income Target. As a result of having no other supplementary savings, but having sufficient DC savings to make a difference to their retirement income, George will be more sensitive to, and potentially negatively affected by, volatility in their investments which affect the overall pot size at retirement and, as a corollary, retirement income levels. Therefore, a strategy

51 See Appendix 5 for more details

52 See Appendix 6 for more details

53 See Appendix 4 for more details

which aims to reduce volatility may be an important way of conserving capital. However, George's gradient suggests that a strategy aimed at increasing returns may be more beneficial, so George may wish to remain in the default strategy or take a decision based on their personal risk appetite.

Variation in characteristics may be the rule, rather than the exception

The variations considered above do not cover all of the ways in which members' circumstances and preferences may vary. Some of the variations that we have considered are fairly common (levels of pay differ greatly in practice, and career breaks are common, especially for mothers). Others may be relatively rare. But because there are so many potential variations, most scheme members are likely to differ in some way from the base case assumptions used in the design of the default investment strategy.

Conclusions

Improving on default investment strategies depends, for some types of scheme member, on finding opportunities to enhance returns and, for others, on finding ways to reduce volatility and to protect against losses

This report has considered the impact on investment strategy of several variations in member circumstances that are common in practice, but are generally not reflected in the design of default investment strategies.

There are several characteristics that would make it appropriate to place a greater focus on enhancing returns. These include those scheme members who are in a strong financial position (e.g., high earners, those with assets outside the pension scheme, or those who continue to earn income through part-time work after retirement), and those who join the workforce late or take a career break to raise children.

There are, in contrast, also some characteristics that would make it appropriate to place a greater focus on reducing risk. These include scheme members who retire at younger ages, and those who access their pension pots through the Uncrystallised Fund Pension Lump Sums (UFPLS) mechanism.

There are several policy options for ensuring that DC default investment strategies meet the needs of a wider number of members

1. Explore ways of increasing the allocation to alternative assets within DC default investment strategies.
2. Use existing data on members, such as pot size, in order to provide prompts about using non-default (self-select) investment strategies.
3. Gather more data on members in order to make DC default investment strategies more tailored, or to provide prompts about non-default (self-select) investment strategies.

Appendix 1: Modelling in this report

All financial amounts are reported in current (2021) earnings terms.

The PPI Individual Model

The Individual Model is the PPI's tool for modelling an illustrative individual's income during retirement. It can model income for different individuals under current policy, or look at how an individual's income would be affected by policy changes. This income includes benefits from the State Pension system and private pension arrangements, and can also include income from earnings and equity release. It is useful to see how changes in policy can affect individuals' incomes in the future.

The PPI's Individual Model calculates streams of retirement incomes for constructed individuals. The streams of income include State Pension, private pension and various state benefits in retirement. The Individual Model uses flexible policy parameters to define the pension landscape throughout the individual's working life and retirement. The individual is constructed by setting out the work history in terms of working patterns and salary level throughout their working life, along with pension scheme membership details.

Individuals modelled were given a full work history to provide an appropriate existing pension wealth in 2021. From 2021, these individuals invested in different funds with different expected returns and volatility. Different glide paths/asset allocations were followed for those investing in the higher risk fund.

At retirement, individuals exhibited one of three illustrative behaviours through retirement:

- Withdrawing 25% of their pension wealth as a tax-free lump sum at retirement, then drawing an income from their remaining wealth, initially at a rate of 3.5% of their pension wealth and increasing the amount in line with the Consumer Price Index (CPI) until they have exhausted their pot.
- Withdrawing 25% of their pension wealth as a tax-free lump sum at retirement, then drawing an income through the purchase of a level lifetime annuity.
- Drawing an income from their uncrystallised fund, initially at a rate of 3.5% of their pension wealth and increasing the amount in line with CPI until they have exhausted their pot (UFPLS). On average, under this assumption people would run out of their capital in around 30 years.

This gives an indicative income to quantify the impact of their private pension saving in accumulation.

The individual's lifecourse and investment strategy are then changed to produce outputs within this report. All results have been run stochastically.

Lifecourses

Lifecourses in this report are based on the WHERL report.[54]

Figure A1.1 Lifecourse for males and females

Male lifecourses	Proportion
Full-time	45%
Unemployed mostly (Age 30 onwards)	4%
Full-time exit at age 49	12%
Full-time exit at age 60	30%
Late start age 23, exit at age 60	9%
Female lifecourses	**Proportion**
Full-time	27%
Unemployed mostly (Age 30 onwards)	17%
Full-time exit at age 49	7%
Caring for 16 years, part-time return	12%
Caring for 4 years, part-time return	13%
Caring for 10 years, return full-time	18%
Part-time from age 23	6%

Lifecourses modelled in table A1.1 were used to obtain the expected pension wealth. These represent the potential paths an individual could take through their adult working lives.

Investment strategies

3,000 scenarios were generated for each investment strategy. The investment strategies modelled are as follows:

Base fund

The investment returns have been set to 5.3% in line with the Office for Budget Responsibility's (OBR) forecast of asset yields from the Economic and Fiscal Outlook (EFO).[55] This assumes a 69:19:12 equity: bond: cash ratio and the FTSE all share historical dividend yield is 3.7%. A 10-year de-risking glide path was modelled, based on a linear progression between the default funds and retirement funds currently available in the pensions industry.

Higher risk fund

A higher risk fund was modelled by altering the glide path within the model. The glide path used is based on fund factsheets of higher risk funds currently available in the pensions industry.

Varied funds

New scenarios were generated for each fund such that the overall investment return and volatility over the individual's life increased/decreased by the desired amount. The funds created include:

- A fund where the overall investment return remains the same and the volatility decreases by 25%.
- A fund where the overall investment return increases by 1% and the volatility remains the same.
- A fund where the overall investment return increases by 1% and the volatility decreases by 25%.
- A fund where the overall investment return increases by 1% and the volatility increases by 25%.
- A fund where the overall investment return decreases by 2% and the volatility decreases by 33%.

Key assumptions

Except where explicitly stated in the report, the key assumptions used in the report are detailed below.

54 WHERL (2017) *The Wellbeing, Health, Retirement and the Lifecourse Project*

55 Office for Budget Responsibility (2021), Economic and fiscal outlook – March 2021

The pensions system

The pensions system modelled is as currently legislated. The triple lock is assumed to be maintained. Individuals are assumed to be either members of a Defined Contribution (DC) or Defined Benefit (DB) occupational pension scheme.

Other economic assumptions

Other economic assumptions are taken from the OBR's EFO[56] (for short-term assumptions) and Fiscal Sustainability Report[57] (for long-term assumptions).

Limitations of analysis

Care should be taken when interpreting the modelling results used in this report. In particular, individuals are not considered to change their behaviour in response to investment performance. For example, if investments are performing poorly, an individual may choose to decrease their withdrawal rate and vice versa.

Key results

The key output from the model is the built-up pension wealth and entitlement over the course of the individual's work history, and the post-retirement income that results from this. The post-retirement income is presented as projected cashflows from retirement over the future lifespan of the individual. These are annual cashflows which include the following key items:

- State Pension
  - They reflect entitlement and the projected benefit level of State Pension components.
- Private pension
  - They are derived from the decumulation of the pension pot, allowing for tax-free cash lump sum and the chosen decumulation style (e.g., annuity or drawdown).
- Other State benefits
  - Other benefits contributing to post-retirement income, such as Pension Credit.
- Tax
  - Tax payable on the post-retirement income, to understand the net income available to the individual.

These cashflows are calculated as nominal amounts and restated in current earnings terms.

Outcomes are expressed in current earnings terms for two reasons; it improves the comprehension of the results and reduces the liability of either overly optimistic or cautious economic assumptions.

Application of output

The model is best used to compare outcomes between different individuals, policy options, or other scenarios. The results are best used in conjunction with an appropriate counterfactual to illustrate the variables under test.

Key data sources

The specification of a model run is based upon three areas:

The individual

The individual to be modelled is specified based upon an earnings and career profile. Saving behaviour for private pension accumulation is considered, as well as the behaviour at retirement.

These are generally parameterised according to the project in question, designed to create vignettes to highlight representative individuals of the groups under investigation.

56 Office for Budget Responsibility (2021), Economic and fiscal outlook – March 2021

57 Office for Budget Responsibility (2020), Fiscal sustainability report – July 2020

The policy options

The policy option maps the pension framework in which the individual exists. It can accommodate the current system and alternatives derived through parameterisation. This allows flexing of the current system to consider potential policy options to assess their impact upon individuals under investigation.

This area has the scope to consider the build-up of pensions in their framework, such as the automatic enrolment regulations for private pensions and the qualification for entitlement to State benefits.

The framework in retirement allows for the tax treatment and decumulation options taken by the individual, as well as other sources of State benefits which influence the post-retirement outcomes for individuals.

Economic assumptions

The deterministic assumptions used in this analysis are taken from the OBR's EFO to ensure consistency. They cover both historical data and future projected values.

Adequacy standards

PLSA Retirement Living Standards

The Retirement Living Standards produced by the Pensions and Lifetime Savings Association (PLSA) are based on the Minimum Income Standards (MIS) research supported by the Joseph Rowntree Foundation (JRF) and carried out by the Centre for Research in Social Policy (CRSP) at Loughborough University. It determines an annual target income under three different Retirement Living Standards (Minimum, Moderate and Comfortable) for those living in-London and outside London, and for single-person and couple households.

The Standards as shown below:[58]

PLSA Retirement Living Standards	Single households		Couple households	
	Outside London	London	Outside London	London
Minimum	£10,500	£12,700	£16,100	£20,300
Moderate	£20,700	£24,700	£29,900	£34,200
Comfortable	£33,900	£37,300	£48,800	£50,600

Figures have been uprated using earnings inflation.

JRF Minimum Income Standards (MIS)

The MIS is based on the public views on a minimum socially acceptable standard of living in the UK today. This was done by specifying a basket of goods and services required by a household.[59]

MIS targets were obtained using the minimum income calculator,[60] which is based on the research conducted for the MIS. The table below shows the figures used in our modelling:

Weekly Minimum Income Standards (2020)	Single household	Couple household
The UK outside London	£205.18	£317.87

This approach includes housing costs within the standard, and figures have been uprated using earnings inflation.

58 Pensions and Lifetime Savings Association (2019), Developing Retirement Living Standards

59 Joseph Rowntree Foundation (2020), A Minimum Income Standard for the United Kingdom in 2020

60 https://www.minimumincome.org.uk , accessed September 2021

Data sources

Fund factsheets

Asset allocations of funds from workplace pension providers were used to determine the progression and length of the de-risking process prior to retirement.

Rental costs

The average monthly rent used in the model was sourced from the Office of National Statistics (ONS). Monthly rent of two-bedroom properties in England were used to model average rent for the individuals in the model. This value was taken off the total retirement income to give the remaining disposable income available to the individual each year.[61]

DB and DC wealth

Analysis of the Wealth and Assets Survey (WAS) and Wealth in Great Britain data tables has been used to inform the individuals modelled in Chapter 3.[62]

Typical pension wealth not yet in payment for an individual at this age is £93,900. Analysis of microdata from the latest WAS suggests a split attributing 20% of this to DC savings and the remainder to DB savings. This means that we have parameterised the individual at the age of 55 to have accrued DC savings of £18,800 and a DB entitlement of £2,400 a year, payable from retirement. We have assumed that from age 55 to retirement they continue to accrue DC savings based upon a contribution rate of 8% of earnings.

Typical pension wealth not yet in payment for an individual at this age who only has DC pension wealth is £26,700. At age 55, the individual has accrued DC savings of £26,700 and no DB entitlement. We have assumed that, from age 55 to retirement, they continue to accrue DC savings based upon a contribution rate of 8% of earnings.

61 Office for National Statistics (ONS) (2021), Private Rental Market Statistics, Table 1.4

62 Office for National Statistics (ONS) (2019), Pension wealth: wealth in Great Britain, Table 6.8

Appendix 2: Sam and Jordan - a higher earner, earning at the 95th percentile for their age and a lower earner, earning at the 35th percentile for their age

High earners can afford to take more risk in their pension investment strategy, while lower earners may wish to enhance returns due to low expected pot sizes

Jordan is identical to Frances in every regard, except that they earn below median earnings (being at the 35th percentile of national earnings, rather than the median) (Figure A2.1).

Figure A2.1: Jordan's working-life and contribution patterns

- Works from age 22 to State Pension age (SPa)
- Earns at the 35th percentile for their age, averaged between genders,
- Contributes 8% of total salary to their pension each year between age 22 and SPa,
- Is aged 55 in 2021,
- Retires at SPa (age 67 in this case),
- Withdraws 25% tax-free lump sum and spends it,
- Draws down a pension income from that date from an income drawdown vehicle at a rate of 3.5% of the original amount (uprated each year by the Consumer Price Index (CPI)).

Sam is identical to Frances in every regard, except that they earn above median earnings (being at the 95th percentile of national earnings, rather than the median) (Figure A2.2).

Figure A2.2: Sam's working-life and contribution patterns

- Works from age 22 to State Pension age (SPa)
- Earns at the 95th percentile for their age, averaged between genders,
- Contributes 8% of total salary to their pension each year between age 22 and SPa,
- Is aged 55 in 2021,
- Retires at SPa (age 67 in this case),
- Withdraws 25% tax-free lump sum and spends it,
- Draws down a pension income from that date from an income drawdown vehicle at a rate of 3.5% of the original amount (uprated each year by CPI).

Sam, who is a high earning individual, is in a strong financial position. They are able to tolerate a greater degree of risk within their investment portfolio. This in turn allows a higher level of return to be pursued than for Frances (the base case).

That logic does not, however, apply in reverse to Jordan, who is a low earner. Although Jordan is in a weaker financial position, reducing the level of risk in the portfolio can be counter-productive since it comes at the cost of a reduction in expected returns. The modelling implies that the risk-return trade-offs for Jordan and Frances (i.e., for the low- and the median-earner) are very similar (Figure A2.3).

Figure A2.3: Variation in the risk-return trade-off for high- and low-earners.[63]

Age of retirement	Base case (Frances)	High earner (Sam)	Low earner (Jordan)
Average (mean) outcome (pension pot at SPa) after 25% tax-free lump sum is taken	£186,000	£447,000	£154,000
Standard deviation	£63,400	£148,400	£52,400
Average total annual income at SPa	£15,200	£24,300	£14,700
Standard deviation	£1,900	£4,300	£1,600
Probability of failing to achieve JRF MIS	<1%	<1%	<1%
Average shortfall below JRF MIS	n/a	n/a	n/a
Probability of failing to achieve PLSA mod	98%	20%	>99%
Average shortfall below PLSA mod	£4,986	£1,505	£6,053
Gradient (% of base case)	100%	105.4%	100.1%

63 For individuals retiring at age 70 or 75, the comparison is based on pot sizes at retirement.

Appendix 3: Eli, Billie and Jules - patchy work and contribution patterns

Eli is identical to Frances in every regard, except that they withdraw from the employed workforce at age 26, return to work part-time at age 42 and subsequently restart pension contributions at age 50 (Figure A3.1).

Figure A3.1: Eli's working-life and contribution patterns

- Works from age 22 to age 26
- Returns to work at age 42 and works part-time for eight years
- Returns to full-time work at age 50 and contributes until SPa
- Earns at median levels for their age and job type, averaged between genders
- Retires at SPa (age 67 in this case),
- Withdraws 25% tax-free lump sum and spends it,
- Draws down a pension income from that date from an income drawdown vehicle at a rate of 3.5% of the original amount (uprated each year by the Consumer Price Index (CPI)).

Jules is identical to Frances in every regard, except that they withdraw from the employed workforce at age 49 and do not return (Figure A3.2).

Figure A3.2: Jules' working-life and contribution patterns

- Works from age 22 to age 49
- While in work, contributes 8% of total earnings to their pension,
- Earns at median levels for their age and job type, averaged between genders
- Withdraws 25% tax-free lump sum when pot is accessed and spends it,
- From age 55 draws down a pension income from an income drawdown vehicle at a rate of 3.5% of the original amount (uprated each year by CPI).

Billie is identical to Frances in every regard, except that they work casually and/or are self-employed until age 45 and then join the employed workforce (Figure A3.3).

Figure A3.3: Billie's working-life and contribution patterns

- Is self-employed until age 45
- Works from age 45 to State Pension age (SPa)
- Earns at median earnings for their age, averaged between genders,
- Contributes 8% of total salary to their pension each year between age 22 and SPa,
- Is aged 55 in 2021,
- Retires at SPa (age 67 in this case),
- Withdraws 25% tax-free lump sum and spends it,
- Draws down a pension income from that date from an income drawdown vehicle at a rate of 3.5% of the original amount (uprated each year by CPI).

These indices consider a variety of different career events: career breaks to raise a child or provide care to a relative, or joining the workforce late.

In each of these situations, retirement pots are smaller than in the base case. This is to be expected, since in each case there is a period where no retirement saving is occurring. The late-career break (which may be precipitated, for example, by the need to care for a relative, such as a parent) has a smaller impact than the other two situations considered; this is because it takes place after the key early- and mid-career retirement saving years. Contributions to the pension pot in those years have longer to generate investment growth. In the late-career break scenario, the investment case relatively favours a focus on risk reduction rather than on return maximisation.

For both the individual who leaves the workforce between ages 26 and 42 (which represents the average age at which parental leave is taken, and the average duration of such leave) or who joins it late, the average pot size in our model reaches barely one third of the base case scenario. Retirement income targets are unlikely to be met. For these individuals, the investment case supports a greater focus on generating higher investment returns, rather than on reducing risk.

At first sight, this may appear at odds with the pattern among the other results, in which less wealth and a higher probability of failing to reach retirement income goals have tended to be associated with a reduced capacity to tolerate investment risk. For these individuals, however, whose average pot sizes are the smallest of all the scenarios considered in this report, our modelling implies that a greater emphasis on return is appropriate. This is because the majority of the retirement provision for these individuals comes from other sources – mainly State Pension provision – putting a floor beneath the potential impact if investment returns are poor. For the smallest pension pots, as well as the largest, the upside from investment risk can outweigh the downside (Figure A3.4).

Figure A3.4: The effect of variation in life experiences, on outcomes[64]

	Base case	Career break ages 26-41 (Eli)	Career break at age 49 (Jules)	Enters workforce at age 45 (Billie)
Average pot size at SPa, after 25% tax-free lump sum is taken	£186,000	£64,000	£148,000	£53,000
St'd deviation	£63,400	£18,800	£54,200	£14,700
Average income	£15,200	£12,000	£14,700	£11,700
St'd deviation	£1,900	£800	£1,600	£700
Prob (below JRF MIS)	<1%	2%	<1%	5%
Average shortfall	n/a	£149	n/a	£1,052
Prob (below PLSA mod)	98%	>99%	>99%	>99%
Average shortfall	£4,986	£8,699	£6,063	£9,077
Gradient (% of base case)	100%	103.6%	98.4%	105.0%

64 For individuals retiring at age 70 or 75, the comparison is based on pot sizes at retirement.

Appendix 4: Dorian and George – saving in both DB and DC versus saving in DC only

Defined Contribution (DC) scheme members who are also Defined Benefit (DB) scheme members can afford to take more risk in their pension investment strategy

George is identical to Frances in every regard, except that their DC pot is the same as the national average (for a person with no DB entitlement) (Figure A4.1).

Figure A4.1: George's working-life and contribution patterns

- Works from age 22 to State Pension age (SPa)
- Earns at median levels for their age, averaged between genders,
- Has an accrued DC pension pot at the average level for their age,
- Is aged 55 in 2021,
- Retires at SPa (age 67 in this case),
- Withdraws 25% tax-free lump sum and spends it,
- Draws down a pension income from that date from an income drawdown vehicle at a rate of 3.5% of the original amount (uprated each year by CPI).

Dorian is identical to Frances in every regard, except that their DC pot is the same as the national average for their age (and for someone with DB entitlement), in addition, they have DB pension entitlement, at the average level for their age (and for someone with DC entitlement) (Figure A4.2).

Figure A4.2: Dorian's working-life and contribution patterns

- Works from age 22 to State Pension age (SPa)
- Earns at median levels for their age, averaged between genders,
- Has an accrued DC and DB savings and entitlement at the average level for their age,
- Is aged 55 in 2021,
- Retires at SPa (age 67 in this case),
- Withdraws 25% tax-free lump sum from the DC & DB savings and spend them,
- Draws down a pension income from that date from an income drawdown vehicle at a rate of 3.5% of the original amount (uprated each year by CPI).

DC savings that supplement a DB pension entitlement presents a different investment situation than savings which are the sole or primary form of retirement saving. A DB pension provides a stable, predictable source of income. A DC arrangement which is additional to a DB pension can afford to have less regard to risk, since the DB benefit acts as an additional underpin with the State Pension.

Even though George's DC pot is larger, on average than Dorian's, their total retirement income is lower, as Dorian also receives a DB income. Neither George nor Dorian is likely to meet the Minimum Income Standard. This is because, unlike Frances, they have not been saving consistently from a young age, but rather have accrued entitlements only in line with the average DB and DC scheme member. In this section, it is the comparison of George to Dorian that is of primary interest (rather than a comparison to Frances). That comparison confirms that Dorian's preference within the investment strategy is for a greater focus on enhancing returns, rather than on reducing risk (Figure A4.3)

Figure A4.3: Variation in the risk-return trade-off for Scheme members who are also members of DB schemes.[65]

	DC only beneficiary (George)	DC+DB beneficiary (Dorian)
Average total annual income at SPa	£11,800	£13,100
Standard deviation	£700	£700
Probability of failing to achieve JRF MIS	2%	<1%
Average shortfall below JRF MIS	£142	n/a
Probability of failing to achieve PLSA mod	>99%	>99%
Average shortfall below PLSA mod	£8,915	£7,640
Gradient (% of base case)	183.1%	318.1%

65 PPI Individual Model and Economic Scenario Generator

Appendix 5: Ali – stops contributing at age 55

Those who cease contributing at younger ages may benefit most from reduced investment volatility

The next variation considered from the base case is an individual, Ali, who retires early. Many people may need to leave work involuntarily as a result of redundancy, health problems or needing to provide care to older relatives or a partner. Ali is identical to Frances in every regard, except that they retire at age 55.

Figure A5.1: Ali's working-life and contribution patterns

- Works from age 22 to State Pension age (SPa)
- Earns at median levels for their age, averaged between genders,
- Contributes 8% of total salary to their pension each year between age 22 and age 55,
- Is aged 55 in 2021,
- Retires at age 55,
- Withdraws 25% tax-free lump sum and spends it,
- Draws down an annual pension income from that date from an income drawdown vehicle at a rate of 3.5% of the original amount (uprated each year by the Consumer Price Index (CPI)).

Because Ali retires from work at age 55, rather than working until SPa as Frances does, they have a smaller pension pot as a result of:

- Ceasing to contribute between ages 55 and 67 and
- Taking income from a drawdown product from age 55 at 3.5% + CPI uprating, instead of from SPa

As a result of taking their private pension early, Ali's pot size at SPa is 44% smaller than it would have been had they worked and contributed until SPa. Ali is more than 60% less likely to achieve a minimally acceptable standard of living and almost certain to fail to achieve a moderate standard of living in retirement as a result of taking their pension pot early (Figure A5.2).

Figure A5.2: The distribution of outcomes for Ali, compared to Frances, who stops working at age 55 and starts to draw their pension (2021 earnings terms)[66]

	Frances	Ali
Average (mean) outcome (pension pot at SPa) after 25% tax-free lump sum is taken	£186,000	£104,000
Standard deviation	£63,400	£48,900
Average total annual income at SPa	£15,200	£13,500
Standard deviation	£1,900	£600
Probability of failing to achieve JRF MIS	<1%	<1%
Average shortfall below JRF MIS	n/a	n/a
Probability of failing to achieve PLSA mod	98%	>99%
Average shortfall below PLSA mod	£4,986	£7,205
Gradient (% of base case)	100%	93.5%

66 PPI Individual Model and Economic Scenario Generator

Ali is less likely to achieve income adequacy targets than both Frances and Alex (who continued to work for longer). Like them, however, higher returns or reduced investment volatility could help improve Ali's chances of achieving an adequate retirement income (though higher contributions while in work and/or changes to means-tested benefits could also help Ali) (Figure A5.3).

Figure A5.3: The effect of changes to the investment return assumptions for Ali (who retires early)[67]

	Standard assumptions	Enhanced return	Reduced volatility
Average pension pot at SPa after 25% tax-free lump sum is taken	£104,000	£128,000	£104,000
Standard deviation	£48,900	£55,500	£28,800
Probability of failing to achieve JRF MIS	<1%	<1%	<1%
Probability of failing to achieve PLSA mod	>99%	>99%	>99%

Unlike Alex, however, it is the relative benefits of reduced investment volatility (rather than of enhanced investment returns) that are greater in Ali's case. The gradient of the trade-off for Ali is less steep than the gradient of the trade-off for Frances, highlighting that the benefit of reducing volatility is (relatively) greater in Ali's case. The difference in the gradients in this case is 6.5%.

The risk-return trade-off changes as retirement age increases

For Ali, who retires early, the benefit of reduced volatility is greater, relative to the benefit of enhanced returns, than for Frances (the base case). In other words, an investment strategy that is designed to meet the needs of Frances is likely, other things being equal, to focus more on the maximisation of return and less on the management of risk than an investment strategy designed to meet the needs of Ali.

As retirement age varies, so too does this trade-off (Figure A5.4).

Figure A5.4: The effect on outcomes of variations in retirement age[68]

Age of retirement	67 (Frances – base case)	55 (Ali)	60	70	75
Average pot size @SPa + eight years (age 75) after 25% tax-free lump sum is taken	£149,000	£84,000	£105,000	£184,000	£258,000
St'd deviation	£59,700	£55,700	£52,800	£84,500	£134,800
Average income at age 75	£15,300	£13,200	£14,100	£15,900	£16,900
St'd deviation	£1,900	£900	£1,400	£2,100	£2,400
Prob (below JRF MIS)	<1%	1%	<1%	<1%	<1%
Average shortfall	n/a	£605	n/a	n/a	n/a
Prob (below PLSA mod)	98%	>99%	>99%	97%	93%
Average shortfall	£5,483	£7,485	£6,605	£5,031	£4,524
Gradient (% of base case)	100%	86.4%	94.0%	97.3%	94.2%

67 PPI Individual Model and Economic Scenario Generator

68 For individuals retiring at age 70 or 75, the comparison is based on pot sizes at retirement

Appendix 6: Val and Chris – Using UFPLS and purchasing an annuity

Scheme members who access their pension with Uncrystallised Fund Pension Lump Sums (UFPLS) may prefer a greater emphasis on reducing investment volatility

Val is identical to Frances in every regard, except that they use the UFPLS mechanism (in which 25% of every withdrawal is tax-free) to increase retirement income instead of taking their 25% tax-free lump sum and entering drawdown. This has the effect of increasing the pre-tax income generated by the pension pot by one third (Figure A6.1).

Figure A6.1: Val's working-life and contribution patterns

- Works from age 22 to State Pension age (SPa)
- Earns at median levels for their age, averaged between genders,
- Contributes 8% of total salary to their pension each year between age 22 and SPa,
- Is aged 55 in 2021,
- Retires at SPa (age 67 in this case),
- Draws down a pension income from that date from his pension pot using UFPLS at a rate of 3.5% of the original amount (uprated each year by the Consumer Price Index (CPI)).

Chris is identical to Frances in every regard, except that they purchase a lifetime annuity. In this case, the pension pot is used to purchase a lifetime annuity, rather than drawing down income each year. This has the effect of removing uncertainty with regard to the level of retirement income, but reduces the flexibility (Figure A6.2).

Figure A6.2: Chris' working-life and contribution patterns

- Works from age 22 to SPa
- Earns at median levels for their age, averaged between genders,
- Contributes 8% of total salary to their pension each year between age 22 and SPa,
- Is aged 55 in 2021,
- Retires at SPa (age 67 in this case),
- Withdraws 25% tax-free lump sum and spends it,
- Purchases an annuity at SPa (uprated each year by CPI).

These differences in how the pension pot is accessed do not affect the size of the pot at retirement. This comparison is based on the level of income that the participant receives 10 years after retirement.

Chris receives, on average, a higher income than Frances both at retirement and ten years later. The relative effect of reducing volatility compared to enhancing returns, however, is very similar in both cases. Hence, the expectation regarding whether or not a scheme member will purchase an annuity on reaching retirement is not a significant consideration in investment strategy while working.

Val also receives, on average, a higher income than Frances, partly because they did not take a tax-free cash lump sum. Unlike Chris, however, Val may prefer greater emphasis on reducing investment volatility rather than enhancing returns. (Figure A6.3).

Figure A6.3: The effect on outcomes of variations in income (ten years after retirement) for different choices of accessing retirement savings[69]

	Base case (Frances)	UFPLS (Val)	Annuity (Chris)
Average (mean) income at SPa	£15,900	£18,000	£18,500
Standard deviation at SPa	£1,900	£2,600	£2,800[70]
Average total annual income 10 years after SPa	£15,200	£17,100	£16,300
Standard deviation	£1,900	£2,600	£2,400
Probability of failing to achieve JRF MIS	<1%	<1%	<1%
Average shortfall below JRF MIS	n/a	n/a	n/a
Probability of failing to achieve PLSA mod	99%	91%	95%
Average shortfall below PLSA mod	£5,598	£4,208	£4,801
Gradient (% of base case)	100%	94.9%	99.6%

69 For individuals retiring at age 70 or 75, the comparison is based on pot sizes at retirement.

70 Uncertainty due to variation in pot size at retirement rather than variation in income during retirement

Appendix 7: Additional variations by age

Age which they contribute from	Base case (Frances) age 55 in 2021	Age 22 in 2021
Average pot size at State Pension age (SPa) after 25% tax-free lump sum is taken	£186,000	£152,000
Std deviation	£63,400	£71,200
Average income at SPa	£15,200	£15,400
Std deviation	£1,900	£2,400
Prob (below JRF MIS)	<1%	<1%
Average shortfall	n/a	n/a
Prob (below PLSA mod)	98%	96%
Average shortfall	£4,986	£5,594
Gradient (% of base case)	100%	117.3%

For completeness, this final appendix applies the report's methodology to compare individuals of different ages. In practice, it is already common to apply different asset allocations at different ages within the same default strategy. Consistent with common practice, the results indicate that a younger individual should pursue a strategy with a greater emphasis on enhancing returns than an older individual.

Glossary:

Alternative asset classes: Assets that are not part of conventional investment types such as equities, bonds and cash. Alternative asset classes include private equity, hedge funds, property, commodities and infrastructure.

Currency risk: The risk of significant volatility in asset values arising from investing in assets denominated in a different currency from that of the investor.

Default investment strategy: The investment strategy (collection of funds) in which members will automatically have their contributions invested if they do not make a choice.

Diversification: Investing in a broad range of asset classes with the aim of reducing overall investment risk if there is a downturn in returns from a particular type of asset.

Fixed income: Investments which pay income as fixed interest payments until the maturity of the asset.

Global equity markets: Investment into overseas company shares

Global infrastructure: Investment in physical infrastructure assets such as roads, airports and telecommunications.

Inflation risk: The risk that one's income may lose value relative to the price of goods and services.

Insolvency risk: The risk that the pension provider becomes insolvent.

Investment risk: The risk that market fluctuations or poor investment strategies will deplete a fund's capital.

Lifestyling: Varying asset allocation according to a scheme member's age.

Longevity risk: The risk that individuals could run out of money before their death.

Market risk: The collection of investment-based risk which those invested in pension savings may face, including currency risk, inflation risk, insolvency risk, and investment risk.

Modelling risk: The risk arising from inaccurate or incomplete modelling.

Peer group risk: The risk of performing less well than strategies in other schemes

Pension pot: The amount of money held in a pension savings account at any given time.

Sequencing risk: The risk of making withdrawals during a time of economic downturn, reducing future potential returns from investments.

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Contact: Chris Curry, Director
Telephone: 020 7848 3744
Email: info@pensionspolicyinstitute.org.uk

Pensions Policy Institute
King's College London
Virginia Woolf Building
1st Floor, 22 Kingsway
London WC2B 6LE

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